2018 Air Quality Annual Status Report (ASR)

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

June, 2018

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Data for Loughborough from 2017 indicates that there continues to be a significant reduction in the concentration of NO_2 levels around the town centre since the opening of the Inner Relief Road in November 2014.

The stretches of High Street and Baxter Gate that border on the newly pedestrianised area have fallen from average figures of 56 and 44µg/m^3 over the 5 years before the road was opened, down to 33 and under 30µg/m^3 respectively during the third full year of monitoring (2017) since the road was opened. These figures thus maintain a 3r^d year beneath the Air Quality Objective levels.

A further measurable improvement for residents has also been observed along Barrow Street where concentrations have fallen from 28 to 26µg/m^3 and Ashby Road where concentrations have dropped to under 32 from 35µg/m^3

Whilst these figures continue to be encouraging and help to support one of the main objectives behind the construction of the road, Officers will continue to monitor and report upon their results.

Monitoring at Syston continues to show that NO_2 levels remain consistently beneath the Air Quality Objectives. It is proposed later in this report (Appendix D) that the

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

available data is now sufficient enough to allow us to move forward to the revocation of this existing AQMA.

On-going partnership work with Mountsorrel Quarry (Tarmac) remains, primarily through the integration of relevant bodies over the quarry's Dust Management and Monitoring Plan (DMMP). This document continued to be regularly reviewed by Council Officers and the quarry management team. Implementation of the DMMP continues to identify and refine operational activities, with its focus to ensure that any sources of on-site fugitive dust emissions are continually identified and addressed through appropriate mechanisms to reduce impact to the local community.

Whilst PM_{10} levels have markedly lowered since the introduction of the quarry DMMP, it is apparent that residents still experience episodic concentration impact from local activities; we can however support the suggestion that transboundary movement has played a part in a number of the 24-hour exceedances experienced at Mountsorrel

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

Success is continuing to be been seen in relation to the 2 major air quality areas of concern for the Council, namely the maintained reduction of NO_2 levels in Loughborough town centre and PM_{10} concentrations at Mountsorrel. It is important to recognise that the beneficial outcomes to public health that are being observed for both of these AQMAs are as a direct result of positive actions having been taken (both physically-engineered i.e. the Inner Relief Road, or through the means of successful collaboration i.e. the DMMP), through their identification, evaluation and the implementation of measures designed to mitigate public exposure.

Conclusions and Priorities

The first set of monitoring data has been reported on from our SO_2 monitor located close to the Great Central Railway. Whilst initial site results suggest that concentrations are within the required objective levels of this particular pollutant, we will continue to monitor levels as we are aware that the instrument went through a period of 'teething' issues with a firmware update being applied to the monitor for the later part of the year.

Work will continue to evaluate the benefits of the Loughborough Inner Relief Road scheme, as well as building upon the well-established work already being committed to at Mountsorrel Quarry.

Whilst we are already seeing some of the larger scale infrastructure projects leading to beneficial air quality improvements; challenges are most likely to be seen in ways to evaluate the consequence of the smaller-scale 'softer-option' measures, which by their nature are difficult to quantify their direct contribution and generally often fall outside of the scope of the general Environmental Health daily work remit. Challenges may also be encountered across those actions that fall to County rather than Borough district responsibility, in that it is especially true of needing to respect and maintain an effective line of communication in relation to progress between Authorities.

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

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1 Local Air Quality Management

This report provides an overview of air quality in Charnwood during 2017. 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 to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Charnwood Borough Council can be found in Table 2.1.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at: https://www.charnwood.gov.uk/pages/airpollution

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

In this report we make a proposal to revoke the Syston AQMA (see Appendix D).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Loughborough	Declared 2001, Amended 2004	NO2 Annual Mean	Loughborough	An area encompassing a number of properties around the town centre	NO	Unknown (in excess of 40 µg/m3)	µg/m3	36.0 µg/m3 (Leicester Rd)	µg/m3	Charnwood Local Air Quality Management – Final Action Plan	2006	http://ww
Syston	Declared 2001, Amended 2004	NO2 Annual Mean	Syston	Residential properties along Melton Rd and Sandford Rd	NO	Unknown (in excess of 40 µg/m3)	µg/m3	37.2 µg/m3 (Melton Rd)	µg/m3	Charnwood Local Air Quality Management – Final Action Plan	2006	http://ww
Great Central Railway (GCR)	Declared 2001	SO2 15 Minute Mean	Loughborough	An area encompassing residential properties near The Great Central Railway	NO	Unknown (in excess of 266 µg/m3 more than 35 times a year)	µg/m3	1 incident of >266 µg/m3 recorded during the 2017 monitoring period	µg/m3	Charnwood Local Air Quality Management – Final Action Plan	2006	http://ww

Mountsorrel	Declared 2011	PM10 Annual Mean	Mountsorrel	An area encompassing residential properties near Mountsorrel Quarry	NO	60 recorded exceedences (from 313 valid samples) of the 24 Hr Mean	Exceedances	15 recorded exceedences (from 238 valid samples) of the 24 Hr Mean. Equivalent to 23 for full year	Exceedances	Dust Management and Monitoring Plan	Revised 2017	

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

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

Defra's appraisal of last year's ASR concluded that the monitoring continued to confirm that there were no results, or recent evidence of exceedances above objectives for:

- Central Loughborough AQMA
- Syston AQMA, or
- Mountsorrel AQMA

It was suggested that our monitoring strategy should be reviewed for these AQMAs to confirm whether alternative sites of relevant exposure exist within these AQMAs, prior to reviewing the status of each AQMA as there have been notable improvements in local air quality within central Loughborough and Syston, with links to the positive impact of the inner relief road.

We have reviewed our network of monitors (diffusion tubes) and believe that they currently continue to represent the most appropriate sites within each AQMA to measure relevant exposure whilst giving consideration to security and access etc. issues. It is also felt that our chosen locations in which the tubes are currently situated typically represent a 'worse case' position. We will however continue to review changes to the network as and when circumstances dictate

In terms of the on-going status of the Loughborough and Mountsorrel AQMAs it is felt that the current evidence base is currently too limited to effectively assess the long term impact of the Inner Relief Road / Mountsorrel Dust Management Plan to confidently consider revocation of the declared areas at this time.

Table 2.2 shows an overview of a number of measure/initiatives currently being undertaken (or completed and being evaluated) by Charnwood in pursuit of improving local air quality.

Furthermore many measures Charnwood are seeking to implement are not thought of in isolation but rather form an integral but broader strategic approach within the Borough's Local Plan (2011-2028) Core Strategy. This is a multi-faceted document that is strategically developed to acknowledge the wider perspective with consideration given to current national and local legislative and economic challenges, but still charting a level of control over sustainable development and means to reduce environmental impact throughout the Borough.

In view of Charnwood having no reported exceedances for a number of years; consideration of any further measures to address areas of specific concern through dedicated long-term Action Plans - further than through the Borough's 'Core Local Strategy' - are not considered applicable at this time.

More information on the Local Plan and details towards its measure of progress can be viewed either on the Council website or on the dedicated Local Plan website at, respectively:

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

http://www.localplan.charnwood.gov.uk/content/index.php?id=122

The latest available annual monitoring report (2015-2016) is available to download from:

http://www.localplan.charnwood.gov.uk/user_uploads/files/2015-16%20Annual%20Monitoring%20Report%20Final%20%28inc.%20cover%29.pdf

Charnwood expects the following measures to be completed over the course of the next reporting year:

- Revocation of the Syston AQMA

  Following appraisal of the data and proposal set out in this report, local consultation with relevant bodies will be made with a view to removing the declared Syston AQMA

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Loughborough Eastern Gateway Project	Transport Planning and Infrastructure	Other	Leicestershire County Council + LA Environmental Health	-	-	-	< 40 µg/m3 (annual mean)	Scheme completed. Continuing review	Completed 2011	Evaluation of post - scheme NO_2 levels continuing. Following a sound evidence base, consideration to the revocation of the Loughborough AQMA will be given
2	Loughborough Inner Relief Road	Transport Planning and Infrastructure	Other	Leicestershire County Council + LA Environmental Health	-	-	-	< 40 µg/m3 (annual mean)	Scheme completed. Continuing review	Completed Nov 2014	Evaluation of post - scheme NO_2 levels continuing. Following a sound evidence base, consideration to the revocation of the Loughborough AQMA will be given
3	Epinal Way Junction	Traffic Management	UTC, Congestion management, traffic reduction	Leicestershire County Council + LA Environmental Health	-	-	-	< 40 µg/m3 (annual mean)	Scheme completed. Continuing review	Completed 2014	Evaluation of post - scheme NO_2 levels continuing. Following a sound evidence base, consideration to the revocation of the Loughborough AQMA will be given

4	Mountsorrell Quarry Dust Management Plan (DMMP)	Environmental Permits	Other	Charnwood Borough Council	-	-	Reduction of PM_{10} concentration	<35 exceedance of 50 µg/m3 per year	Continuing review	-	Evaluation of PM_{10} levels continuing Following a sound evidence base, consideration to the revocation of the Mountsorrel AQMA will be given
5	Charnwood Local Plan 2011 to 2028 Core Strategy (Particularly Policy CS 17) https://www.charnwood.gov.uk/files/documents/adopted_core_strategy1/Charnwood%20Local%20Plan%202011%20-%202028%20Core%20Strategy%20Adopted%20November%202015.pdf	Policy Guidance and Development Control	Other policy	Charnwood Borough Council	-	-	Shift from travel by private car to walking, cycling and public transport	6% shift	On-Going	2028	Policy provides significant guidance and measures to mitigate any air quality impacts such as Sustainable Travel Plans and key decision making for all major developments
6	Staff car sharing scheme	Alternatives to private vehicle use	Car & lift sharing schemes	Charnwood Borough Council	-	-	Staff Uptake	-	-	On-going	-
7	CO_2 banding for staff car parking allowance / permits	Traffic Management	Emission based parking or permit charges	Charnwood Borough Council	-	-	-	-	-	On-going	-
8	Taxi Testing to comply with VOSA requirements	Vehicle Fleet Efficiency	Testing Vehicle Emissions	Charnwood Borough Council	-	-	Pass / Failure	-	-	On-going	Yearly test with 6 month interim

9	Civil Parking Enforcement	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	Charnwood Borough Council	-	-	Enforcement Stats	-	Unknown	On-going	Measue to improve traffic flow and reduce congestion
10	Home Working	Promoting Travel Alternatives	Encourage / Facilitate home-working	Charnwood Borough Council	-	-	Uptake	-	Unknown	On-going	-
11	Workplace Challenge Scheme	Promoting Travel Alternatives	Promotion of walking	National but promoted internally by Charnwood Borough Council	-	-	-	-	-	Annual	-
12	Evaluation of fewer parking spaces or higher charges to restrain car access to work or shops	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	Leicestershire County Council + Charnwood Borough Council	-	-	Incorporating the effectiveness of Civil Parking Enforcement (CPE)	-	-	-	-
13	Investment in cycle route network to reach all parts of Loughborough	Transport Planning and Infrastructure	Cycle network	Leicestershire County Council	Unknown	Unknown	Monitoring of %age increase in cycling at counting points across Loughborough	-	Unknown	Unknown	-
14	Increasing bus travel through work on Quality Bus Partnership (QBP)	Alternatives to private vehicle use	Other	Leicestershire County Council	Unknown	Unknown	Unknown	-	Unknown	Unknown	-
15	Increasing travel by train with bus connections to town centre and key destinations	Promoting Travel Alternatives	Promote use of rail and inland waterways	Leicestershire County Council	-	-	-	-	Unknown	Unknown	-
16	Personalised Travel Planning and Accessibility Team set up to promote sustainable travel choices	Promoting Travel Alternatives	Personalised Travel Planning	Leicestershire County Council	Unknown	Unknown	Unknown	-	Unknown	Unknown	-

17	Network management for roadworks, incidents, and planned events	Traffic Management	Other	Leicestershire County Council	-	-	-	-	-	-	-
18	School Travel Planning	Promoting Travel Alternatives	School Travel Plans	Leicestershire County Council	-	-	Schools with travel plans in place and monitoring the % of journeys to school as the only pupil	-	Unknown	-	-
19	Providing more consistent and reliable journey times	Traffic Management	UTC, Congestion management, traffic reduction	Leicestershire County Council	-	-	Average vehicle speeds (weekday morning peak)	-	Unknown	-	-

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) as a means to assess $PM_{2.5}$ levels within the Borough:

As no local $PM_{2.5}$ monitoring or modelling data is available, there are several sources of existing information that may assist in evaluating $PM_{2.5}$ at the local level. This includes, but is not limited to:

***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.

***Ratio of PM_{10} to $PM_{2.5}$*.** In the absence of any $PM_{2.5}$ monitoring data, local authorities can use one of the methodologies provided in LAQM.(TG16) Chapter 7 Section 1 (paras 7.107 to 7.111) to provide an indication of $PM_{2.5}$ concentrations.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Charnwood Borough Council undertook automatic (continuous) monitoring at 4 sites during 2017. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix E. 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 (passive) monitoring of NO_2 at 48 (52 tubes) sites during 2017. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix E.

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" and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

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

There were no exceedences of the annual mean air quality objective in 2017.

3.2.2 Particulate Matter (PM_{10})

Charnwood Borough Council continues to monitor PM_{10} levels in the vicinity of Mountsorrel Quarry. Recent monitoring has shown that levels are in compliance with the air quality objectives. Further areas of site improvement and methods for on-site monitoring are detailed within the sites Dust Management and Monitoring Plan, available at: Mountsorrel Quarry Dust Management and Monitoring Plan

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

There were no exceedences of the air quality objectives in 2017.

3.2.3 Particulate Matter ($PM_{2.5}$)

Charnwood Borough Council do not undertake any local monitoring of $PM_{2.5}$

As outlined in section 2.3; consideration will be taken via a number of available indicative data sources as well as local knowledge for us to identify any localised 'hot-spots' that may be, or become, potential areas of concern.

It is important to note however that due to its extremely small size, $PM_{2.5}$ can travel for long distances in the air and it is estimated that as much as 40% to 50% of the levels found in any given area can be from sources outside a local authority's direct boundary [4].

The following provides an estimation of $PM_{2.5}$ using the nationally derived correction factor from recorded PM_{10} observations at the Mountsorrel PM_{10} monitoring site, considered to be the 'worst-case' location for public exposure to dust within the Borough:

The recorded annual mean concentration of PM_{10} at the Mountsorrel site in 2017 was 24.8µg/m^3. The PM2.5 concentration at this location can be estimated as follows:

The recorded annual mean PM10 concentration multiplied by the nationally derived correction factor: 24.8 x 0.7 = 17.4

Estimated annual mean PM2.5 = 17.4µg/m^3

Given the fact that considerable effort is being made to lessen PM_{10} dust emissions from Mountsorrel Quarry over recent years via the DMMP; it would be fair to suggest that whilst not directly measured, it is likely that associated levels of $PM_{2.5}$ from the plant are also seeing discernible reductions.

[4] Fine Particulate Matter ($PM_{2.5}$) in the United Kingdom. Air Quality Expert Group (AQEG) Report. 2012

3.2.4 Sulphur Dioxide (SO_2)

Monitoring in respect of the Great Central Railway commenced in July 2016 although initial 'teething' issues were experienced with the unit preventing any meaningful data becoming available until January 2017.

Furthermore; the unit underwent a firmware update during September 2017 allowing re-characterisation of the SO_2 sensor to give a higher confidence in the raw readings already obtained.

The monitor is co-located alongside 3x sulphur dioxide tubes that that are changed on a monthly basis. 3 further 'background' diffusion tubes have also been located throughout the Borough to allow a comparison of concentrations against the site of interest.

Table A.7 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2017 with the air quality objectives for SO_2.

Whilst initial results suggest that concentrations are within the required objective levels of this particular pollutant, we will continue to monitor levels to build a longer term picture of concentrations at this site.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In 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	PM10	YES	Volumetric Gravimetric	~34	N/A	~1.5
CM2	Great Central Railway	Industrial	454380	319768	SO2	YES	Electrochemical Sensor	0	N/A	~1.5
CM3	Baxter Gate (Loughborough) AQMA	Kerbside	453687	319672	NO2	YES	Chemiluminescent	N/A	~1	~1.5
CM4	Syston AQMA	Roadside	462540	311428	NO2	YES	Chemiluminescent	~10	~3	~1.5

Notes:

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT1	Ratcliffe Rd (L'boro)	Roadside	454087	320392	NO2	YES	0	~3	NO	~3
DT2	Shelthorpe Rd (L'boro)	Roadside	454234	318657	NO2	NO	~8	~3	NO	~3
DT3	Forest Rd (L'boro)	Roadside	452833	318776	NO2	NO	0	~6	NO	~2.5
DT4	Haydon Rd (L'boro)	Roadside	452314	319620	NO2	YES	~8	~6	NO	~2.5
DT5	Alan Moss Rd / Epinal Way (L'boro)	Roadside	452173	319924	NO2	YES	0	~15	NO	~1.5
DT6	Epinal Way / Ling Rd (L'boro)	Roadside	453678	318678	NO2	NO	0	~9	NO	~3
DT7	Leicester Rd (L'boro)	Roadside	454002	319253	NO2	YES	0	~3	NO	~3
DT8	Derby Rd (L'boro)	Roadside	453231	320028	NO2	YES	~3	~3	NO	~3
DT9	Derby Rd / Briscoe Avn (L'boro)	Roadside	452670	320527	NO2	YES	~3	~4	NO	~3
DT10	Durham Rd 1 (L'boro)	Urban Background	452352	320697	NO2	NO	N/A	N/A	NO	~3.5
DT11	Durham Rd 2 (L'boro)	Urban Background	452352	320697	NO2	NO	N/A	N/A	NO	~3.5
DT12	Durham Rd 3 (L'boro)	Urban Background	452352	320697	NO2	NO	N/A	N/A	NO	~3.5
DT13	Alan Moss Rd / A6 Derby Rd (L'boro)	Roadside	452903	320212	NO2	YES	0	~8	NO	~1.5

DT14	High St (L'boro)	Roadside	453730	319596	NO2	YES	N/A	~3	NO	~3
DT15	Market Place (L'boro)	Urban Centre	453611	319540	NO2	YES	N/A	N/A	NO	~3
DT16	Ashby Rd (L'boro)	Roadside	453189	319709	NO2	YES	0	~4	NO	~3
DT17	Cow Hill Lodge (Shepshed)	Roadside	448876	318307	NO2	NO	0	~10	NO	~1.5
DT18	Roseberry St (L'boro)	Roadside	452697	319921	NO2	NO	~13	~3	NO	~3
DT19	Melton Rd Town Centre (Syston)	Roadside	462777	311692	NO2	YES	~3	~3	NO	~3
DT20	1123 Melton Rd (Syston)	Roadside	46235	311213	NO2	YES	0	~6	NO	~1.5
DT21	1116 Melton Rd (Syston)	Roadside	462373	311254	NO2	YES	0	~3	NO	~3
DT22	Loughborough Rd (Birstall)	Roadside	459233	309233	NO2	NO	0	~15	NO	~1.5
DT23	A6 (Birstall)	Roadside	459178	309890	NO2	NO	~2	~5	NO	~3
DT24	21 Humberstone Lane (Thurmaston)	Roadside	460821	308757	NO2	NO	0	~6	NO	~1.5
DT25	43 Humberstone Lane (Thurmaston)	Roadside	460861	308824	NO2	NO	0	~5	NO	~1.5
DT26	22 Humberstone Lane (Thurmaston)	Roadside	460835	308784	NO2	NO	0	~5	NO	~1.5

DT27	Ashby Rd Central (Shepshed)	Roadside	448121	318257	NO2	NO	~12	~2	NO	~3
DT28	Loughborough Rd (Hathern)	Roadside	450260	321922	NO2	NO	~30	~3	NO	~3
DT29	Barrow Street (L'boro)	Roadside	453901	319488	NO2	NO	0	~10	NO	~3
DT30	School Street (L'boro)	Roadside	453946	319619	NO2	NO	0	~3	NO	~3
DT31	Fennel Street (L'boro)	Roadside	453694	319890	NO2	NO	0	~3	NO	~3
DT32	High Street (Syston)	Roadside	462369	311809	NO2	YES	0	~4	NO	~3
DT33	Syston AQMS 1	Roadside	462540	311428	NO2	YES	~10	~3	YES	~1.5
DT34	Syston AQMS 2	Roadside	462540	311428	NO2	YES	~10	~3	YES	~1.5
DT35	Syston AQMS 3	Roadside	462540	311428	NO2	YES	~10	~3	YES	~1.5
DT36	Baxter Gate AQMS 1	Kerbside	453687	319672	NO2	YES	N/A	~1	YES	~1.5
DT37	Baxter Gate AQMS 2	Kerbside	453687	319672	NO2	YES	N/A	~1	YES	~1.5
DT38	Baxter Gate AQMS 3	Kerbside	453687	319672	NO2	YES	N/A	~1	YES	~1.5
DT39	Nottingham Rd (L'boro)	Roadside	454154	320116	NO2	NO	N/A	~3	NO	~3
DT40	156 Ratcliffe Rd (L'boro)	Roadside	454285	320294	NO2	NO	0	~6	NO	~1.5
DT41	156 Meadow Lane (L'boro)	Roadside	453933	320663	NO2	NO	0	~8	NO	~1.5
DT42	31 Station Boulevard	Roadside	454142	320593	NO2	NO	0	~9	NO	~1.5

	(L'boro)									
DT43	91 Wharncliffe Rd (L'boro)	Roadside	454250	319682	NO2	NO	0	~4	NO	~1.5
DT44	3 Simpson Cl (Syston)	Roadside	461499	310459	NO2	NO	0	~30	NO	~1.5
DT45	1 Brackenfield Way (Thurmaston)	Roadside	461994	309975	NO2	NO	0	~8	NO	~1.5
DT46	74 Hathern Rd (Shepshed)	Roadside	448311	320511	NO2	NO	0	~8	NO	~1.5
DT47	7 Shepshed Rd (Hathern)	Roadside	449935	322227	NO2	NO	0	~11	NO	~1.5
DT48	37 Darwin Crescent (L'boro)	Suburban	450942	321076	NO2	NO	~4	N/A	NO	~1.5
DT49	Far Street (Wymeswold)	Roadside	460313	323521	NO2	NO	~1	~2	NO	~3
DT50	Groby Rd (Anstey)	Roadside	454800	308525	NO2	NO	~1	~3	NO	~3
DT51	15 Leicester Rd (Anstey)	Roadside	455167	308549	NO2	NO	0	~4	NO	~3
DT52	22 Main Street (Barkby)	Roadside	463483	309880	NO2	NO	0	~4	NO	~3

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
CM3	Kerbside	Automatic	92	92	-	-	-	-	29.45
CM4	Roadside	Automatic	82	82	36.29	-	-	-	34.87
DT1	Roadside	Diffusion Tube	100	100	29.5	21.6	21	24.3	24.3
DT2	Roadside	Diffusion Tube	92	92	36.1	22.3	20.1	23.1	21.0
DT3	Roadside	Diffusion Tube	100	100	32.7	26.6	25	28.6	26.7
DT4	Roadside	Diffusion Tube	100	100	32.1	25.2	26	27.8	30.0
DT5	Roadside	Diffusion Tube	100	100	28.2	23.4	21.5	23.7	24.8
DT6	Roadside	Diffusion Tube	92	92	30.1	26.1	24.4	26.7	29.1
DT7	Roadside	Diffusion Tube	100	100	**42.7**	34.2	30.6	37.9	36.0
DT8	Roadside	Diffusion Tube	100	100	**40.4**	30.7	28.7	33.4	33.3
DT9	Roadside	Diffusion Tube	92	92	30.9	25.1	23.1	26.8	27.0
DT10	Urban Background	Diffusion Tube	100	100	24.7	18.3	17.8	19.9	21.1
DT11	Urban Background	Diffusion Tube	100	100	23.4	19.2	17	19.4	19.7
DT12	Urban Background	Diffusion Tube	100	100	26.1	19.3	16.9	19.1	19.9
DT13	Roadside	Diffusion Tube	100	100	33.6	27.8	25.2	27.4	27.5

DT14	Roadside	Diffusion Tube	100	100	**65.7**	39.1	28.5	32.4	33.0
DT15	Urban Centre	Diffusion Tube	92	92	25.9	21.4	18.4	21.2	21.3
DT16	Roadside	Diffusion Tube	100	100	38.5	30	26.7	28	31.6
DT17	Roadside	Diffusion Tube	100	100	32.2	24.8	21.3	27.1	25.4
DT18	Roadside	Diffusion Tube	100	100	24.9	17	17.9	19.7	19.4
DT19	Roadside	Diffusion Tube	100	100	36.8	27.7	27.2	31.7	33.2
DT20	Roadside	Diffusion Tube	100	100	31.7	24.5	22.9	27.3	29.8
DT21	Roadside	Diffusion Tube	83	83	36.1	28.4	26.4	35.8	37.2
DT22	Roadside	Diffusion Tube	100	100	39.5	30.5	28.5	32.3	33.7
DT23	Roadside	Diffusion Tube	100	100	37.9	30.9	28.4	31.8	32.4
DT24	Roadside	Diffusion Tube	100	100	**41.4**	32.5	30.9	33.9	35.3
DT25	Roadside	Diffusion Tube	100	100	38.1	30.4	26	32.6	34.2
DT26	Roadside	Diffusion Tube	100	100	32.4	26.3	24.1	27.3	30.9
DT27	Roadside	Diffusion Tube	100	100	27.9	25.2	22.7	27.3	23.7
DT28	Roadside	Diffusion Tube	100	100	27.9	23	20.8	24.1	22.0
DT29	Roadside	Diffusion Tube	100	100	28.8	23.5	22.6	26.3	26.0
DT30	Roadside	Diffusion Tube	100	100	26.7	20.6	19.9	22.1	22.4
DT31	Roadside	Diffusion Tube	100	100	25.2	29.9	27.4	31.4	30.5

DT32	Roadside	Diffusion Tube	100	100	33.1	25.7	24.7	28.5	32.2
DT33	Roadside	Diffusion Tube	100	100	36.5	30.8	27.6	30.5	35.4
DT34	Roadside	Diffusion Tube	100	100	36.7	29.4	27.1	29.8	34.6
DT35	Roadside	Diffusion Tube	100	100	35.5	28.8	25.7	29.8	34.1
DT36	Kerbside	Diffusion Tube	100	100	**46.5**	33.8	26.2	30.9	29.9
DT37	Kerbside	Diffusion Tube	100	100	**47.1**	33.7	25.3	31.7	29.9
DT38	Kerbside	Diffusion Tube	100	100	**46.7**	32.2	26.1	31	28.8
DT39	Roadside	Diffusion Tube	92	92	**48.2**	**40.1**	30.7	35.2	32.6
DT40	Roadside	Diffusion Tube	100	100	28.5	22	21.1	24.8	22.9
DT41	Roadside	Diffusion Tube	100	100	30.1	25.5	21.5	24.6	23.6
DT42	Roadside	Diffusion Tube	100	100	29.3	24	22.2	25.8	25.8
DT43	Roadside	Diffusion Tube	83	83	34.4	27.5	24.3	28.2	25.7
DT44	Roadside	Diffusion Tube	100	100	-	-	21.8	26.5	28.0
DT45	Roadside	Diffusion Tube	100	100	-	-	19.9	22.2	24.5
DT46	Roadside	Diffusion Tube	100	100	-	-	18.9	22.2	21.5
DT47	Roadside	Diffusion Tube	100	100	-	-	21.1	22.9	24.2
DT48	Suburban	Diffusion Tube	100	100	-	-	14.1	17.6	15.8
DT49	Roadside	Diffusion Tube	100	100	-	-	27.9	31.6	29.4

DT50	Roadside	Diffusion Tube	100	100	-	-	21.9	26.6	27.4
DT51	Roadside	Diffusion Tube	100	100	-	-	22.2	26.2	27.5
DT52	Roadside	Diffusion Tube	100	100	-	-	18	20.8	23.1

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

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.**

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

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

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

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

The following plots show the trends in Annual Mean Nitrogen Concentrations measured at selected Diffusion Tube Monitoring Sites.

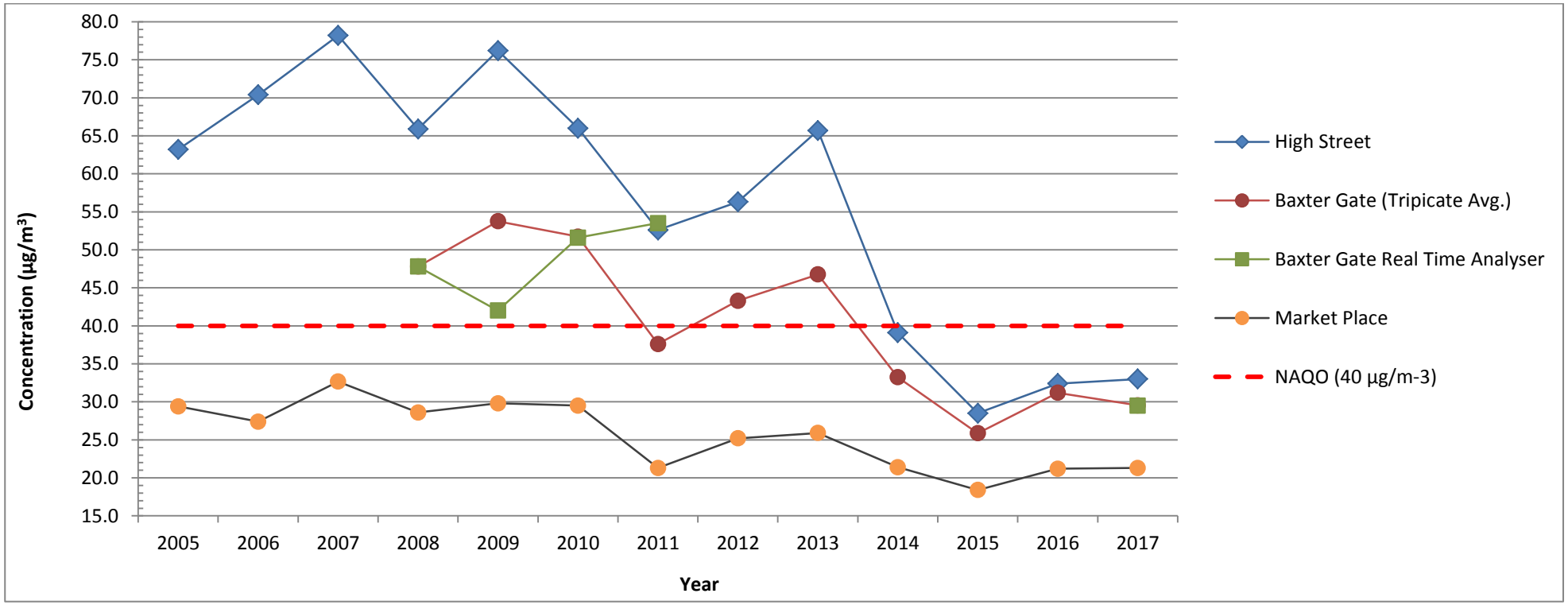


Figure A.1 Plot of NO_2 Concentration against Year for Loughborough Town Centre (i) sites

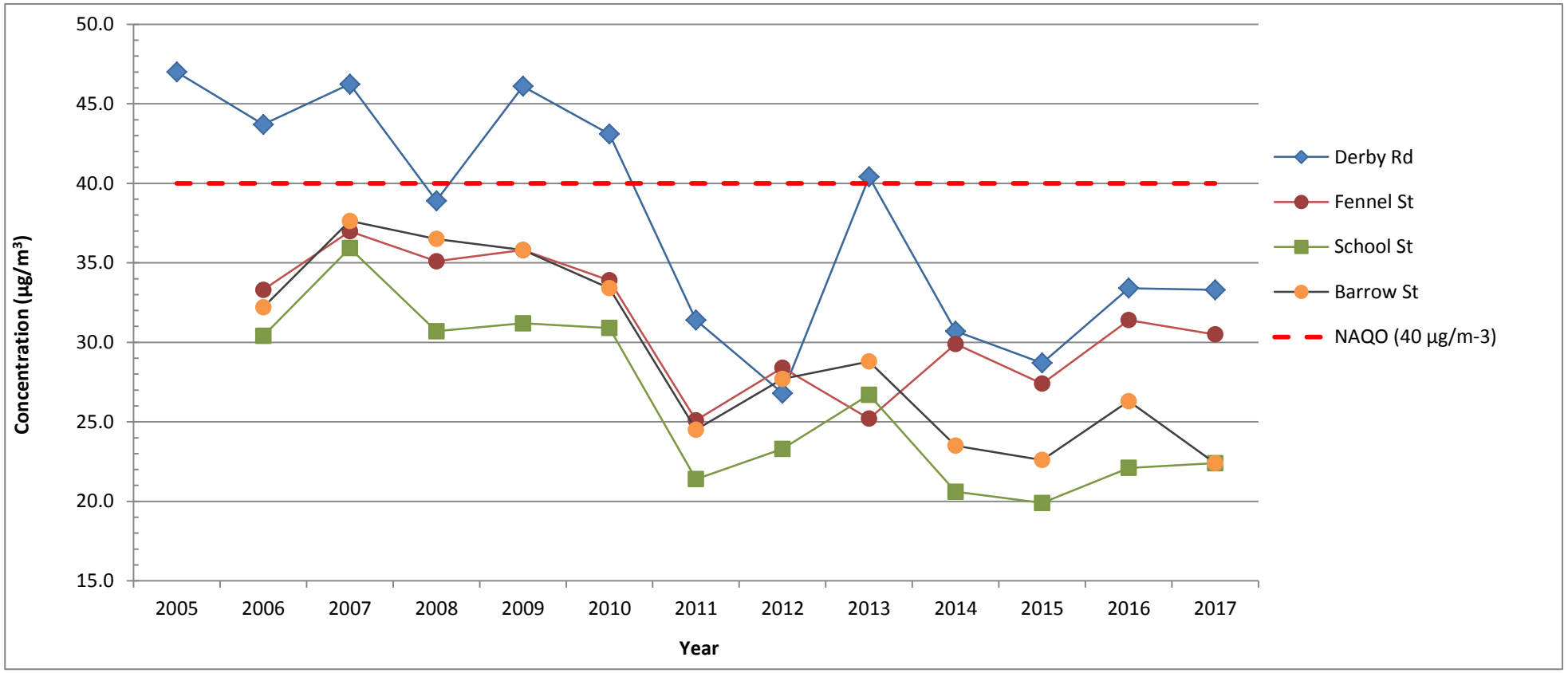


Figure A.2 Plot of NO_2 Concentration against Year for Loughborough Town Centre (ii) sites

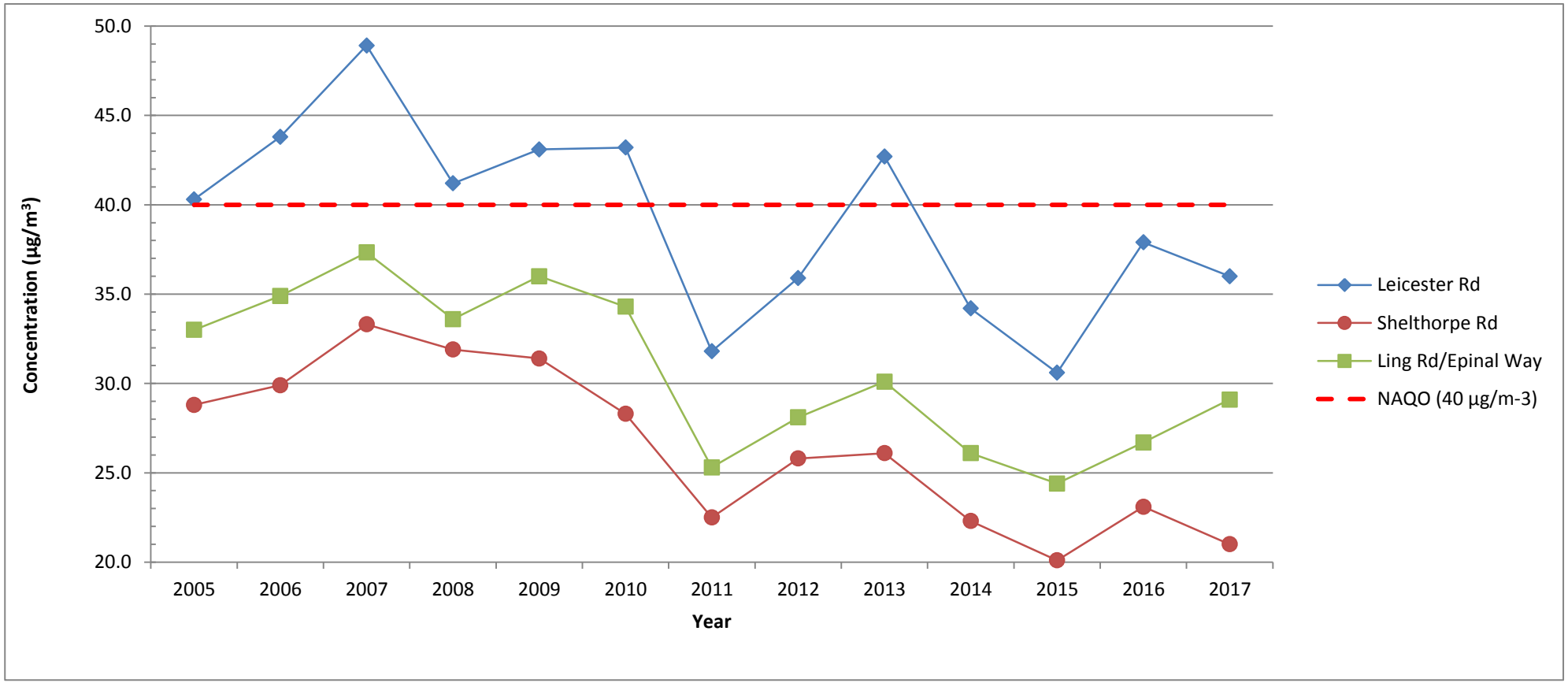


Figure A.3 Plot of NO_2 Concentration against Year for Loughborough South sites

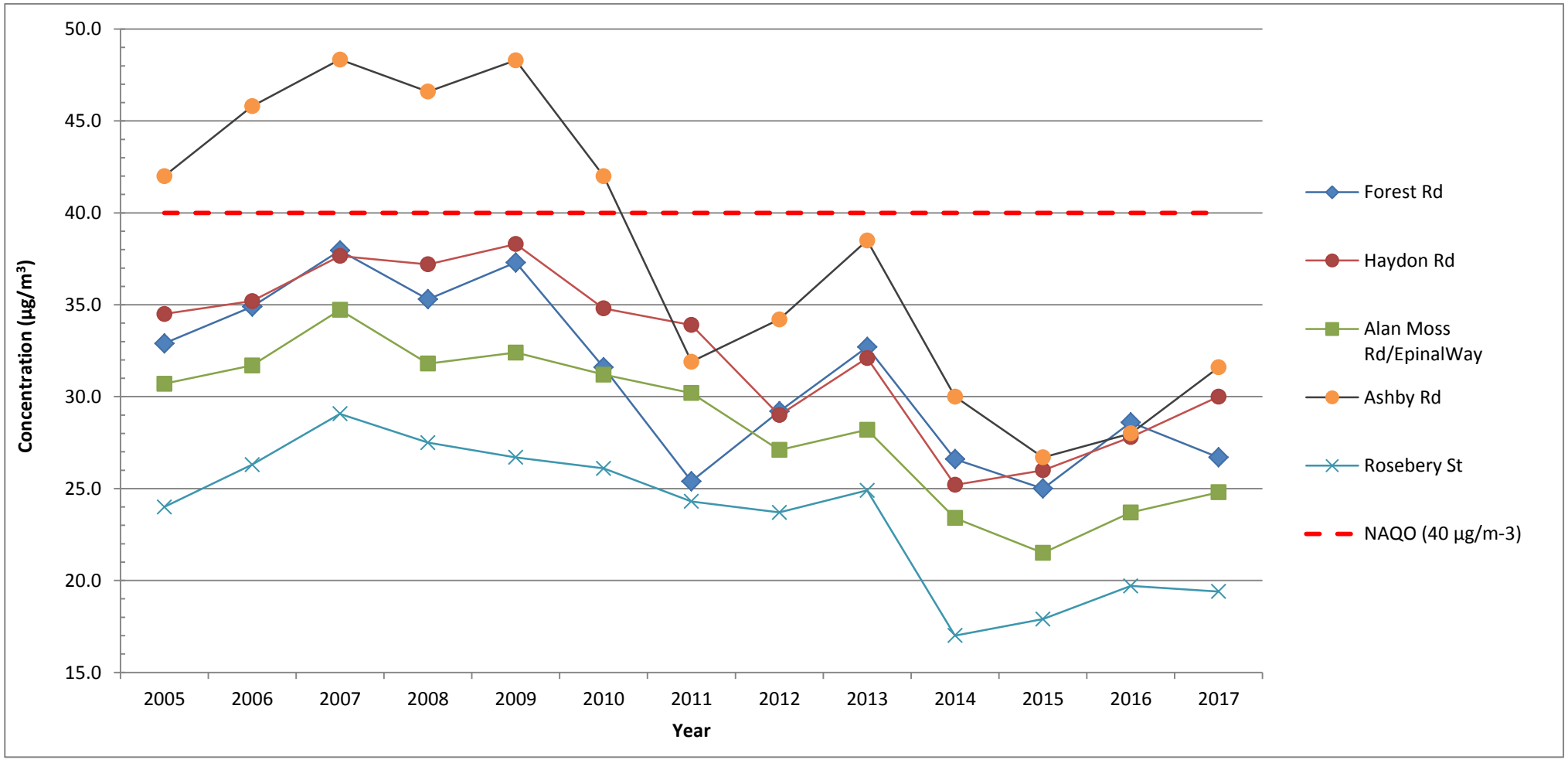


Figure A.4 Plot of NO_2 Concentration against Year for Loughborough West sites

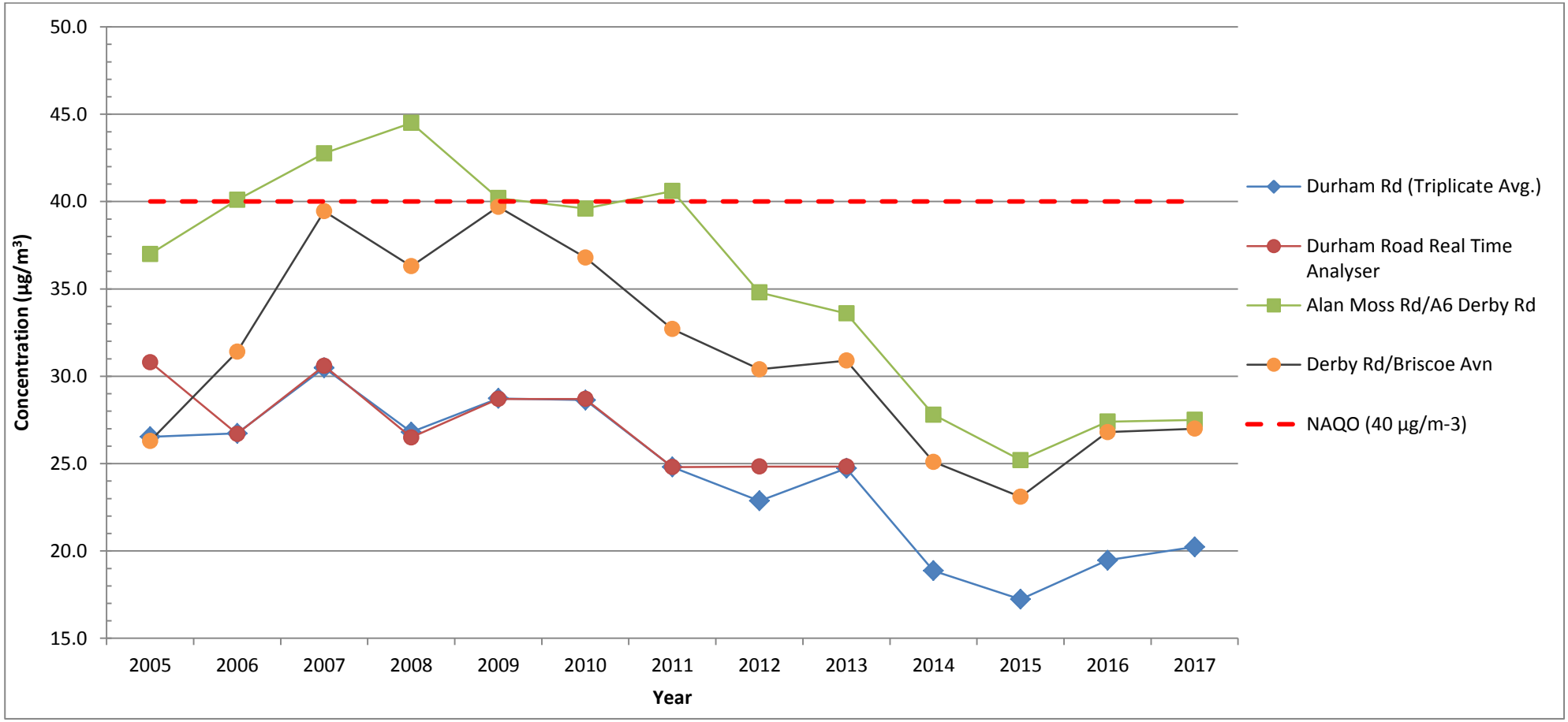


Figure A.5 Plot of NO_2 Concentration against Year for Loughborough North sites

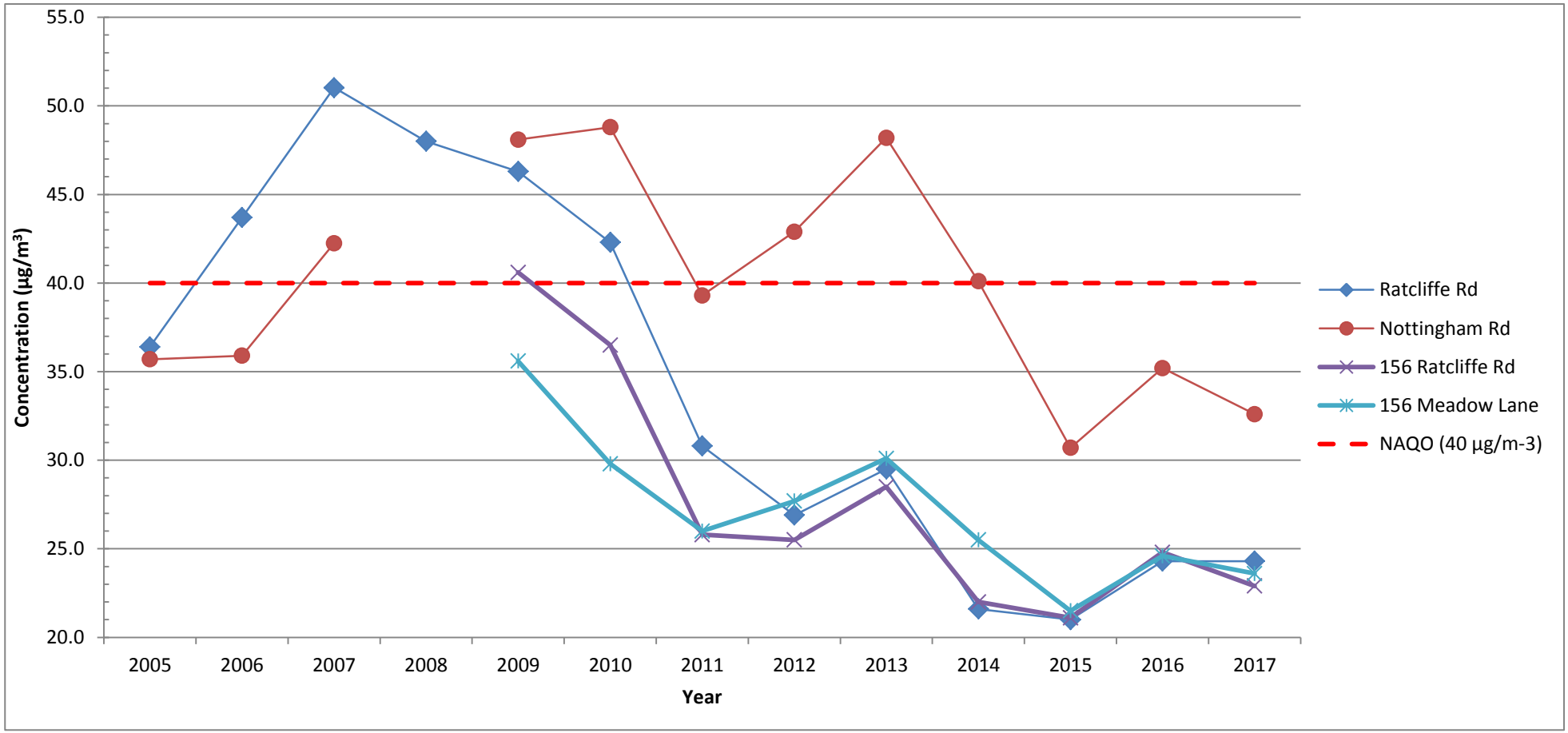


Figure A.6 Plot of NO_2 Concentration against Year for Loughborough East sites

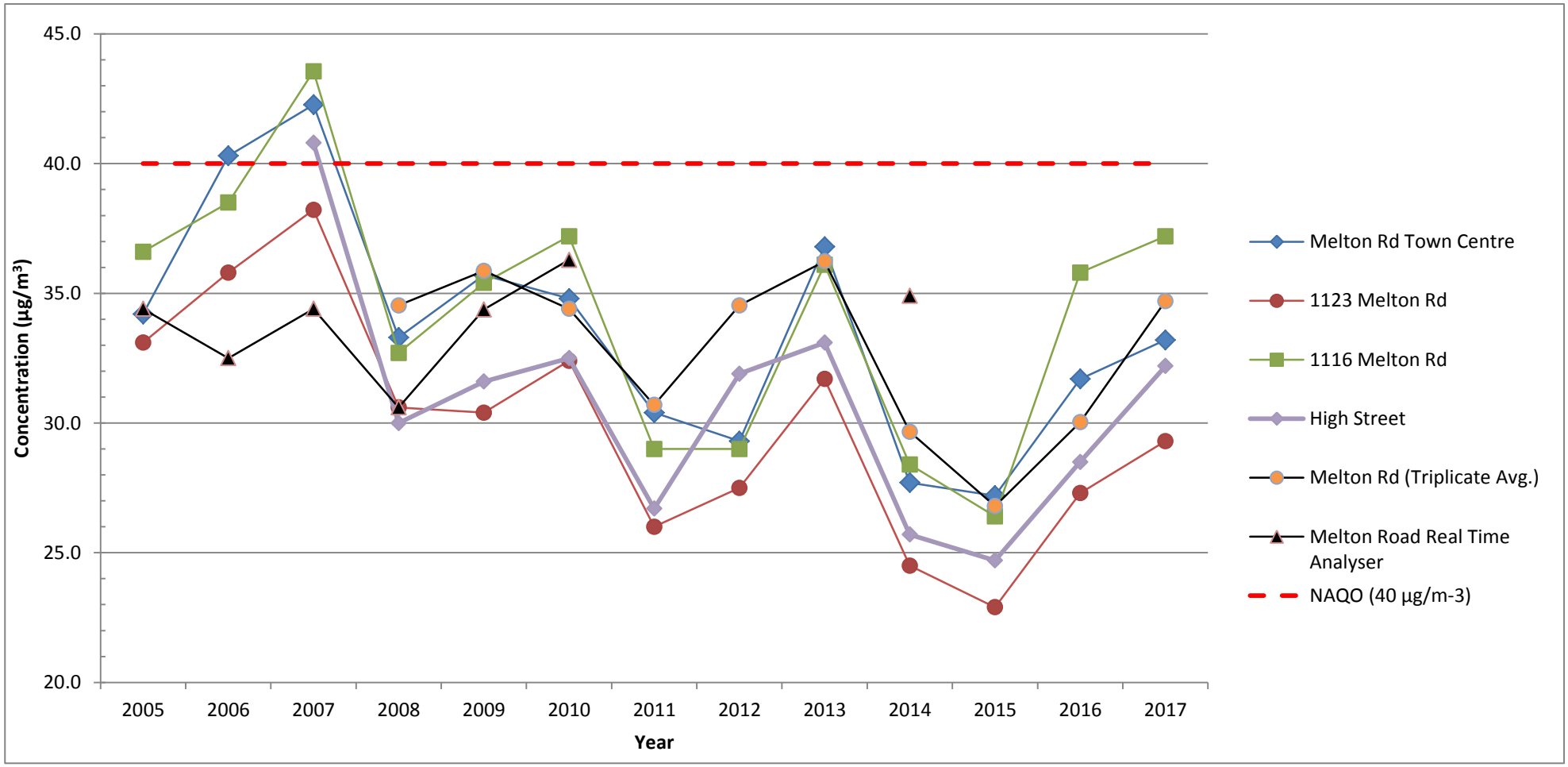


Figure A.7 Plot of NO_2 Concentration against Year for Syston sites

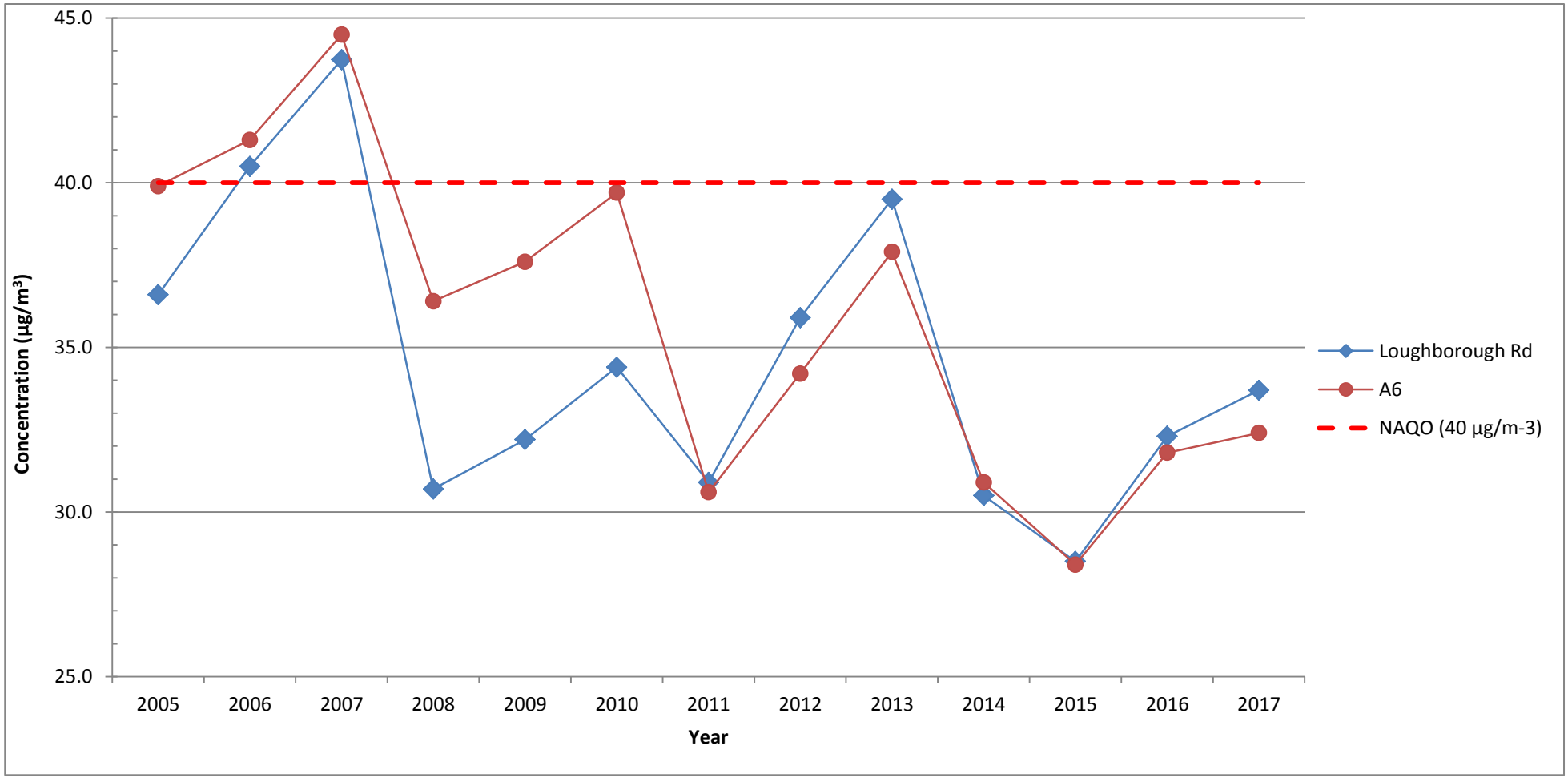


Figure A.8 Plot of NO_2 Concentration against Year for Birstall sites

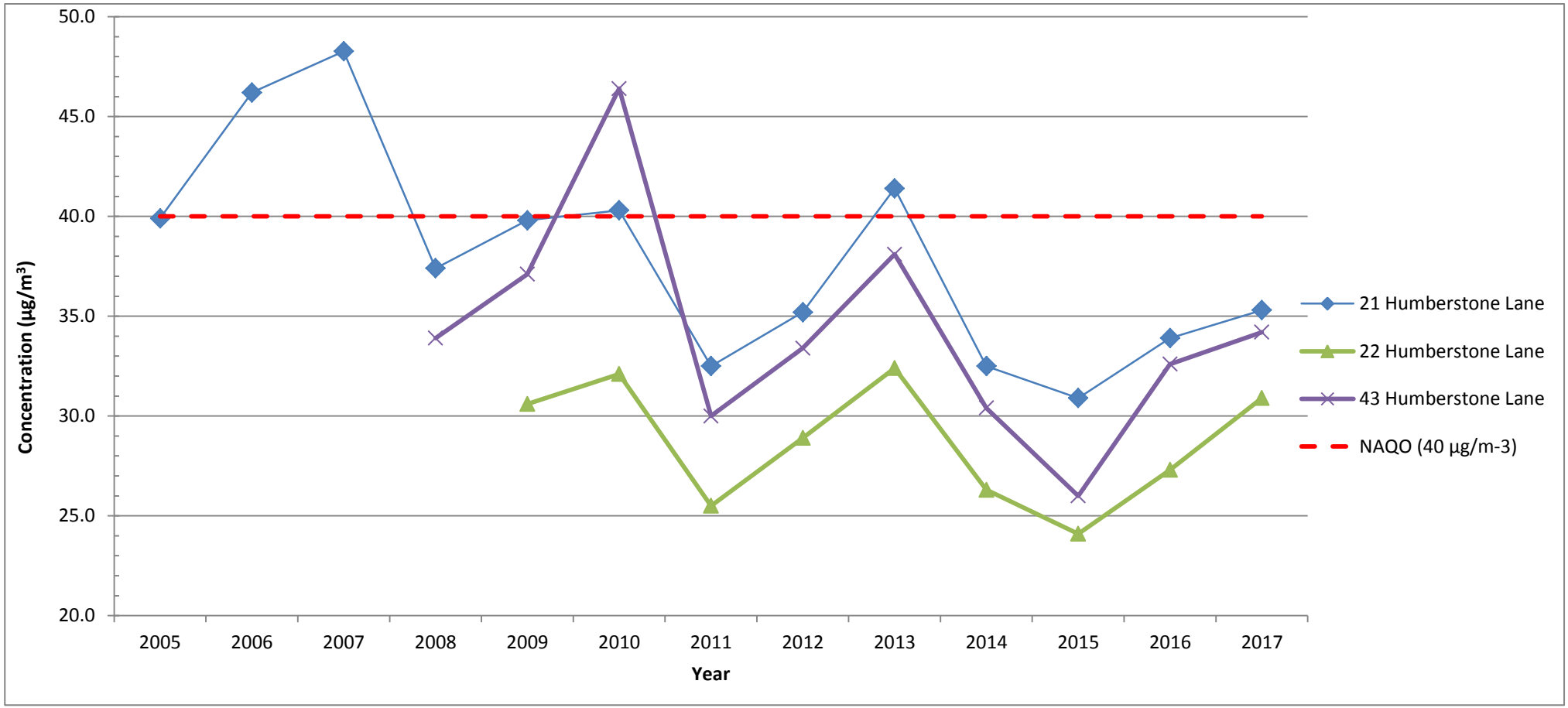


Figure A.9 Plot of NO_2 Concentration against Year for Thurmaston sites

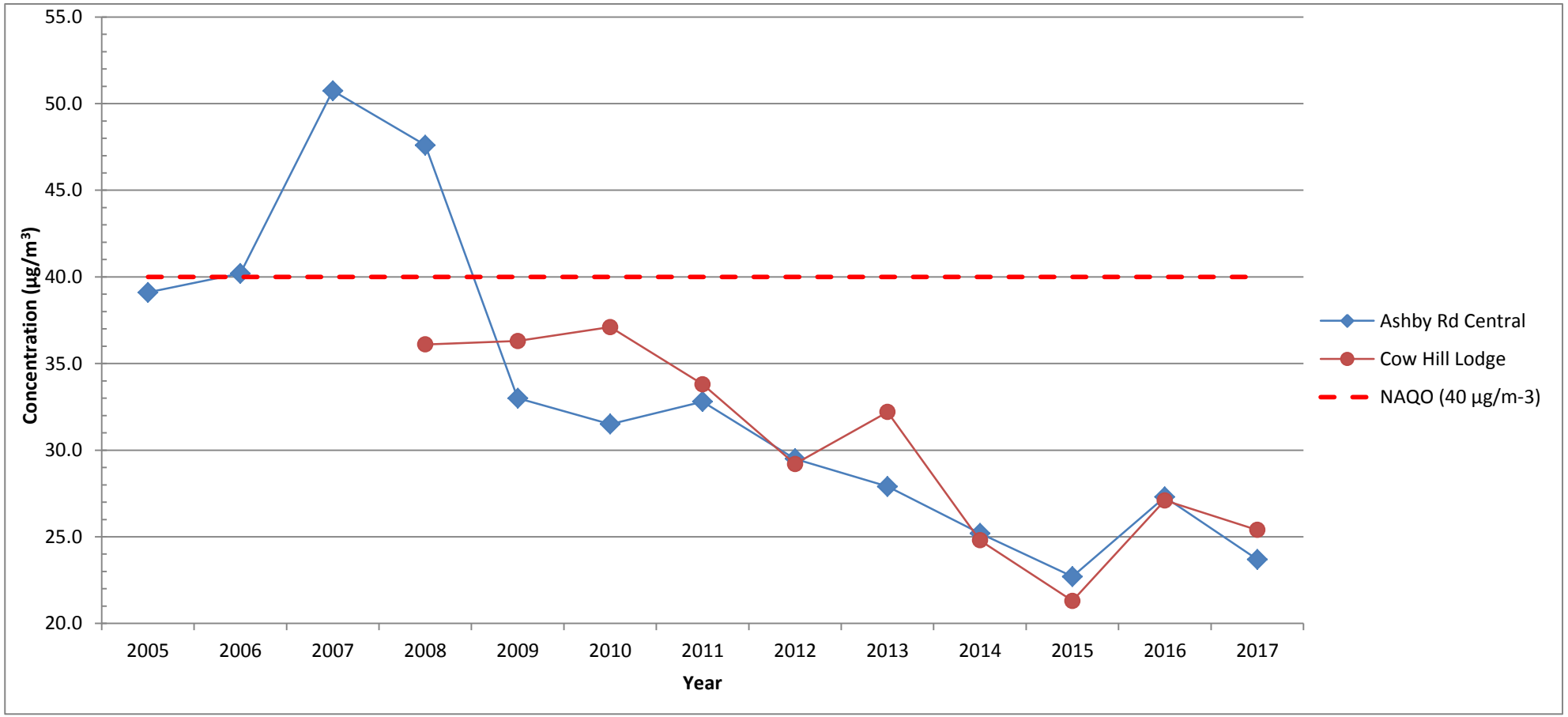


Figure A.10 Plot of NO_2 Concentration against Year for Shepshed sites

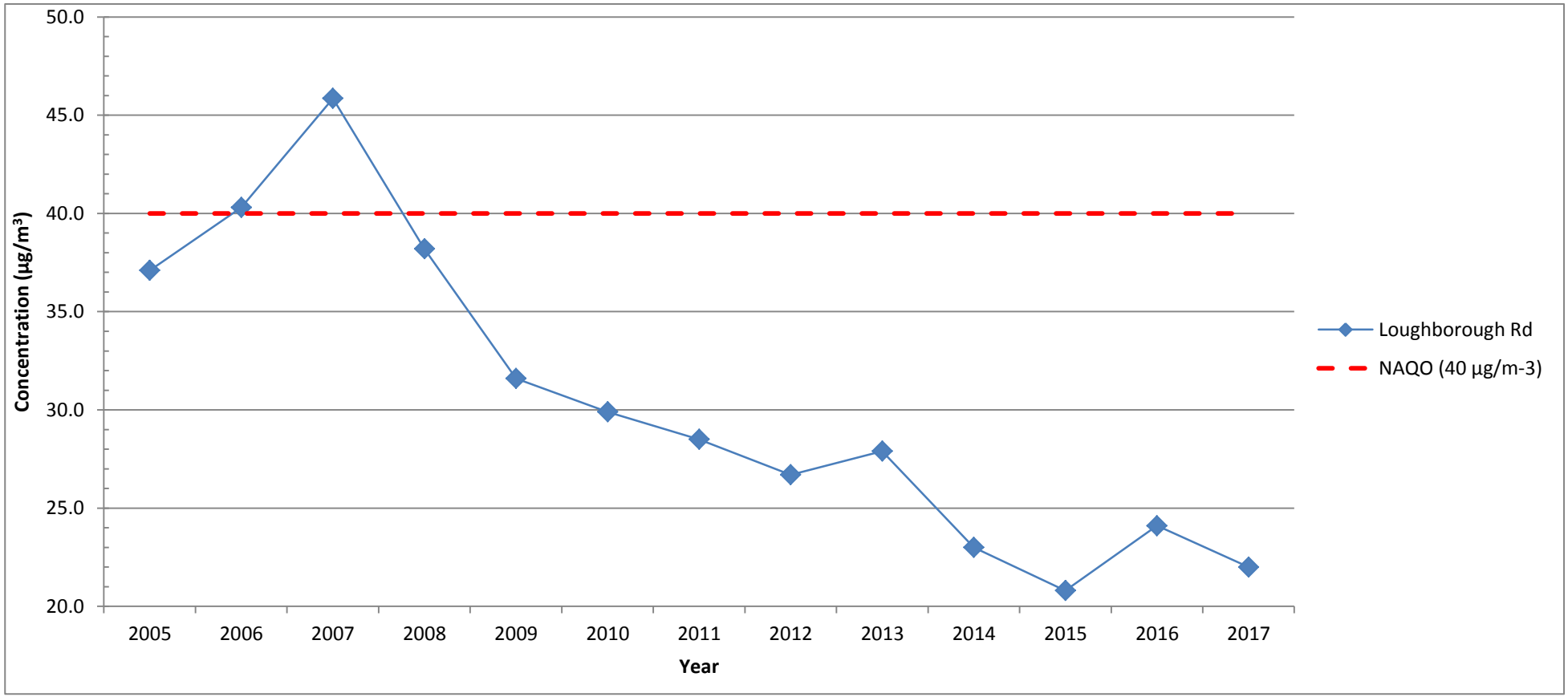


Figure A.11 Plot of NO_2 Concentration against Year for Hathern site

Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2013	2014	2015	2016	2017
CM3	Kerbside	Automatic	92	92	-	-	-	-	0
CM4	Roadside	Automatic	82	82	-	-	-	-	[11.46]

Notes:

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.**

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

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

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

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2013	2014	2015	2016	2017
CM1	Industrial	65	65	24.1	25.5	27.09	24.65	24.84

☐ **Annualisation has been conducted where data capture is <75%**

Notes:

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

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2013	2014	2015	2016	2017
CM1	Industrial	65	65	[44.75]	[49.12]	[49.01]	[46.86]	[46.94]

Notes:

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.**

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

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

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

Table A.7 – SO_2 Monitoring Results

Site ID	Site Type	Valid Data Capture for monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	Number of Exceedances 2017 (percentile in bracket) [3]		
				15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
CM2	Industrial	77	77	[79.77]	[40.89]	[22.35]

Notes:

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)

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2017

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (*) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DT1	44.6	28.5	17.6	25.4	19.6	21.9	18.3	21.9	21.8	24.7	30.7	28.9	25.3	24.3	
DT2	0	27.0	24.6	22.1	21.6	17.4	14.4	18.7	18.5	21.4	29.4	25.6	21.9	21.0	
DT3	39.07	30.17	31.39	25.38	26.49	25.29	19.14	25.1	21.85	27.27	33.28	29.54	27.8	26.7	
DT4	44.44	32.13	35.41	28.67	24.82	17.29	33.07	28.02	27.32	35.01	38.4	30.14	31.2	30.0	
DT5	38.24	27.77	25.64	24.04	20.33	19.49	29.02	22.56	22.84	22.26	31.37	26.91	25.9	24.8	
DT6	40.6	0	27.29	26.4	25.85	25.08	35.74	27.7	24.41	29.85	38.33	32.54	30.3	29.1	
DT7	51.68	37.13	40.67	36.96	39.15	30.89	39.48	29.63	33.98	34.38	41.7	34.63	37.5	36.0	
DT8	53.02	33.42	36.94	36.99	34.6	26.63	34.43	26.94	29.4	30.6	41.37	31.79	34.7	33.3	
DT9	42.6	29.89	29.2	33.69	0	19.79	28.12	22.98	20.29	22.13	34.05	26.69	28.1	27.0	
DT10	37.69	22.7	21.02	23.92	16.58	15.4	24.91	16.67	16.68	17.75	26.59	23.7	22.0	21.1	
DT11	36.16	23.71	20.74	22.5	16.62	13.54	14.07	14.58	16.28	17.88	25.48	24.79	20.5	19.7	
DT12	36.55	21.59	19.27	25.08	16.64	13.32	14.34	16.42	16.49	18.31	26.46	23.99	20.7	19.9	
DT13	46.79	32.87	29.34	33.51	25.27	24.42	18.46	23.59	21.9	24.9	32.21	30.6	28.7	27.5	
DT14	49.87	36.79	36.75	38.55	28.21	27.33	25.58	29.92	28.14	33.29	41.91	36.42	34.4	33.0	
DT15	37.71	23.37	20.16	22.9	18.73	14.38	0	17.84	17.5	20.42	27.8	23.49	22.2	21.3	

DT16	44.75	33.32	36.65	33.47	29.96	28.9	24.17	27.26	27.1	33.49	41.27	34.69	32.9	31.6	
DT17	37.39	31.43	29.32	30.75	25.16	24.51	20.33	25.76	15.35	25.82	24.33	26.93	26.4	25.4	
DT18	39.98	22.16	21.79	17.36	14.83	12.8	12.67	15	15.62	19.1	25.36	25.86	20.2	19.4	
DT19	45.42	36.26	33.77	31.67	26.64	26.17	21.48	25.41	23.64	32	39.43	33.54	31.3	33.2	
DT20	41.42	32.16	30.66	26.08	25.72	21.5	19.42	22.21	24.05	25.23	36.12	32.66	28.1	29.8	
DT21	0	35.94	37.97	37.09	32.13	0	19.92	30.2	31.91	36.72	45.9	42.8	35.1	37.2	
DT22	35.57	34.01	38.65	33.97	25.86	26.35	19.92	29.96	27.79	34.49	37.53	37.64	31.8	33.7	
DT23	52.01	39.65	34.61	32.59	35.2	29.48	24.77	28.01	29.21	29.07	33.39	34.89	33.6	35.6	32.4
DT24	48.17	37.74	32.33	34.43	31.57	28.5	16.05	30.03	26.69	33.78	40.4	39.47	33.3	35.3	
DT25	48.48	35.44	31.58	32.24	26.65	27.42	21.45	30.6	29.92	32.06	35.22	36.42	32.3	34.2	
DT26	41.9	31.55	29.87	37.09	22.81	20.56	19.18	25.35	23.55	28.53	36.3	32.7	29.1	30.9	
DT27	50.76	40.76	37.66	38.05	35.76	34.8	26.65	33.63	34	33.56	34.05	36.52	36.4	34.9	23.7
DT28	48.48	30.02	27.73	30.73	26.12	20.37	20.8	26.22	27.11	26.95	36.85	32.47	29.5	28.3	22.0
DT29	43.11	30.34	30.72	24.96	25.4	20.71	15.76	23.3	21.57	25.93	32.45	31.19	27.1	26.0	
DT30	35.12	26.31	23.03	22.44	15.12	15.89	18.27	18.2	21.04	23.11	30.94	30.69	23.3	22.4	
DT31	47.1	33.7	33.84	30.16	31.98	25.63	20.71	25.89	29.73	29.04	39.25	34.59	31.8	30.5	
DT32	45.66	34.33	30.5	28.75	26.03	21.43	22.68	25.45	23.6	30.63	39.18	36.37	30.4	32.2	
DT33	43.29	34.83	36.16	31	26.03	26.63	21.63	28.2	31.02	36.37	40.6	45.46	33.4	35.4	
DT34	42.78	31.93	33.31	28.66	26.69	25.1	23.74	31.04	27.54	37.39	42.42	41.5	32.7	34.6	
DT35	42.04	32.53	33.48	27.21	25.96	25.2	22.6	25.43	31.09	36.54	39.94	43.86	32.2	34.1	
DT36	48.55	33.79	34.76	27.09	33.59	23.57	19.98	26.06	25.86	28.67	35.95	35.83	31.1	29.9	
DT37	47.41	35.71	34.92	26.07	32.49	22.88	20.71	23.99	27.65	29.14	36.68	36.39	31.2	29.9	
DT38	44.33	35.11	34.44	27.45	34.63	21.51	18.35	22.4	24.26	27.8	34.91	34.6	30.0	28.8	
DT39	48.96	0	36.29	35.61	34.43	16.53	18.07	33.39	31.16	36.17	45.33	37.1	33.9	32.6	
DT40	37.21	27.64	15.28	27.33	21.31	18.51	17.14	21.86	19.35	21.88	32.42	26.58	23.9	22.9	
DT41	37	28.77	27.22	22.47	21.79	18.26	17.51	19.91	20.13	23.63	29.51	28.9	24.6	23.6	
DT42	38.05	29.68	29.22	24.65	24.16	22.43	15.73	26.12	22.26	26.22	34.27	29.23	26.8	25.8	

DT43	45.14	31.61	31.41	23.18	28.16	11.4	19.27	23.56	23.2	25.26	31.47	27.42	26.8	25.7	
DT44	45.41	0	27.41	23.61	19.13	0	16.14	17.75	20.05	23.97	35.85	34.48	26.4	28.0	
DT45	38.08	24.71	22.97	19.24	17.64	16.42	16.07	20.28	19.28	20.96	31.67	29.86	23.1	24.5	
DT46	34.87	23.88	20.2	16.65	22.9	16.32	16.46	19.54	19.48	19.63	34.69	24.21	22.4	21.5	
DT47	40.82	25.75	26.66	25.22	19.48	20.59	19.14	22.49	21.6	24.78	27.13	28.4	25.2	24.2	
DT48	32.52	20.21	13.11	13.46	13.24	10.84	11.15	11.25	13.18	16.1	21.7	20.83	16.5	15.8	
DT49	42.42	32.33	30.33	31.92	31.85	25.66	21.71	26.44	27.42	27.71	38.81	31.37	30.7	29.4	
DT50	39.09	31.37	25.52	23.03	24.37	19.03	17.87	20.99	22.38	24.94	30.94	30.25	25.8	27.4	
DT51	41.08	29.96	27.74	27.19	22.55	18.45	16.87	21.04	22.95	21.84	32.22	29.76	26.0	27.5	
DT52	42.42	25.7	21.3	17.53	14.8	14.58	14.77	17.61	18.31	17.77	31.2	25.87	21.8	23.1	

☒ **Local bias adjustment factor used [0.96 'North' tubes & 1.06 'South' tubes]**

☒ **Where applicable, data has been distance corrected for relevant exposure**

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.**

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

(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tubes

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

Consideration is normally given to the advisory documents on the LAQM Support website when defining and considering whether to use local or national co-location bias adjustment factors.

The following factors are part of our decision for deciding on which factors to use:

- Tube exposure time
- Length of the monitoring study
- QA/QC of the chemiluminescence analyser
- QA/QC of diffusion tubes
- Siting of the co-location study
- Siting of other tubes in the survey

Factor from Co-location Studies

Triplicates are co-located at our 2 automatic monitoring sites:

Site ID	Location	Triplicate annual mean average (µg/m^3) (Dm)	Automatic analyser annual mean concentration (µg/m^3) (Cm)	Bias correction factor (Cm / Dm)
DT 36, 37, 38	**CM3** Baxter Gate, L'boro	30.77	29.45	0.96
DT 33, 34, 35	**CM4** Melton Rd, Syston	32.77	34.87	1.06

Tubes in the 'north' of the Borough i.e. Loughborough, Shepshed, Hathern and Wymeswold, have been corrected against the factor of x0.96

Tubes in the 'south' of the Borough i.e. Syston, Thurmaston, Birstall, Anstey and Barkby have been corrected against the factor of x1.06

Short-term to Long-term Data adjustment

There were no monitoring sites during 2017 that would have been “short term”.

Therefore no further data adjustment is necessary for seasonal variation

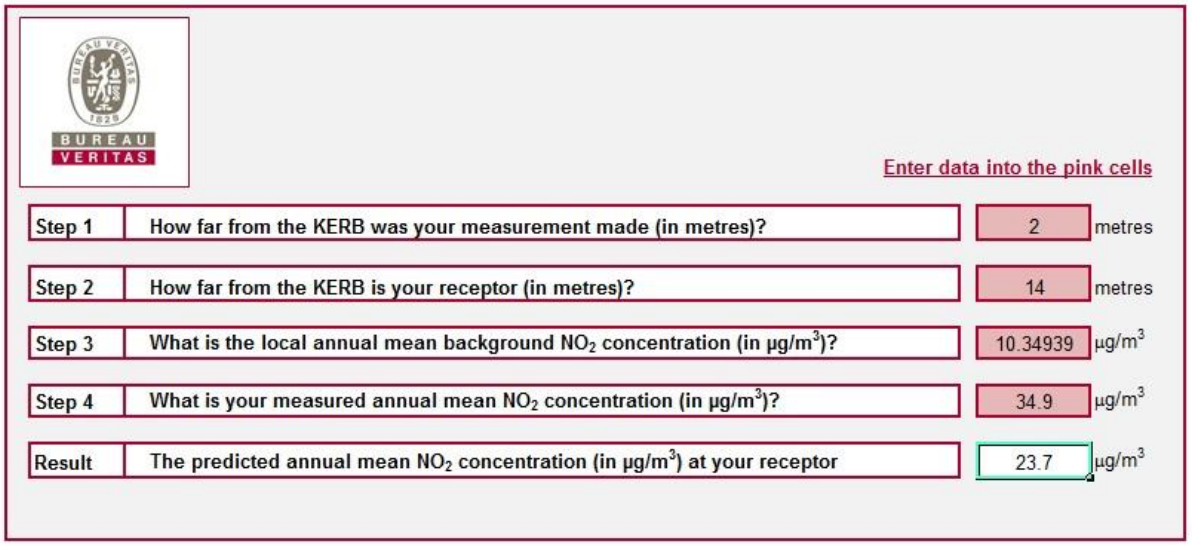
Diffusion Tube – Distance Correction

The raw data for three sites: Ashby Rd Central (Shepshed), Loughborough Rd (Hathern) and A6 (Birstall) have been distance corrected as they are all roadside locations where the tubes are positioned some distance away from the façade of the nearest receptor – in all cases on a roadside lighting column.

Using the "NO_2 with Distance from Roads Calculator" (v 4.2) available from the UK Air Quality Archive, it is possible for us to calculate the distance NO_2 falloff between these kerbside tubes and the nearest receptors, as follows:

Ashby Rd Central (Shepshed)

Using the calculator the concentration at the nearest receptor is shown below to be 23.7µg/m^{-3}



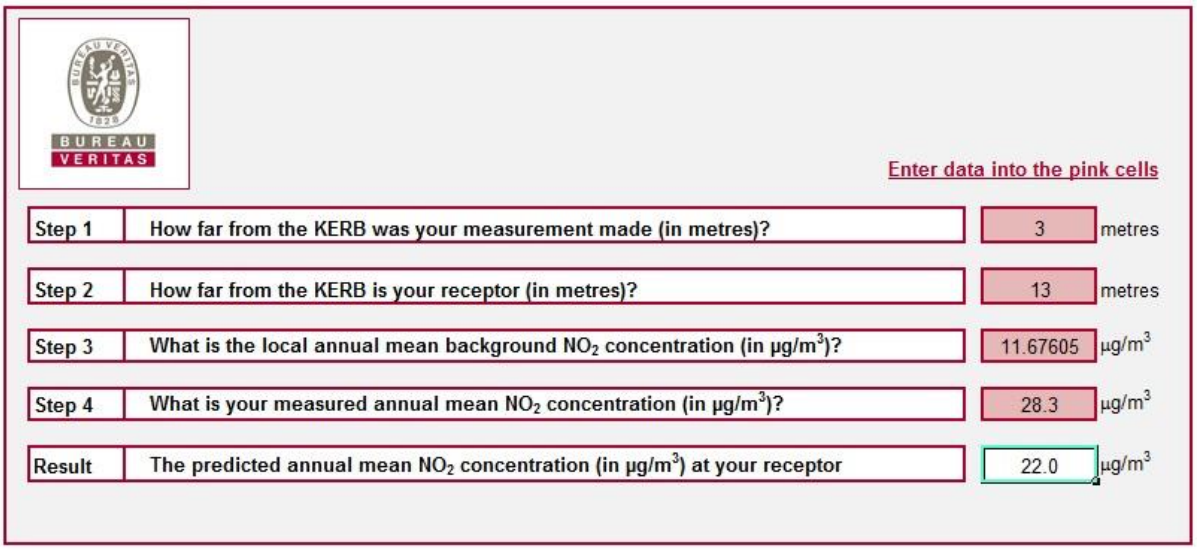
BUREAU VERITAS

Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	14	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	10.34939	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	34.9	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	23.7	µg/m^3

Loughborough Rd (Hathern)

Using the calculator the concentration at the nearest receptor is shown below to be 22.0µg/m^{-3}

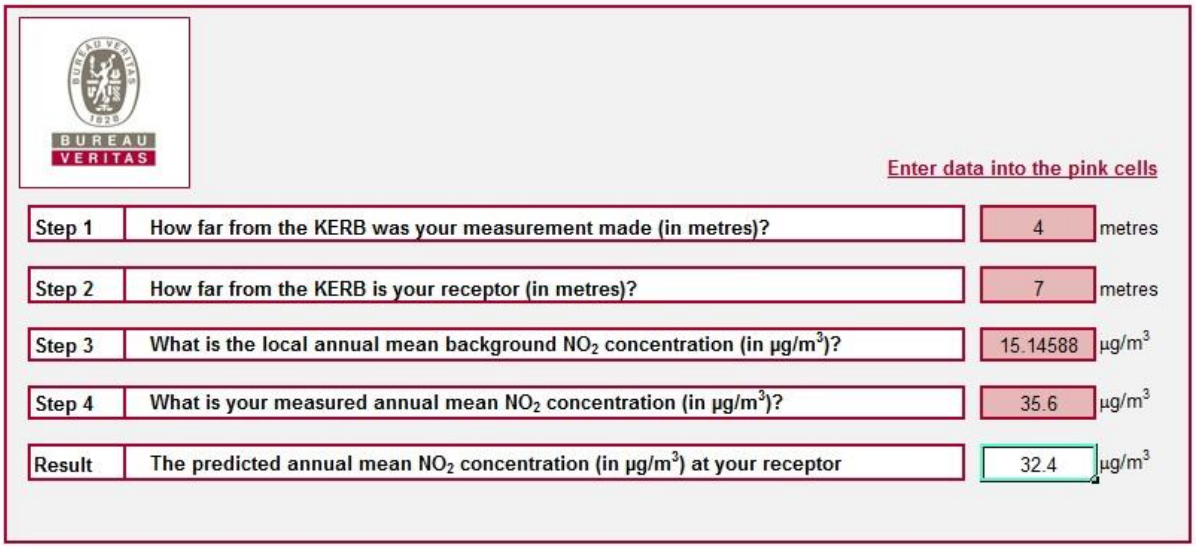


Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	13	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	11.67605	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	28.3	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	22.0	µg/m^3

A6 (Birstall)

Using the calculator the concentration at the nearest receptor is shown below to be 32.4µg/m^{-3}



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	4	metres
Step 2	How far from the KERB is your receptor (in metres)?	7	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	15.14588	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	35.6	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	32.4	µg/m^3

QA/QC of diffusion tube monitoring

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 follows links:

- AIR-PT Rounds 13 to 24 (Apr 2016 - Feb 2018) (PDF 228KB)

Results submitted were determined to be **satisfactory**

QA/QC of automatic monitoring

The analysers are serviced under schedule via Matt's Monitors.

Daily "automatic" and fortnightly manual calibrations are also undertaken, the later performed by the Local Authority.

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

Appendix D: Proposal to Revoke the Syston AQMA

Background to the Declaration of the Syston AQMA

Following an initial screening assessment in the early 2000's there had been evidence to suggest that although levels of nitrogen dioxide in the conurbation of Syston would not generally breach the air quality objectives - other than in close vicinity (10 to 20 metres) of roadside locations – there was the potential that these objectives would not be achieved at a number of particularly sensitive properties along the main road lengths through and in the immediate vicinity of the town. Whilst much of the original documentation (including the original AQMA Orders) leading towards the development of the AQMA have been lost via multiple office relocations and through the loss of knowledge due to staff changes; it is understood that these susceptible properties were at the time considered within the declaration of the area as 'a whole'. These findings were accepted by the then Department of Environment, Transport and the Regions and as a consequence the Syston AQMA was first declared in 2001 in relation to likely exceedances of the NO_2 annual mean (40µg/m^3) along the Melton Road corridor through the town of Syston.

Later evidence presented in Charnwood's 2004 Round 1 Stage 4 Review and Assessment report - based solely on forward predications from 2003 monitoring data - concluded that whilst it was "*quite likely*" there would be breaches at key receptors, that "*on the whole the original estimates of the extent of exceedances of the air quality objectives made in 2001 were overly pessimistic in terms of geographical and metric extent of exceedance*". It was further expressed that "*Air quality in Syston and Loughborough is not considered to be as poor as originally predicated*" (Charnwood, 2004).

The 2004 report further details the modelling methodology used in determining the predications using contemporary information about road traffic movement, its composition with estimates of the contribution of different classes of road vehicles to NOx and NO_2 emission, extending to meteorological data and other significant background sources.

Whilst this September 2004 report recommended that no revisions should be made to the existing (2001) Syston Air Quality Management Area, further dialogue with Defra and consultees around that time resulted in the conclusion that going forward the AQMA needed to be declared on individual roads and properties. This ultimately led to an amendment of the original Order being made on the 29th November 2004, designating the residential properties detailed below as now defining the revised AQMA which continues to remain in place as of 2018:

Melton Road, Syston	numbers 1108-1126, 1182-1190, 1238-1260 (even)
	numbers 0191-1109, 1121-1141, 1163 (odd)
	Midland Railway Hotel
Sandford Road	2A

The designated area also incorporates the land within the following highways including all publicly owned land within 10 meters of the kerbside of each;
Melton Road (High Street to Fosseway)

Directed Monitoring Post- 2004

As with any air quality modelling or monitoring; outputs cannot be solely relied upon to provide absolute proof, or otherwise, of compliance with air quality objectives.

It was with this view that Charnwood gave consideration to increasing the scope of our monitoring network around the Melton Road corridor to inform on the validity of the projections made by the earlier modelled predictions.

The area of Melton Road under scrutiny is a straight single carriageway of approximately 1Km in length that effectively runs past a railway access road at its south-westerly end, through a mix of residential dwellings and shop frontages to what is considered the 'town centre' at the north-easterly end. Roadside buildings generally become denser as you travel further north towards the town centre, although residential properties are more prevalent at the southern end. A 'canyon-effect' could be considered to be in place along certain stretches where the buildings are high sided and are within 3-5 metres to the kerbside. The road has a number of

road marked parking spaces along its length, primarily around the midpoint area of the stretch in question, which although typically do not restrict traffic flow, occasionally may cause traffic to pause when cars are manoeuvring to park. At the northerly town centre end there is a 4 road junction that is currently served by a mini-roundabout. It is fair to say that this junction is often congested and due to the road layout often causes stop-start traffic due to it also having 2 zebra crossings on the immediate entry/exit points to the roundabout and a pedestrian crossing on a 3rd. The 4th exit has a pedestrian crossing some further distance back from the junction.

Directly opposite properties identified in the AQMA Order i.e. #1182 – 1192 is the entrance to an Aldi supermarket with car park. A little further to the north is a Tesco, again with associated car park. In terms of a combination of traffic movement, congestion and relevant residential exposure it would be reasonable to suggest that these particular dwellings would represent a 'worst case' scenario in terms of NO_2 exposure on Melton Road and through the years has provoked questions from the Town Council as to the results of our monitoring.

With this information, Charnwood has continued to review the locations of available monitoring sites in order to cover as much of the road length, both to easterly and westerly sides of the south-north running road to target relevant receptors designated under the AQMA Order.

Funding was finally secured in early 2007 enabling the installation of a dedicated continuous NO_2 monitor to be located immediately in front of the residential properties at # 1182 – 1192 Melton Road. The monitor went live on 19th June 2007 and is co-located with diffusion tubes in triplicate to facilitate the 'bias-correction' of other tubes in the vicinity. With additional diffusion tubes positioned on the façades of 1116, 1123, the 'town centre' i.e. a lamppost immediately adjacent to a congested mini-roundabout and similarly at a position on High Street we believe the spacing of the continuous monitor / diffusion tubes are well located to give representative data along the primary area of Melton Road / High Street where we would expect to see elevated concentrations. Locations of the monitoring sites can be seen in Map 6 within Appendix E below.

Discussion of Results

As can be seen in the annual mean NO_2 Monitoring data presented above within Table A.3 of Appendix A; there have been no reported exceedances of the air quality objective over the years 2013-17 from any of the area relevant diffusion tubes i.e.:

DT19: Syston Town Centre

DT20: 1123 Melton Road

DT21: 1116 Melton Road

DT32: High Street

DT33-35: Monitor Station Triplicates at 1182 – 1192 Melton Road

Giving consideration to a longer trend series, dating back to 2005; we can see from the plot of NO_2 concentration against year for the Syston sites there has been a steady decline in levels throughout this period with the last recorded breaches in 2007 at the DT19, DT21, and DT32 locations (Figure A.7, Appendix A).

It is encouraging to note that the individual yearly trends for each of the sites are closely matched i.e. a decrease in concentration at one site in any given year is replicated at the other locations, similarly the same being true for any yearly increase in concentrations.

Of interest is the outcome of monitoring at 1116 Melton Road. This location appears to be the site of highest concentration on a number of years, namely 2007, 2010, 2016 and 2017. It may be that this location is more exposed to the characteristics of the aforementioned ‘canyon-effect’ in parts of Melton Road, rather than the already highlighted issues surrounding the more noticeable vehicle movements around the zone often cited as being the primary area of concern near to #1182 – 1192.

Recent dialogue with the LAQM Helpdesk has informed that typically 3 years of monitoring data with results below an objective is required to support any revocation. This should further be supported by robust monitoring evidence and include the confirmation that there are no alternative sites of relevant exposure within these AQMAs, also that the existing monitoring locations represent worse-case exposures within the AQMA. Charnwood can confirm this to be the case.

As the results and conclusions from all previous annual reports submitted over this timescale have been accepted by Defra, the data supports the view that even when consideration is given to the location of highest level recorded NO_2 annual mean concentration i.e. at the façade of 1116 Melton Road, that it has been consistently shown that measured concentrations are compliant and within the air quality objective levels for this pollutant throughout the existing AQMA.

This leads us to believe that the outcome of this review now supports the revocation of the 2004 AQMA Order.

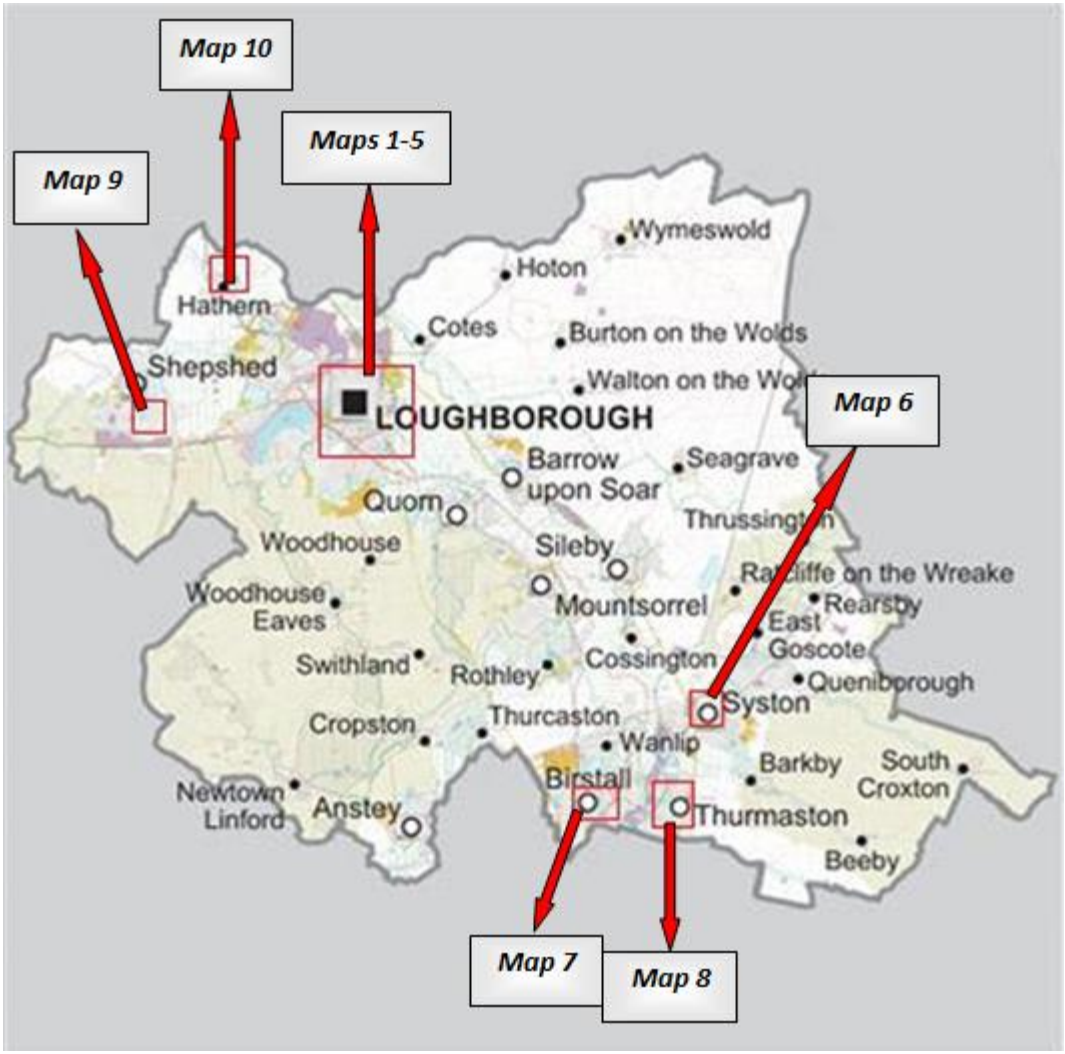
Proposal of Revocation

Upon consideration and acceptance of the findings within this report; it is Charnwood's intention to further consult with Syston Town Council (and any other parties where necessary) to recommend the revocation of the Syston Air Quality Management Area and then revoke the AQMA accordingly.

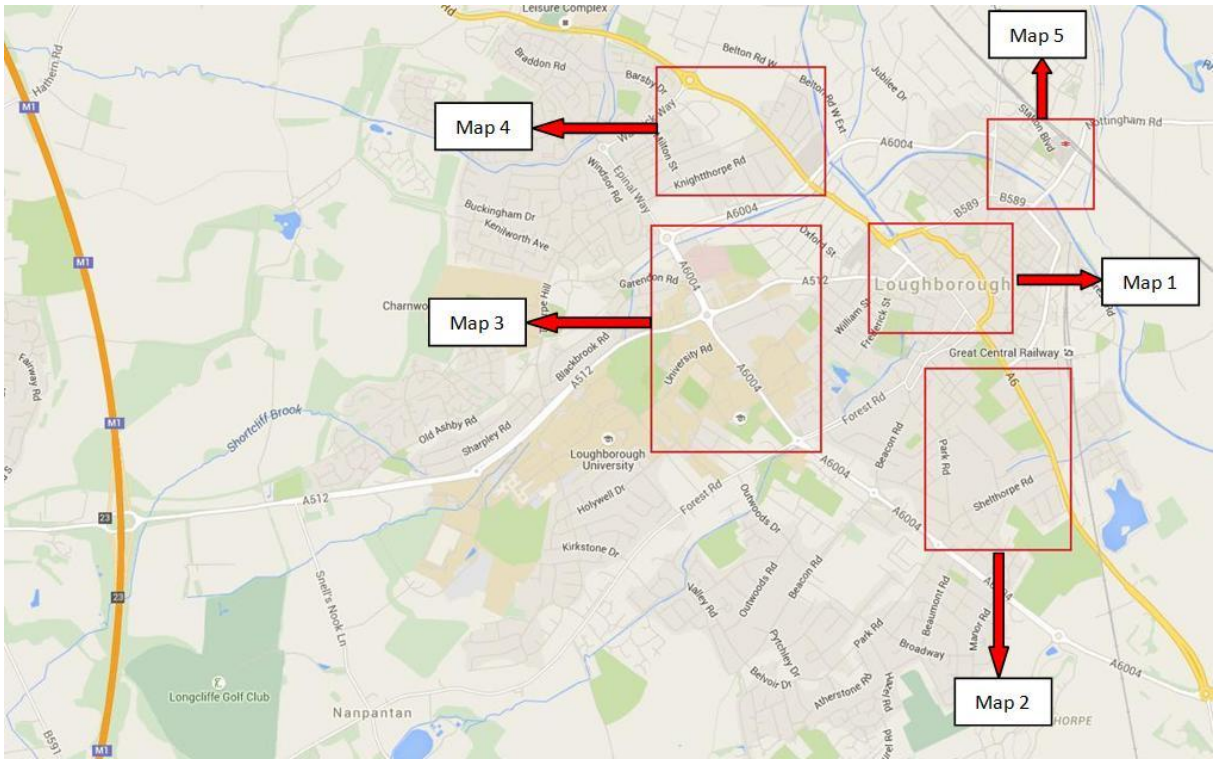
Appendix E: Map(s) of Monitoring Locations and AQMAs

Selected maps of key monitoring areas

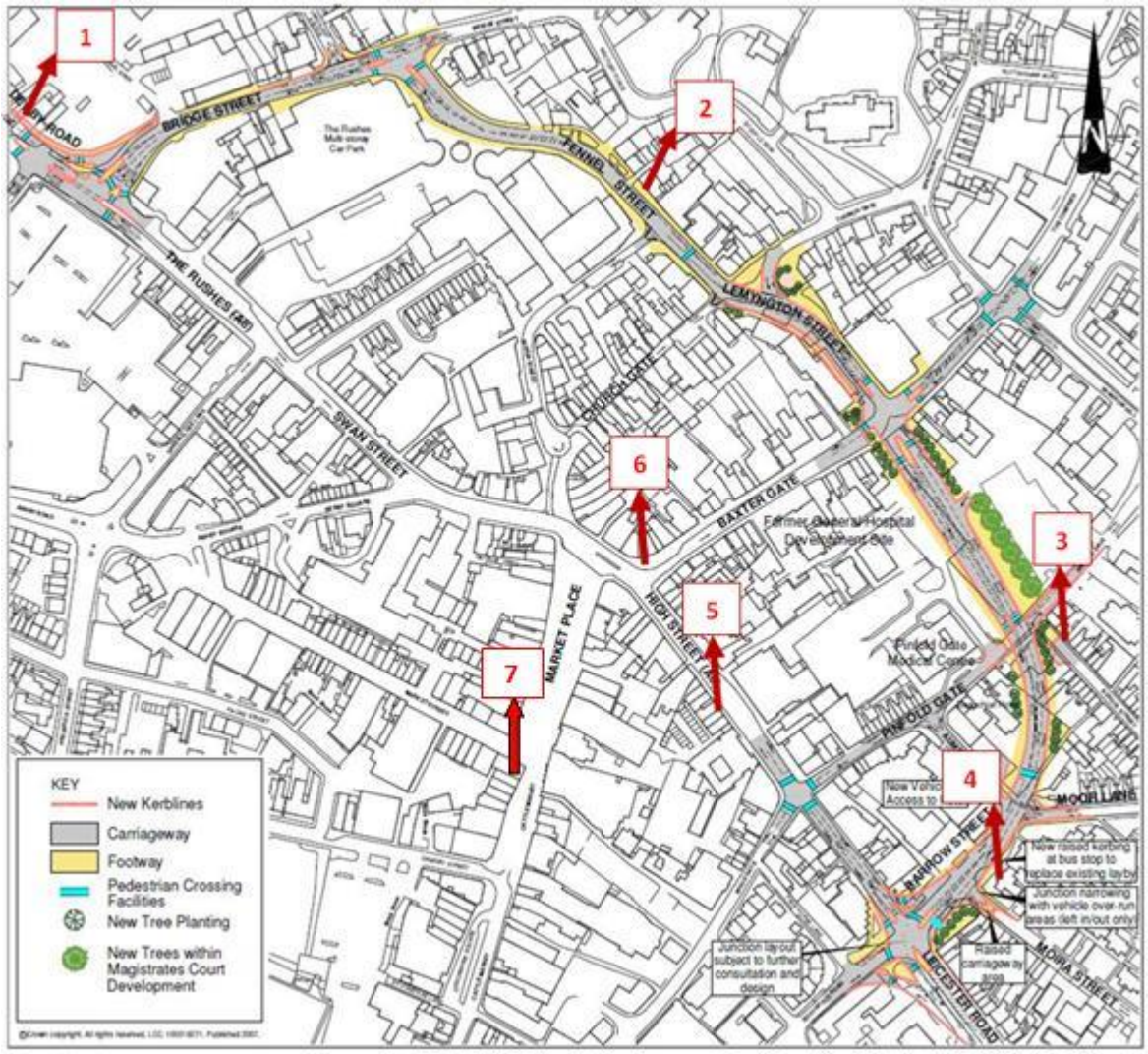
The Borough of Charnwood



Loughborough Area:



Map 1: Loughborough Town Centre

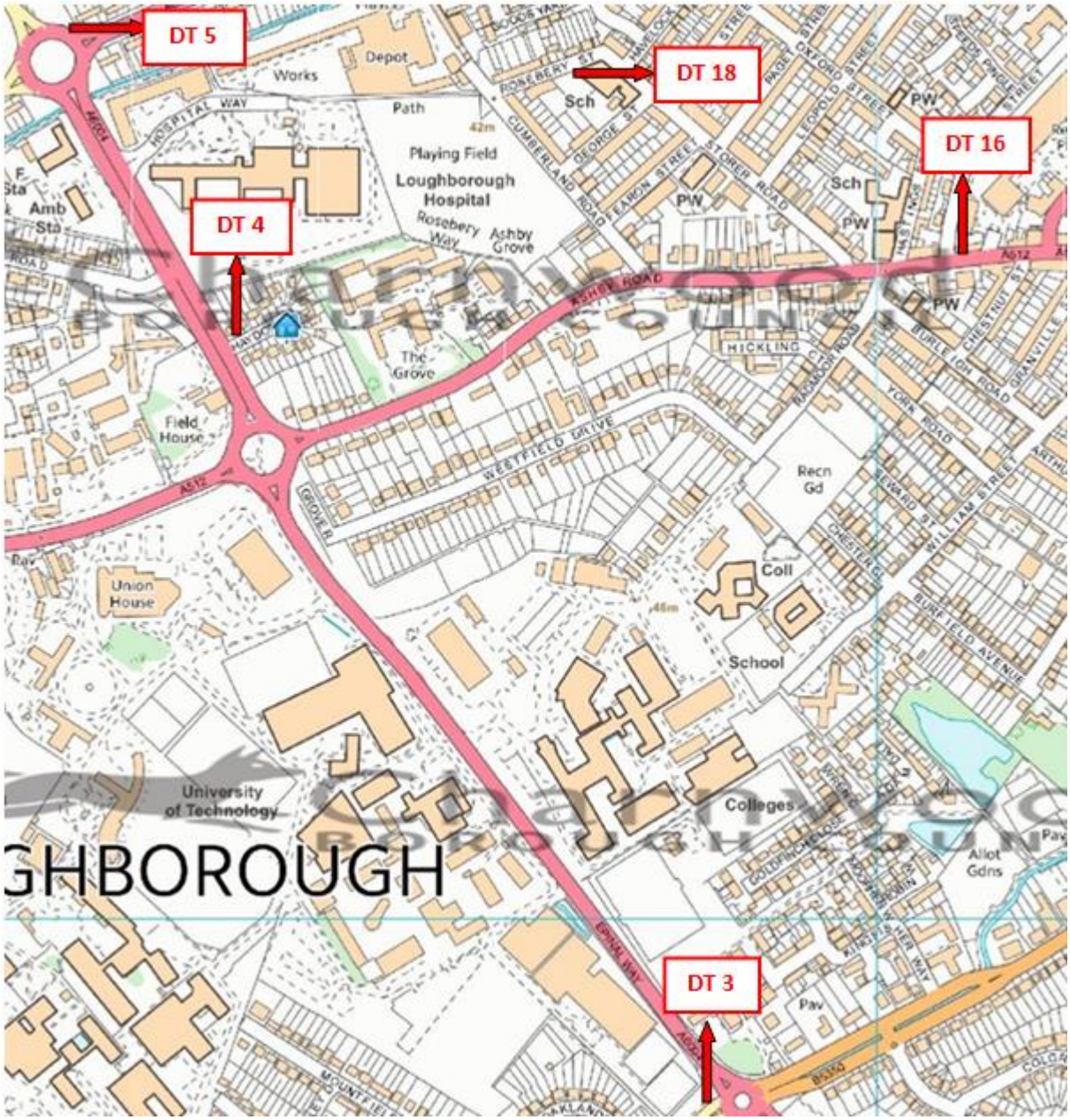


Map Position	Site ID	Site Name	Pollutant
1	DT8	Derby Road	NO_2
2	DT31	Fennel Street	NO_2
3	DT30	School Street	NO_2
4	DT29	Barrow Street	NO_2
5	DT14	High Street	NO_2
6	DT36, DT37, DT38	Baxter Gate AQMS 1, 2, and 3	NO_2

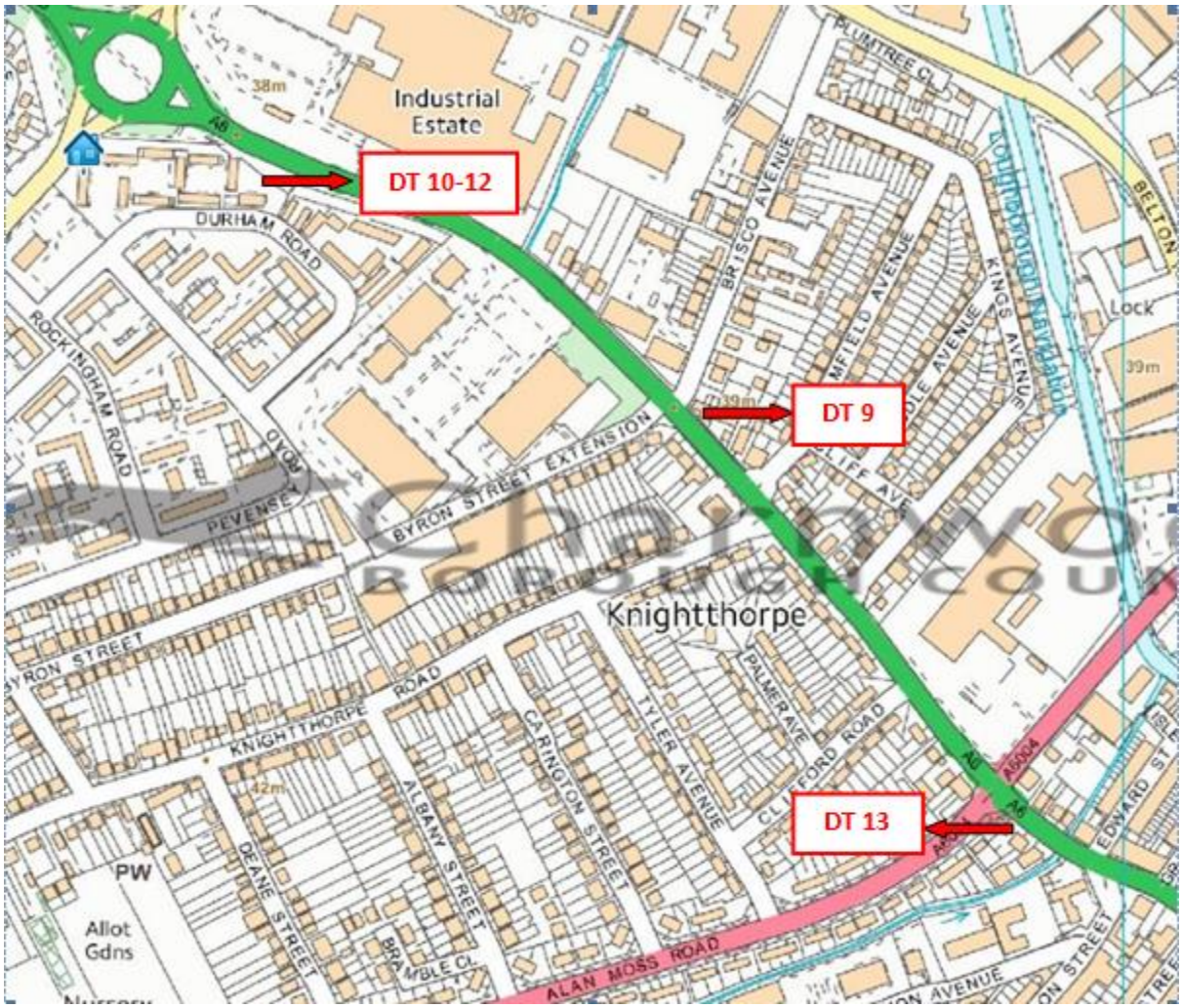
The above map shows the route of the Inner Relief Road which opened in November 2014. Traffic is now routed away from the town centre.

Map 2: Loughborough South

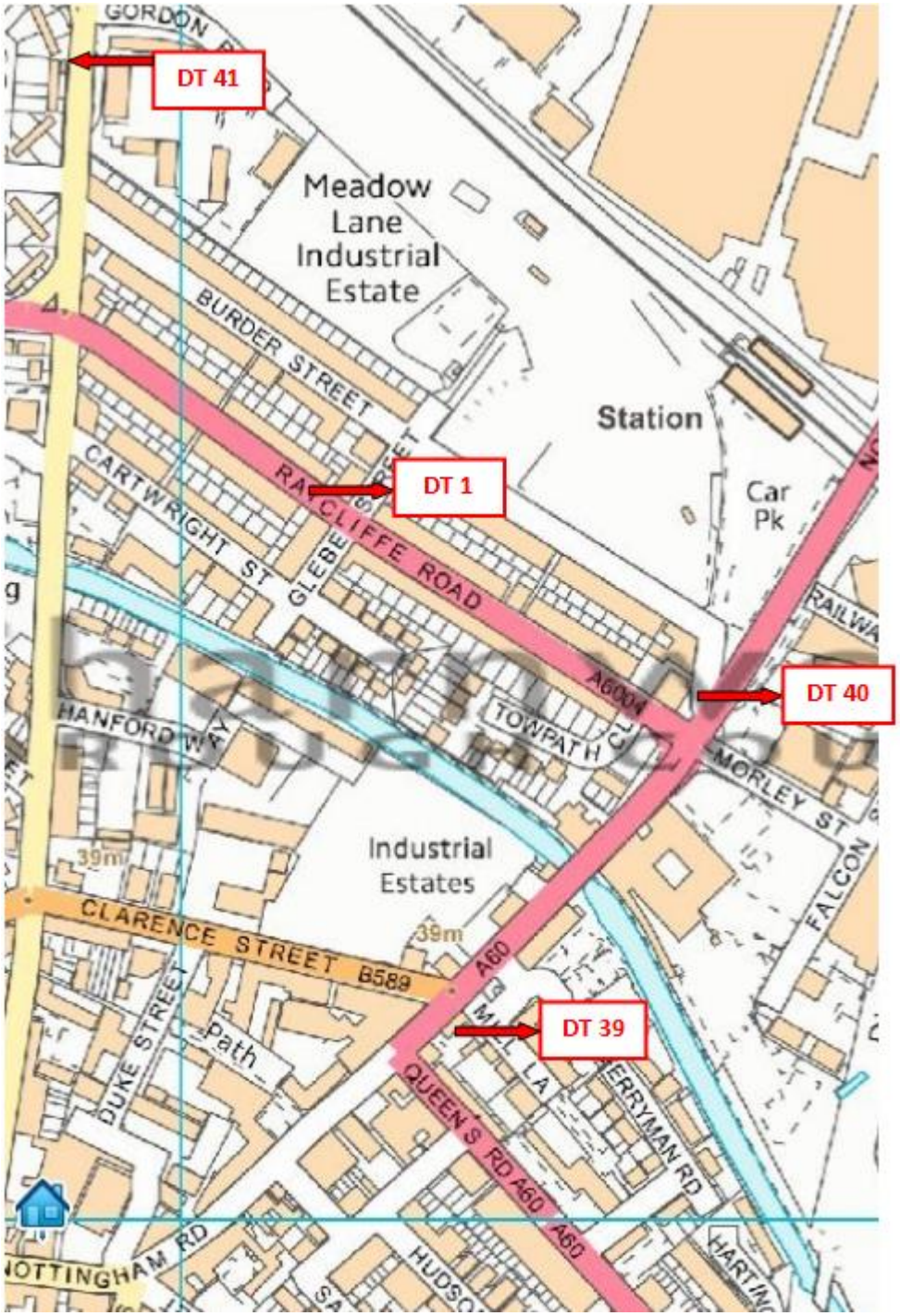
Map 3: Loughborough West



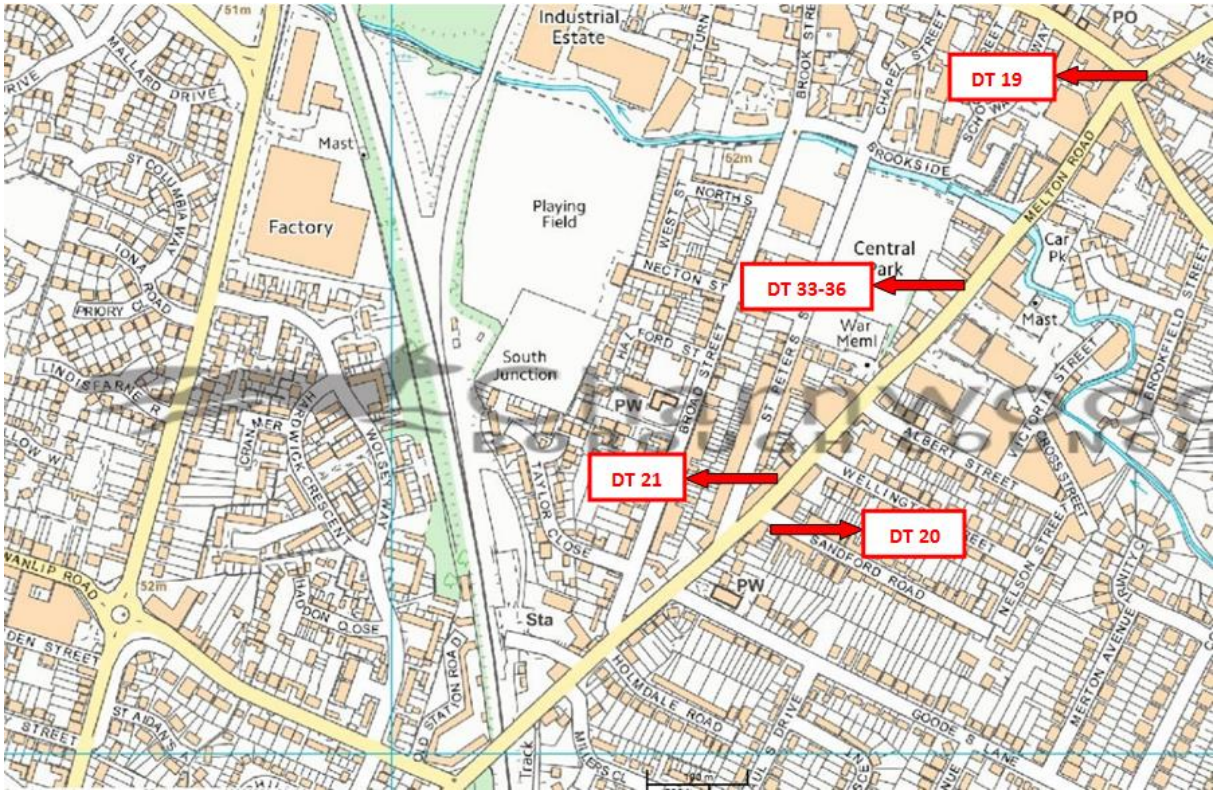
Map 4: Loughborough North



Map 5: Loughborough East

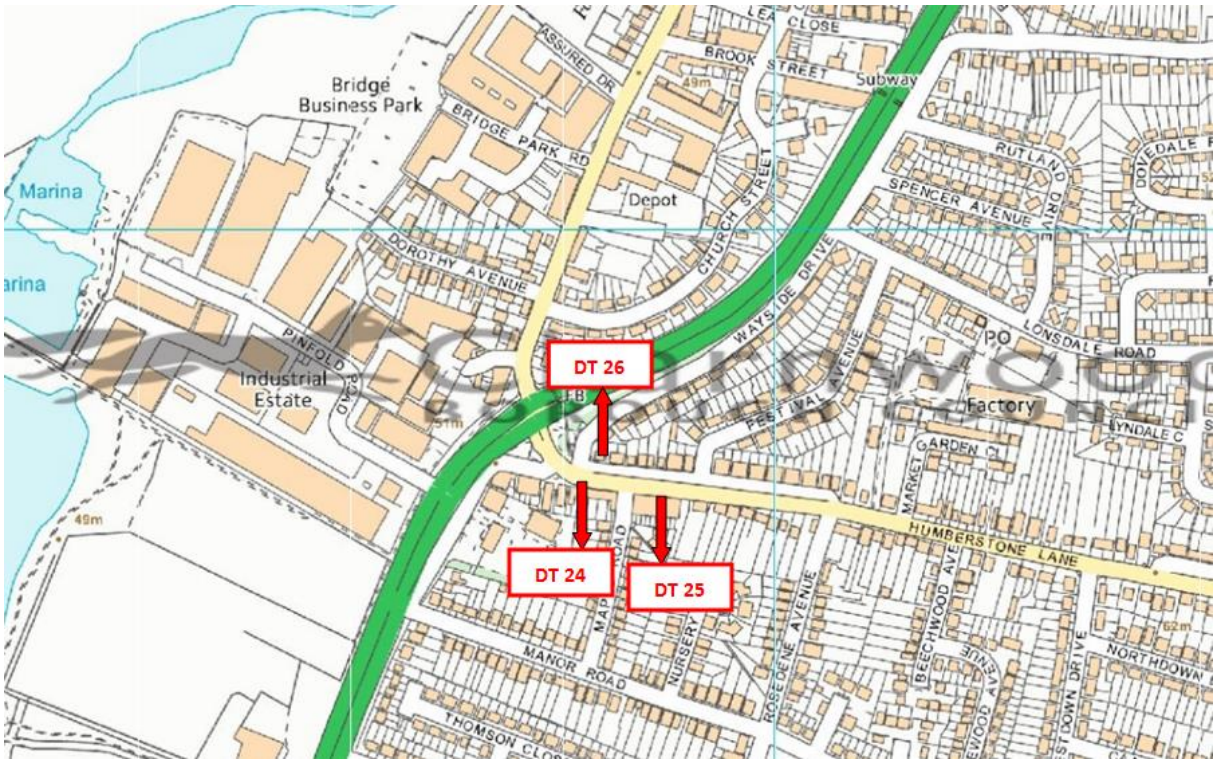


Map 6: Syston

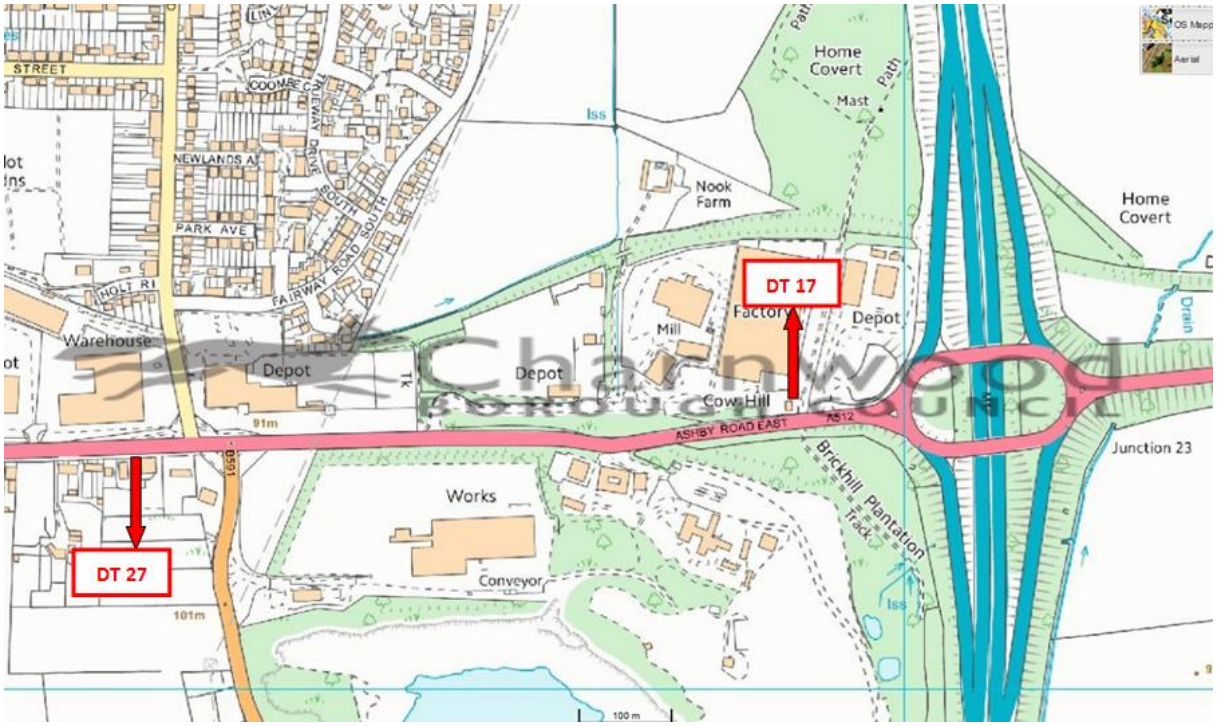


Map 7: Birstall

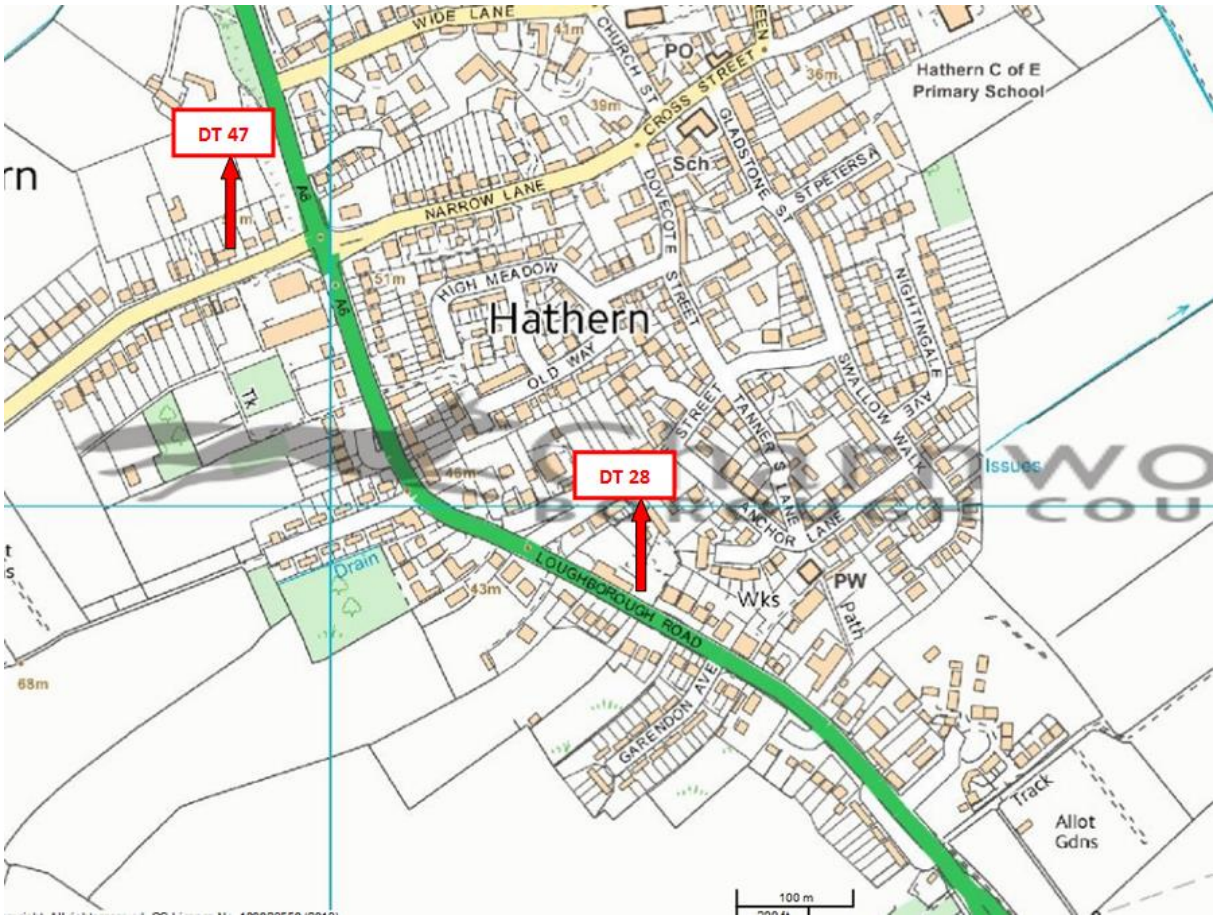
Map 8: Thurmaston



Map 9: Shepshed



Map 10: Hathern



Appendix F: Summary of Air Quality Objectives in England

Table F.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[4] 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	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMMP	Dust Monitoring and Management Plan
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
GCR	Great Central Railway
LAQM	Local Air Quality Management
LIRR	Loughborough Inner Relief Road
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) 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

Charnwood Borough Council - Previous Air Quality Review & Assessment documents (including Final AQ Action Plan)
https://www.charnwood.gov.uk/pages/airpollution

Charnwood 2004 Round 1 Stage 4 Review and Assessment
https://www.charnwood.gov.uk/files/documents/2004_round_1_stage_4_review_and_assesment/2004%20Round%201%20Stage%204%20Review%20%26%20Assesment.pdf

LAQM Technical Guidance document TG(16)
https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf

LAQM Support - NO_2 Diffusion Tube QA/QC
https://laqm.defra.gov.uk/diffusion-tubes/diffusion-tubes.html