



2017 Air Quality Annual Status Report (ASR)

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

August, 2017

Charnwood Borough Council

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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 billion³.

Data for Loughborough from 2016 indicates that there continues to be a significant reduction in the concentration of NO₂ 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/m³ over the 5 years before the road was opened, down to 32 and 31µg/m³ respectively during the second full year of monitoring (2016) since the road was opened. These figures thus maintain a 2nd 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/m³ and Ashby Road where concentrations have dropped to 28 from 35µg/m³

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 NO₂ levels remain consistently beneath the Air Quality Objectives. It is anticipated that consideration will soon be given to the revocation of this existing AQMA.

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

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 PM₁₀ 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 seen in relation to the 2 major air quality areas of concern for the Council, namely the reduction of NO₂ levels in Loughborough town centre and PM₁₀ 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

Work is now being undertaken to evaluate the concentration of sulphur dioxide (SO₂) in the vicinity of the Great Central Railway (GCR) engine sheds at Loughborough. The on-going data from monitoring equipment installed during July 2016 is expected to give us a better understanding of the current levels in the area, updating our knowledge of the area since the AQMA was declared in 2001 and the corresponding Detailed Assessment published during 2003.

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. 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.

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](#)

Table of Contents

Executive Summary: Air Quality in Our Area	i
Air Quality in Charnwood	i
Actions to Improve Air Quality	ii
Conclusions and Priorities	ii
Local Engagement and How to get Involved	iii
1 Local Air Quality Management	1
2 Actions to Improve Air Quality	2
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in Charnwood	5
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations.....	12
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	13
3.1 Summary of Monitoring Undertaken	13
3.1.1 Automatic Monitoring Sites	13
3.1.2 Non-Automatic Monitoring Sites.....	13
3.2 Individual Pollutants	14
3.2.1 Nitrogen Dioxide (NO ₂).....	14
3.2.2 Particulate Matter (PM ₁₀).....	14
3.2.3 Particulate Matter (PM _{2.5})	15
3.2.4 Sulphur Dioxide (SO ₂)	16
Appendix A: Monitoring Results	17
Appendix B: Full Monthly Diffusion Tube Results for 2016	39
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	42
Appendix D: Map(s) of Monitoring Locations and AQMAs	46
Appendix E: Summary of Air Quality Objectives in England	56
Glossary of Terms	57

List of Tables

Table 2.1 – Declared Air Quality Management Areas.....	3
Table 2.2 – Progress on Measures to Improve Air Quality	7

List of Figures

Figure A.1 Plot of NO₂ Concentration against Year for Loughborough Town Centre (i) sites 26

Figure A.2 Plot of NO₂ Concentration against Year for Loughborough Town Centre (ii) sites 27

Figure A.3 Plot of NO₂ Concentration against Year for Loughborough South sites.. 28

Figure A.4 Plot of NO₂ Concentration against Year for Loughborough West sites .. 29

Figure A.5 Plot of NO₂ Concentration against Year for Loughborough North sites .. 30

Figure A.6 Plot of NO₂ Concentration against Year for Loughborough East sites ... 31

Figure A.7 Plot of NO₂ Concentration against Year for Syston sites 32

Figure A.8 Plot of NO₂ Concentration against Year for Birstall sites 33

Figure A.9 Plot of NO₂ Concentration against Year for Thurmaston sites 34

Figure A.10 Plot of NO₂ Concentration against Year for Shepshed sites 35

Figure A.11 Plot of NO₂ Concentration against Year for Hathern site 36

1 Local Air Quality Management

This report provides an overview of air quality in Charnwood during 2016. 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 can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by 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: <http://www.charnwood.gov.uk/pages/airpollution>

See full list at <http://uk-air.defra.gov.uk/aqma/list>.

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 (inc. date of publication)
						At Declaration	Now	
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)	37.9 µg/m3 (Leicester Rd)	Charnwood Local Air Quality Management – Final Action Plan http://www.charnwood.gov.uk/files/documents/final_air_quality_action_plan/draftairqualityactionplan.pdf
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)	35.8 µg/m3 (Melton Rd)	Charnwood Local Air Quality Management – Final Action Plan http://www.charnwood.gov.uk/files/documents/final_air_quality_action_plan/draftairqualityactionplan.pdf
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)	In Progress	Charnwood Local Air Quality Management – Final Action Plan http://www.charnwood.gov.uk/files/documents/fi

Charnwood Borough Council

								nal_air_quality_action_plan/draftairqualityactionplan.pdf
Mountsorrel	Declared 2011	PM10 24 Hour Mean	Mountsorrel	An area encompassing residential properties near Mountsorrel Quarry	NO	60 recorded exceedences (from 313 valid samples) of the 24 Hr Mean	21 recorded exceedences (from 268 valid samples) of the 24 Hr Mean. Equivalent to 29 for full year	Dust Management and Monitoring Plan http://www.charnwood.gov.uk/files/documents/dust_management_and_monitoring_plan/DMMP%20Final%202016.pdf

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 collated data from the monitoring locations suggests that there are no exceedences of air quality objectives at any location. With regards to monitoring Sulphur Dioxide (SO₂) it was commented that the Council should assess whether the AQMA for the 15-minute objective for SO₂ can be revoked.

Charnwood Borough Council is continuing to take forward a number of direct measures during the current reporting year of 2016/17 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

A number of key completed actions remain included in this table due to the influence they continue to contribute to the on-going assessment of the individual long-term effectiveness of each measure, amongst those are:

-) The Loughborough Inner Relief Road (Nov 2014) - leading to an associated sustained reduction in NO₂ levels around the town centre since the opening.
-) The re-designing of the Epinal Way junction (Loughborough) - leading to an improvement in traffic flow with an associated sustained reduction in NO₂ levels.
-) A review and update of the original 2011 Dust Management and Monitoring Plan (DMMP) for Mountsorrel Quarry. The DMMP continues to evolve and provide a robust methodology for further assessment.

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

-) The completion of the first full year of monitoring of Sulphur Dioxide (SO₂) concentrations in the vicinity of the Great Central Railway and associated AQMA. This will provide evidence towards the current appropriateness of the designated AQMA against the 15-minute objective for SO₂.

-) A review of data in respect to the Syston Air Quality Management Area with a view towards the revocation of this particular 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/m ³ (annual mean)	Scheme completed	Completed 2011	Evaluation of NO ₂ levels continuing
2	Loughborough Inner Relief Road	Transport Planning and Infrastructure	Other	Leicestershire County Council + LA Environmental Health	-	-	-	< 40 µg/m ³ (annual mean)	Scheme completed	Completed Nov 2014	Evaluation of NO ₂ levels continuing
3	Epinal Way Junction	Traffic Management	UTC, Congestion management, traffic reduction	Leicestershire County Council + LA Environmental Health	-	-	-	< 40 µg/m ³ (annual mean)	Scheme completed	Completed 2014	Evaluation of NO ₂ levels continuing
4	Mountsorrel Quarry Dust Management Plan (DMMP)	Environmental Permits	Other	Charnwood Borough Council	-	-	Reduction of PM ₁₀ concentration	<35 exceedance of 50 µg/m ³ per year	Continuing review	-	Evaluation of PM ₁₀ levels continuing
5	Charnwood Local Plan 2011 to 2028 Core Strategy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Charnwood Borough Council	-	-	-	-	-	Adopted Nov 2015	Provides guidance and measures to mitigate any air quality impacts
6	New Boiler Plant at CBC	Promoting Low Emission Plant	Public Procurement of stationary combustion sources	Charnwood Borough Council	-	-	-	-	Completed	Installed Aug 2015	-
7	Electric charge points at Beehive Car Park	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote	Street Management at CBC installed equipment with grant funding	-	-	-	-	Completed	Completed	-

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	(L'boro)	rt	Low Emission Vehicles, EV recharging, Gas fuel recharging	from Cenex Plugged in Midlands and 'Choose how you Move' Leicestershire County Council							
8	Replace Street Wardens fleet vehicles with 2 electric charge vehicles and 4 diesels with reduced CO2 emissions	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	Charnwood Borough Council (Street Management / Fleets Contract Manager)	-	-	-	-	2 x electric purchased Apr 2015 4 x diesel purchased Aug 2015	Completed	-
9	Driver Assessments	Vehicle Fleet Efficiency	Driver training and ECO driving aids	Charnwood Borough Council (Cleansing & Open spaces)	-	-	Reduction in fuel consumption	-	No training yet, but Tracker allows monitoring of driver style (speeding, acceleration, braking, cornering). All drivers have had warning that speeding will not be tolerated. That had an immediate impact on their performance which must impact on fuel consumption, although too early to measure any discernible difference	-	-
10	Staff car sharing scheme	Alternatives to private vehicle use	Car & lift sharing schemes	Charnwood Borough Council	-	-	Uptake	-	-	On-going	-
11	CO2 banding for staff car parking allowance /	Traffic Management	Emission based parking or permit charges	Charnwood Borough Council	-	-	-	-	-	On-going	-

Charnwood Borough Council

	permits										
12	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
13	New electronic bus information and shelters in Loughborough	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	-	-	-	-	-	Installed	Completed	-
14	Improved pedestrian signs in Loughborough	Public Information	Via other mechanisms	-	-	-	-	-	Installed	Completed	-
15	Civil Parking Enforcement	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	Charnwood Borough Council	-	-	Enforcement Stats	-	Unknown	On-going	Measure to improve traffic flow and reduce congestion
16	Home Working	Promoting Travel Alternatives	Encourage / Facilitate home-working	Charnwood Borough Council	-	-	Uptake	-	Unknown	On-going	-
17	Workplace Challenge Scheme	Promoting Travel Alternatives	Promotion of walking	National but promoted internally by Charnwood Borough Council	-	-	-	-	-	Annual	-
18	ULEV (Joint funded study across the County and City for potential scheme for electric charge points and	Promoting Low Emission Transport	Taxi emission incentives	Leicestershire County Council	-	-	-	-	CBC evaluation completed	-	Scheme assessed to not be beneficial to CBC due to taxi mileages involved

Charnwood Borough Council

	purchase scheme for taxis)										
19	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)	-	-	-	-
20	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	-
21	Increasing bus travel through work on Quality Bus Partnership (QBP)	Alternatives to private vehicle use	Other	Leicestershire County Council	Unknown	Unknown	Unknown	-	Unknown	Unknown	-
22	Birstall 'Park & Ride'	Alternatives to private vehicle use	Bus based Park & Ride	Leicestershire County Council	-	-	Uptake	-	Completed	Opened July 2011	-
23	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	-
24	Personalised Travel Planning and Accessibility	Promoting Travel Alternatives	Personalised Travel Planning	Leicestershire County Council	Unknown	Unknown	Unknown	-	Unknown	Unknown	-

Charnwood Borough Council

	Team set up to promote sustainable travel choices										
25	Network management for roadworks, incidents, and planned events	Traffic Management	Other	Leicestershire County Council	-	-	-	-	-	-	-
26	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	-	-
27	Providing more consistent and reliable journey times	Traffic Management	UTC, Congestion management, traffic reduction	Leicestershire County Council	-	-	Average vehicle speeds (weekday morning peak)	-	Unknown	-	-
28	Following completion of Town Centre Improvement Scheme, review TRO arrangements and signal operations at key junctions in / around town	Traffic Management	Other	Leicestershire County Council	-	-	-	-	Unknown	Unknown	-
29	Programme of network signing improvements (including de-cluttering)	Traffic Management	Other	Leicestershire County Council	-	-	-	-	Unknown	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 PM₁₀ 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 1 site during 2016. Table A.1 in Appendix A shows the details of the site.

PC hard drive failure and a resulting partial loss of data (plus additional downtime whilst upgrading to a new air quality software suite) relating to monitoring records at a further 2 sites; **Baxter Gate (L'boro):NO₂** and **Melton Rd (Syston): NO₂**, unfortunately meant data capture was insufficient for inclusion in this report. Hence there is no data presented for NO₂ hourly mean concentrations.

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 (passive) monitoring of NO₂ at 48 sites (52 tubes) during 2016. Table A.2 in Appendix A shows the details of the sites.

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments 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 (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B.

There were no exceedences of the annual mean air quality objective in 2016.

3.2.2 Particulate Matter (PM₁₀)

Charnwood Borough Council continues to monitor PM₁₀ 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. in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

Table A.4 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past 5 years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

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 PM₁₀ observations at the Mountsorrel PM₁₀ monitoring site, considered to be the 'worst-case' location for public exposure to dust within the Borough:

The recorded annual mean concentration of PM₁₀ at the Mountsorrel site in 2016 was 24.7µg/m³. The PM_{2.5} concentration at this location can be estimated as follows:

The recorded annual mean PM₁₀ concentration multiplied by the nationally derived correction factor: 24.7 x 0.7 = 17.3

Estimated annual mean PM_{2.5} = 17.3µg/m³

Given the fact that considerable effort is being made to lessen PM₁₀ 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 (SO₂)

Monitoring in respect of the Great Central Railway commenced in July 2016. Whilst we have a good rate of data capture for this part-year period, some questions have been raised with the manufacturer of the analyser about the accuracy of the output when compared against 3x sulphur dioxide tubes that we have co-located alongside the monitor.

At the time of writing; arrangements are being made for the unit to undergo a firmware update allowing re-characterisation of the SO₂ sensor to give a higher confidence in the raw readings already obtained. We hopefully will therefore be able to retrospectively provide this data in our future submissions.

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

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

Charnwood Borough Council

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

Charnwood Borough Council

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 (L'boro)	Roadside	462369	311809	NO2	YES	0	~4	NO	~3
DT33	Syston AQMS 1	Roadside	462540	311428	NO2	YES	~10	~3	YES	~1.5
DTT34	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

Charnwood Borough Council

	(L'boro)									
DT43	91 Wharcliffe 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 NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
DT1	Roadside	Diffusion Tube	83	83	26.9	29.5	21.6	21	24.3
DT2	Roadside	Diffusion Tube	100	100	25.8	36.1	22.3	20.1	23.1
DT3	Roadside	Diffusion Tube	100	100	29.2	32.7	26.6	25	28.6
DT4	Roadside	Diffusion Tube	100	100	29	32.1	25.2	26	27.8
DT5	Roadside	Diffusion Tube	100	100	27.1	28.2	23.4	21.5	23.7
DT6	Roadside	Diffusion Tube	100	100	28.8	30.1	26.1	24.4	26.7
DT7	Roadside	Diffusion Tube	100	100	35.9	42.7	34.2	30.6	37.9
DT8	Roadside	Diffusion Tube	92	92	36.8	40.4	30.7	28.7	33.4
DT9	Roadside	Diffusion Tube	92	92	30.4	30.9	25.1	23.1	26.8
DT10	Urban Background	Diffusion Tube	100	100	21.9	24.7	18.3	17.8	19.9
DT11	Urban Background	Diffusion Tube	100	100	23.6	23.4	19.2	17	19.4
DT12	Urban Background	Diffusion Tube	100	100	23.1	26.1	19.3	16.9	19.1
DT13	Roadside	Diffusion Tube	100	100	34.8	33.6	27.8	25.2	27.4
DT14	Roadside	Diffusion Tube	100	100	56.3	<u>65.7</u>	39.1	28.5	32.4
DT15	Urban Centre	Diffusion	92	92	25.2	25.9	21.4	18.4	21.2

		Tube							
DT16	Roadside	Diffusion Tube	100	100	34.2	38.5	30	26.7	28
DT17	Roadside	Diffusion Tube	100	100	29.2	32.2	24.8	21.3	27.1
DT18	Roadside	Diffusion Tube	100	100	23.7	24.9	17	17.9	19.7
DT19	Roadside	Diffusion Tube	100	100	29.3	36.8	27.7	27.2	31.7
DT20	Roadside	Diffusion Tube	92	92	27.5	31.7	24.5	22.9	27.3
DT21	Roadside	Diffusion Tube	92	92	29	36.1	28.4	26.4	35.8
DT22	Roadside	Diffusion Tube	100	100	33.8	39.5	30.5	28.5	32.3
DT23	Roadside	Diffusion Tube	100	100	34.2	37.9	30.9	28.4	31.5
DT24	Roadside	Diffusion Tube	100	100	35.2	41.4	32.5	30.9	33.9
DT25	Roadside	Diffusion Tube	100	100	33.4	38.1	30.4	26	32.6
DT26	Roadside	Diffusion Tube	100	100	28.9	32.4	26.3	24.1	27.3
DT27	Roadside	Diffusion Tube	100	100	29.5	27.9	25.2	22.7	27.3
DT28	Roadside	Diffusion Tube	92	92	26.7	27.9	23	20.8	24.1
DT29	Roadside	Diffusion Tube	83	83	27.7	28.8	23.5	22.6	26.3
DT30	Roadside	Diffusion Tube	92	92	23.3	26.7	20.6	19.9	22.1
DT31	Roadside	Diffusion Tube	92	92	28.4	25.2	29.9	27.4	31.4
DT32	Roadside	Diffusion Tube	100	100	31.9	33.1	25.7	24.7	28.5

DT33	Roadside	Diffusion Tube	100	100	33.6	36.5	30.8	27.6	30.5
DTT34	Roadside	Diffusion Tube	100	100	32.5	36.7	29.4	27.1	29.8
DT35	Roadside	Diffusion Tube	100	100	31.5	35.5	28.8	25.7	29.8
DT36	Kerbside	Diffusion Tube	100	100	43.7	46.5	33.8	26.2	30.9
DT37	Kerbside	Diffusion Tube	100	100	42.6	47.1	33.7	25.3	31.7
DT38	Kerbside	Diffusion Tube	100	100	43.6	46.7	32.2	26.1	31
DT39	Roadside	Diffusion Tube	100	100	42.9	48.2	40.1	30.7	35.2
DT40	Roadside	Diffusion Tube	100	100	25.5	28.5	22	21.1	24.8
DT41	Roadside	Diffusion Tube	100	100	27.7	30.1	25.5	21.5	24.6
DT42	Roadside	Diffusion Tube	100	100	29.3	29.3	24	22.2	25.8
DT43	Roadside	Diffusion Tube	100	100	28.9	34.4	27.5	24.3	28.2
DT44	Roadside	Diffusion Tube	92	92	-	-	-	21.8	26.5
DT45	Roadside	Diffusion Tube	100	100	-	-	-	19.9	22.2
DT46	Roadside	Diffusion Tube	100	100	-	-	-	18.9	22.2
DT47	Roadside	Diffusion Tube	100	100	-	-	-	21.1	22.9
DT48	Suburban	Diffusion Tube	83	83	-	-	-	14.1	17.6
DT49	Roadside	Diffusion Tube	100	100	-	-	-	27.9	31.6
DT50	Roadside	Diffusion Tube	92	92	-	-	-	21.9	26.6

DT51	Roadside	Diffusion Tube	92	92	-	-	-	22.2	26.2
DT52	Roadside	Diffusion Tube	100	100	-	-	-	18	20.8

- Diffusion tube data has been bias corrected
- Annualisation has been conducted where data capture is <75%
- If applicable, all data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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.

Figures A.1 – A.11 Trends in Annual Mean NO₂ Concentrations

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

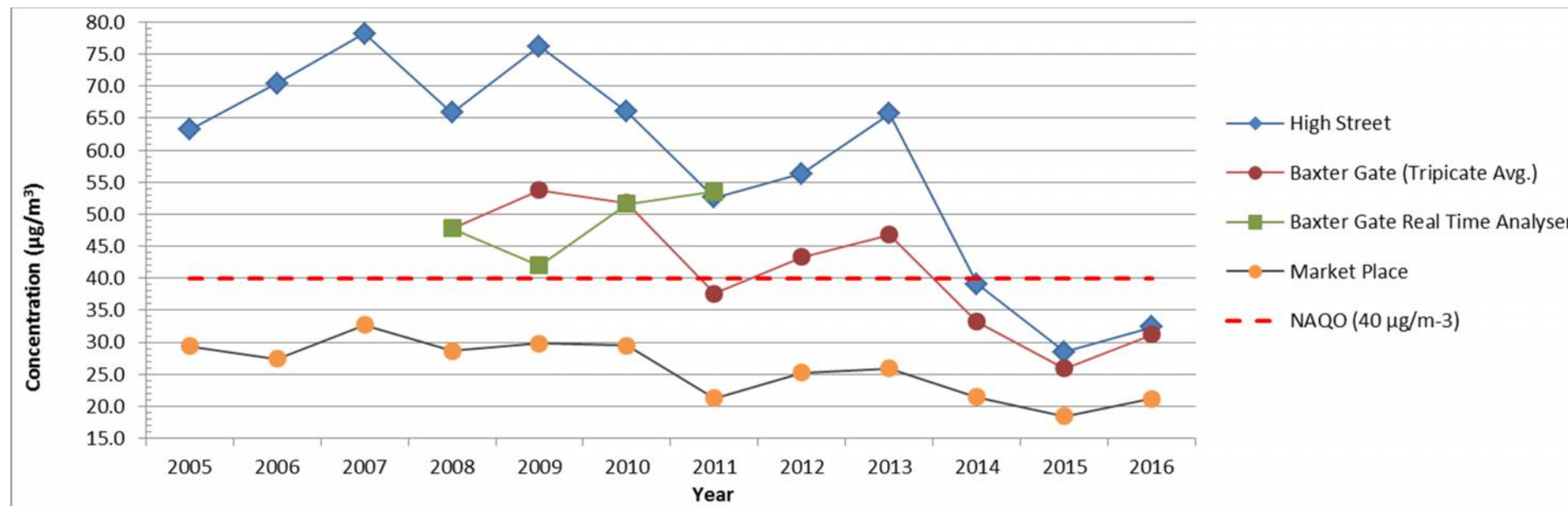


Figure A.1 Plot of NO₂ Concentration against Year for Loughborough Town Centre (i) sites

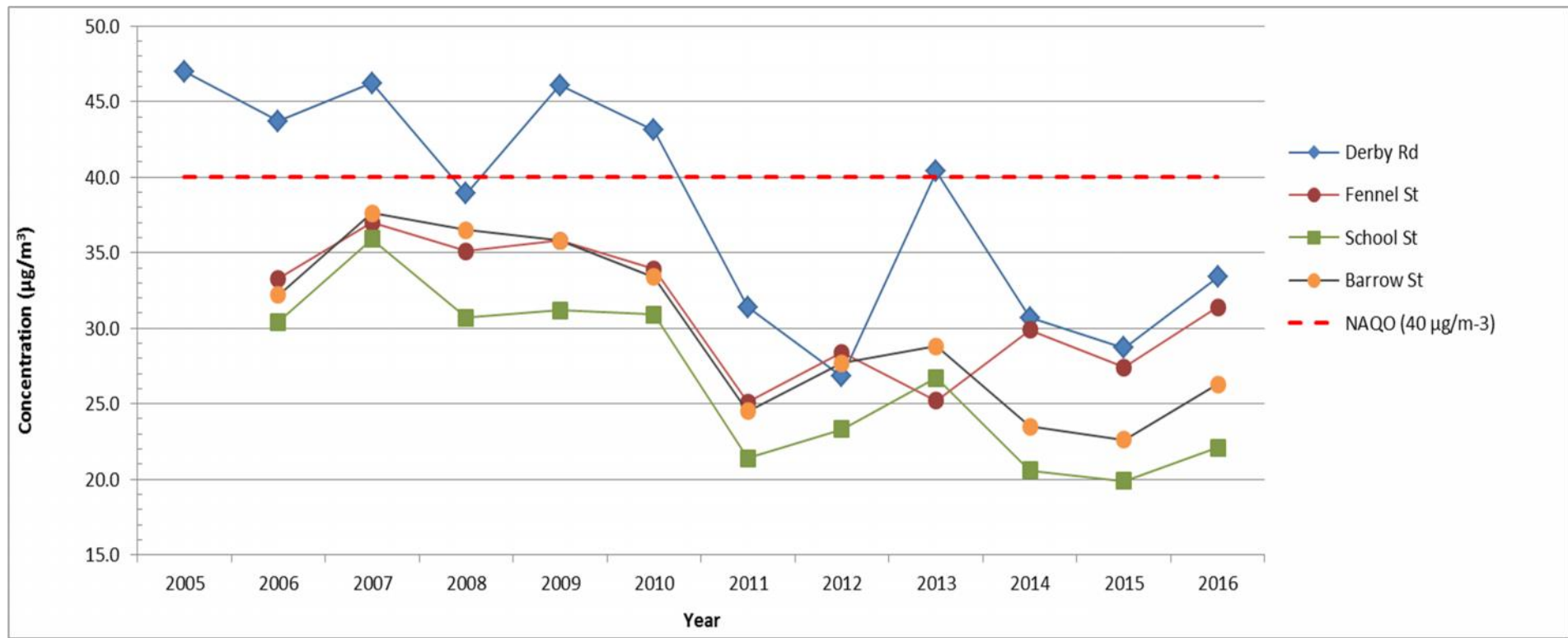


Figure A.2 Plot of NO₂ Concentration against Year for Loughborough Town Centre (ii) sites

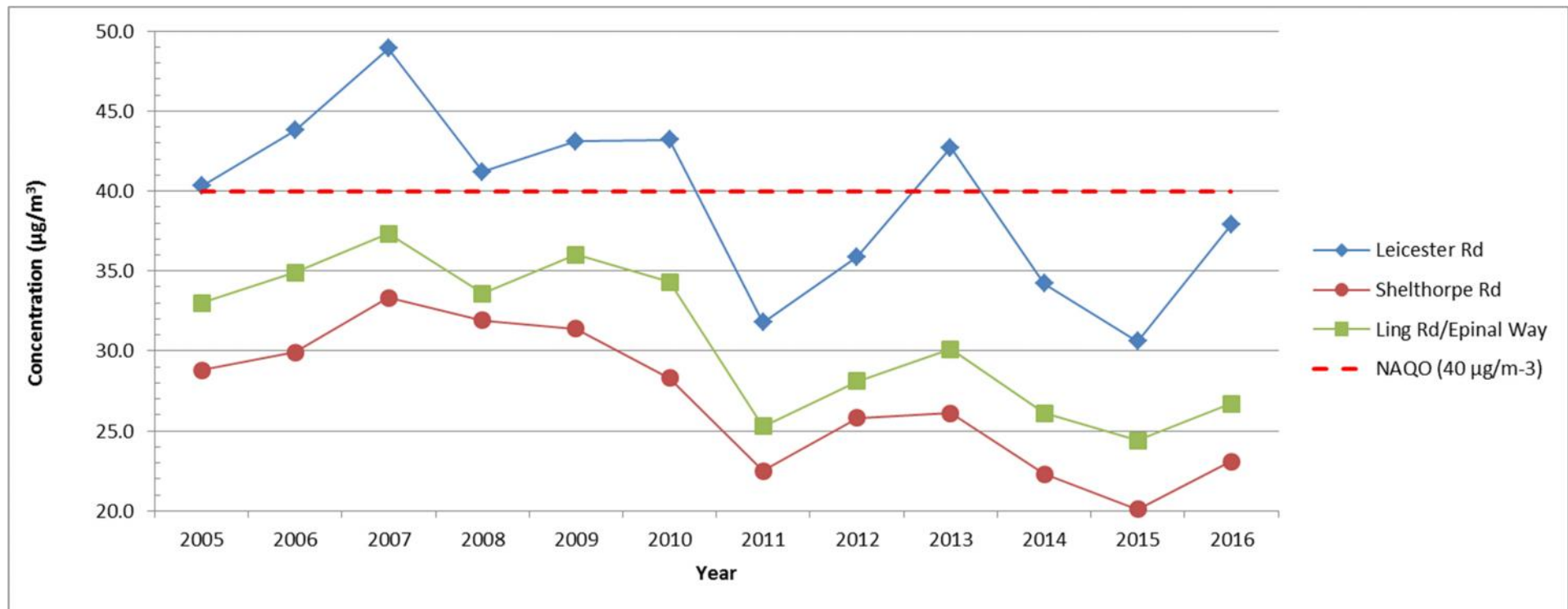


Figure A.3 Plot of NO₂ Concentration against Year for Loughborough South sites

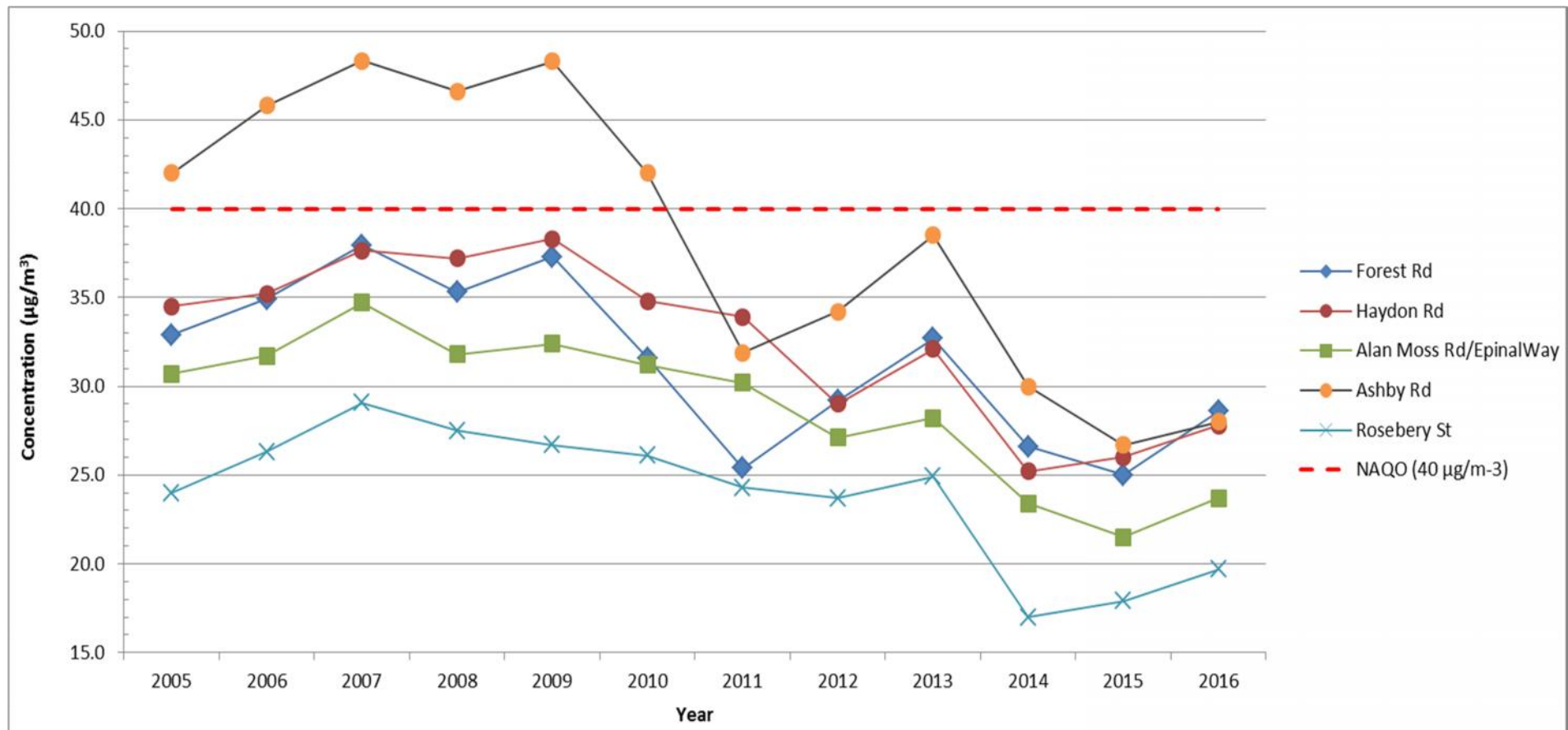


Figure A.4 Plot of NO₂ Concentration against Year for Loughborough West sites

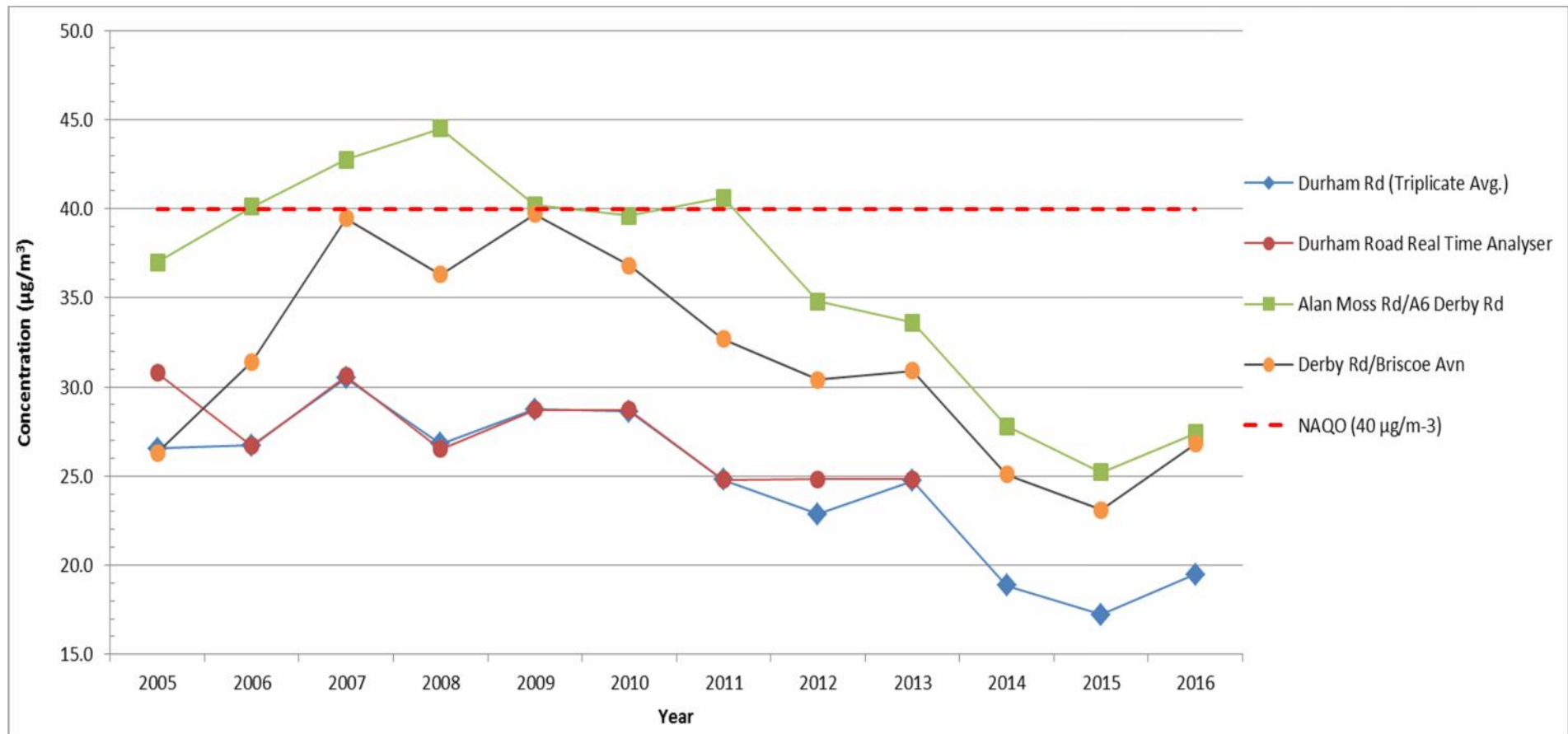


Figure A.5 Plot of NO₂ Concentration against Year for Loughborough North sites

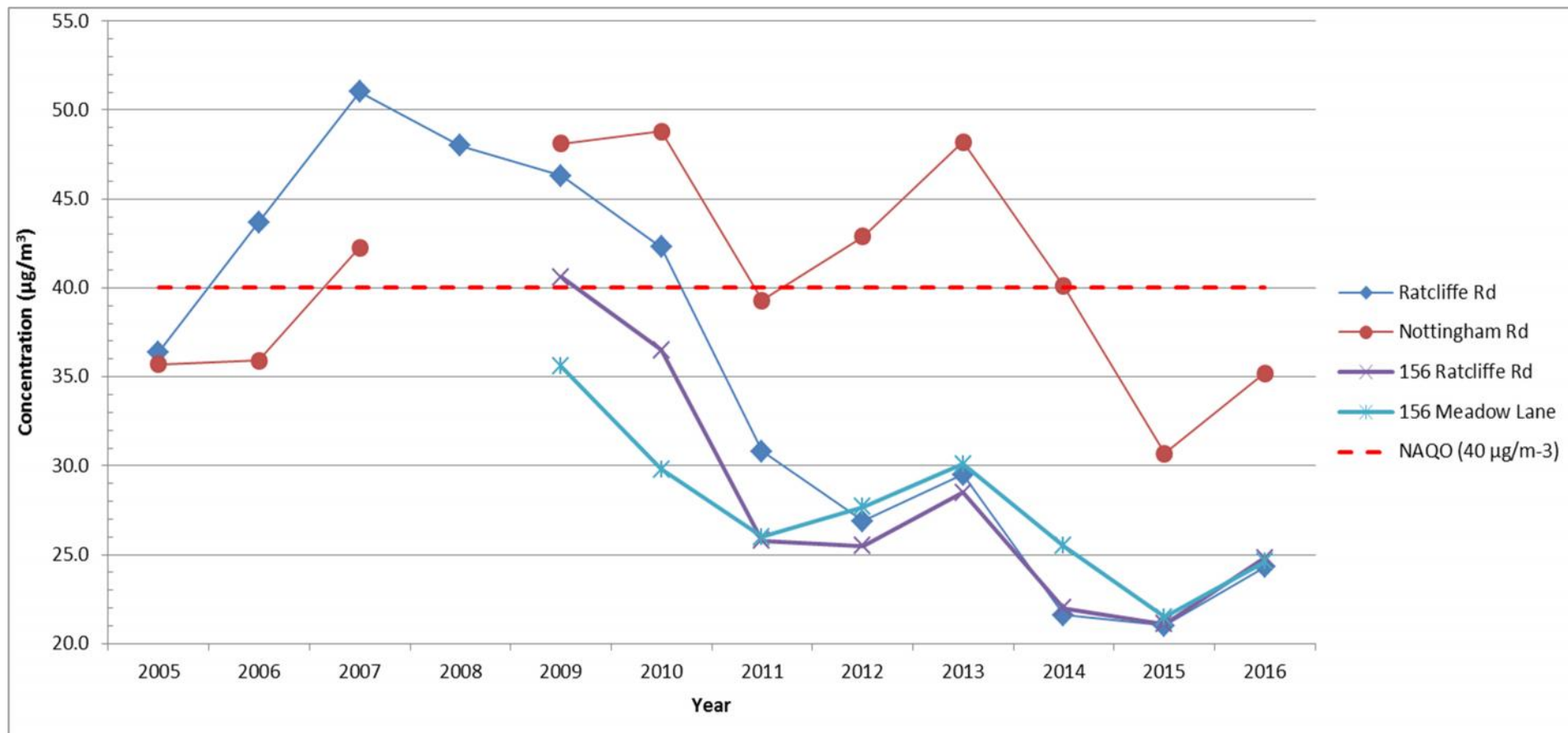


Figure A.6 Plot of NO₂ Concentration against Year for Loughborough East sites

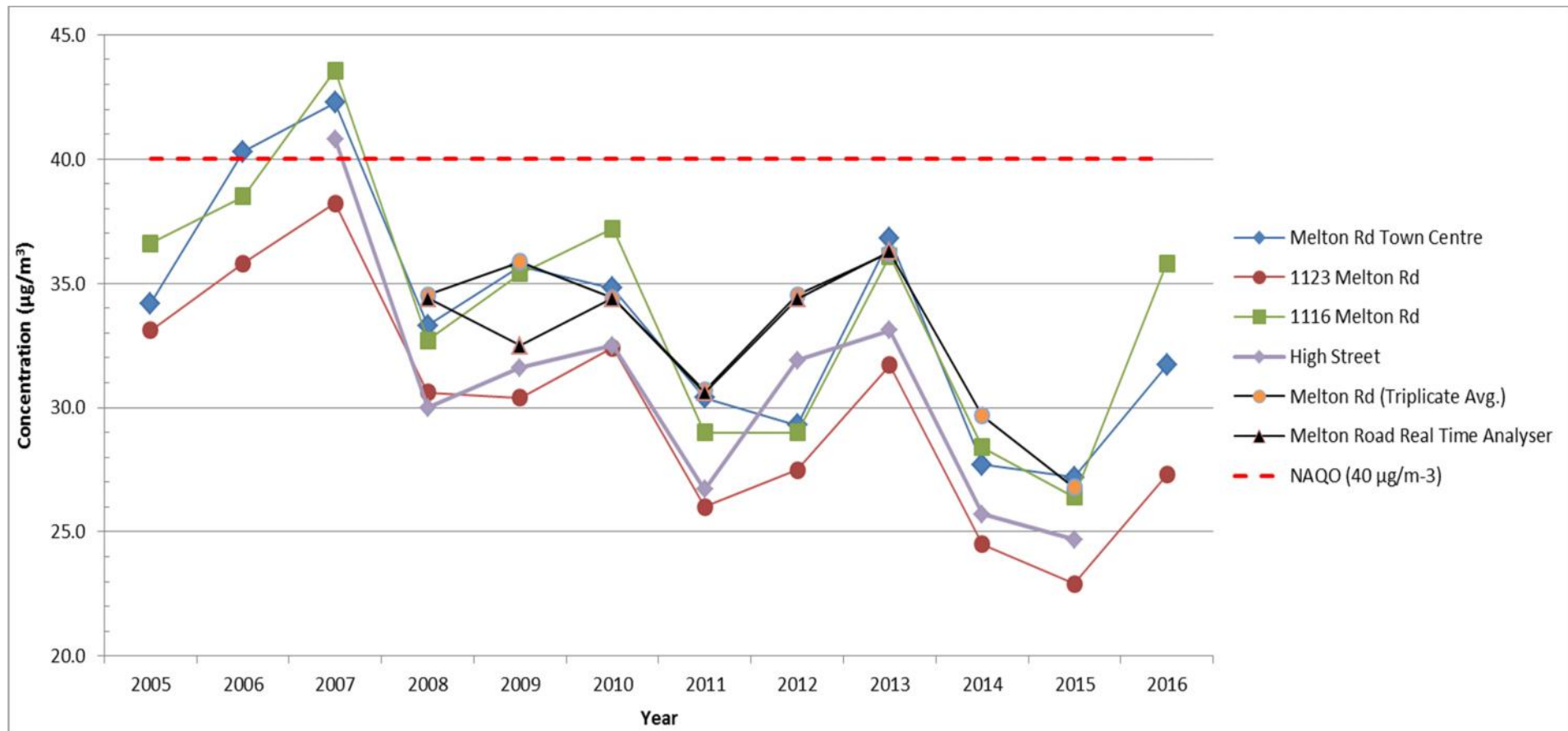


Figure A.7 Plot of NO₂ Concentration against Year for Syston sites

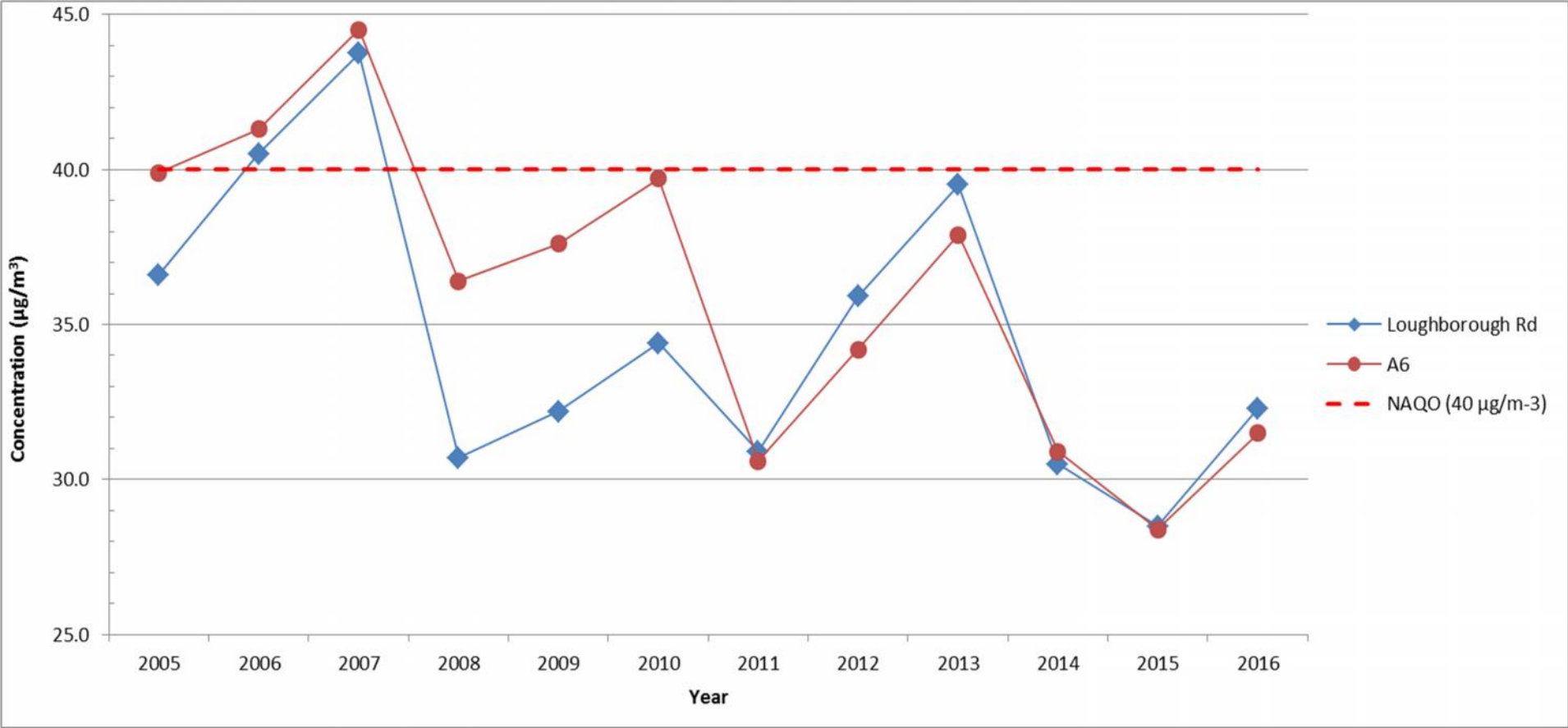


Figure A.8 Plot of NO₂ Concentration against Year for Birstall sites

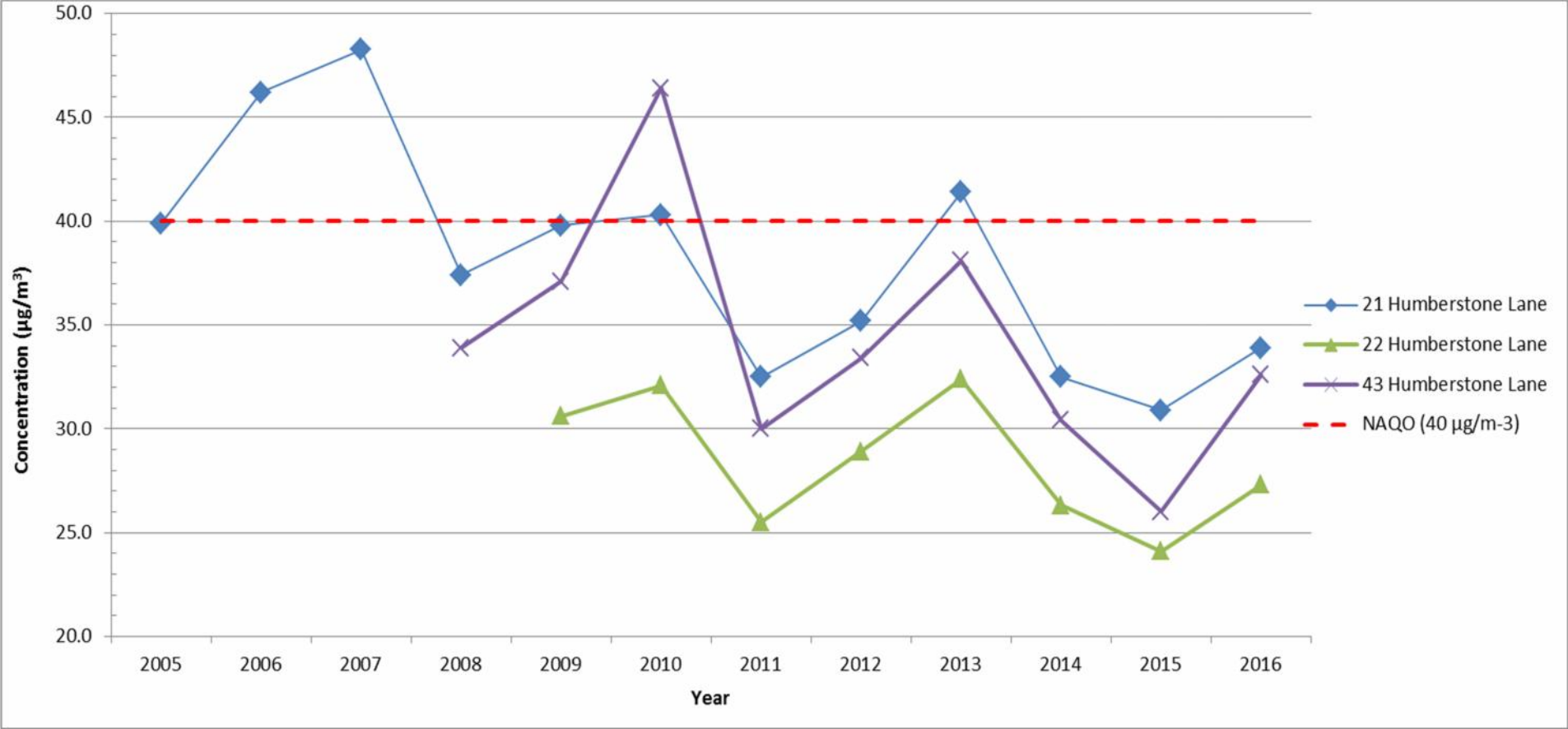


Figure A.9 Plot of NO₂ Concentration against Year for Thurmaston sites

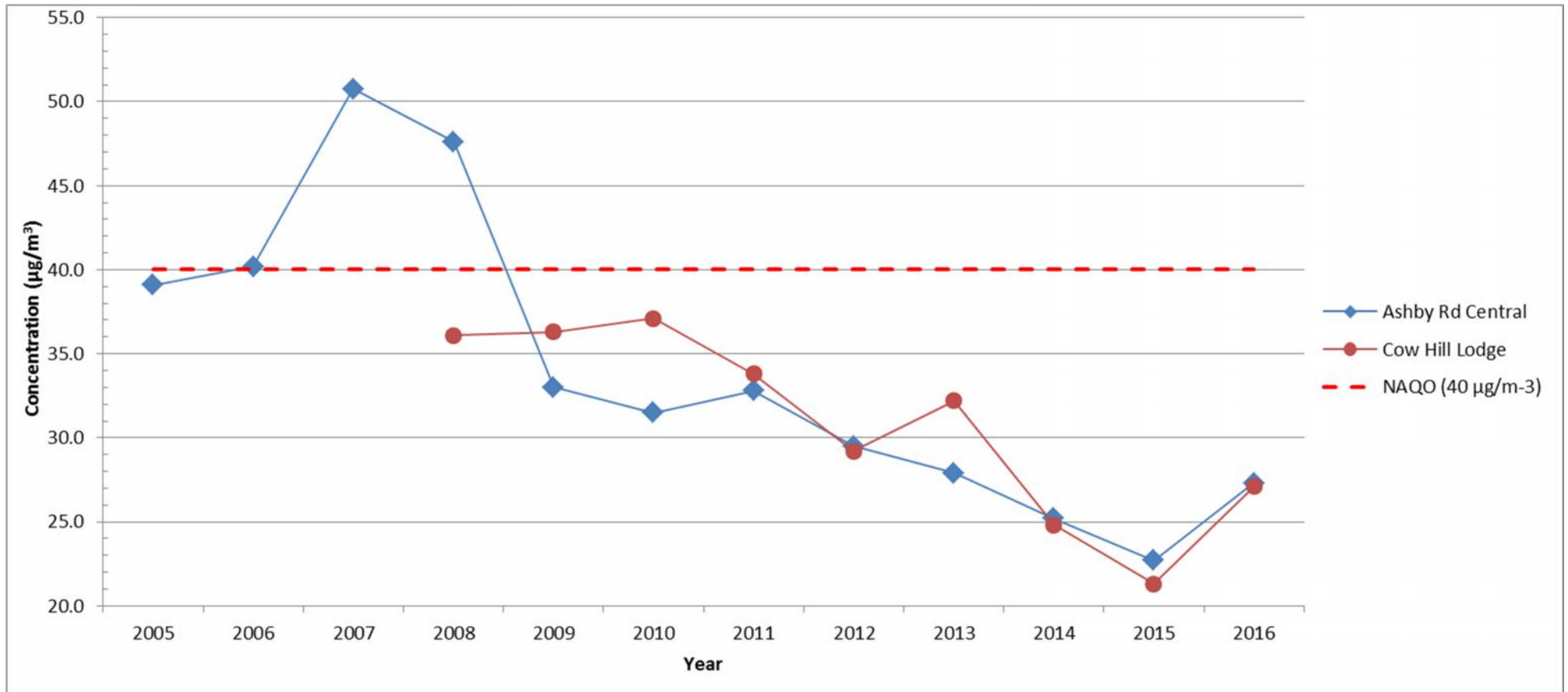


Figure A.10 Plot of NO₂ Concentration against Year for Shepshed sites

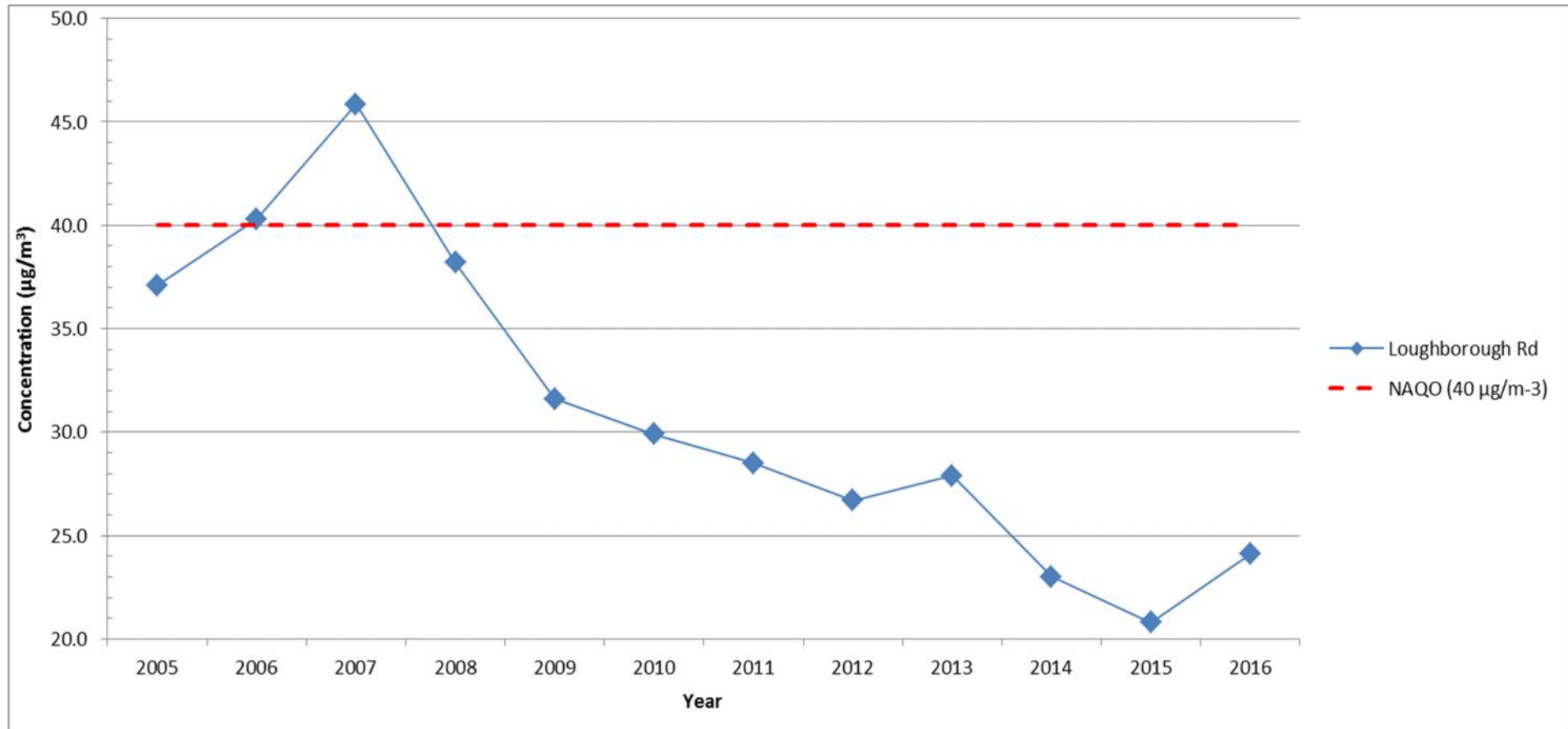


Figure A.11 Plot of NO₂ Concentration against Year for Hathern site

Table A.4 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
CM1	Industrial	73	73	22.96	24.1	25.5	27.09	24.65

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ 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.4 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2012	2013	2014	2015	2016
CM1	Industrial	73	73	16 [42.92]	[44.75]	[49.12]	[49.01]	[46.86]

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ 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.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (x0.94) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
DT1	30.77	31.13	25.97	25.08	-	16.34	17.94	18.83	-	24.18	32.67	35.36	25.8	24.3	
DT2	28.72	27.04	27.65	24.05	18.74	20.45	15.09	16.59	22.85	27.98	32.96	33.37	24.6	23.1	
DT3	33.89	35.69	31.83	31.98	27.86	26.54	22.04	22.67	26.99	34.23	34.93	36.3	30.4	28.6	
DT4	37.46	36.13	26.93	28.24	23.18	21.94	26.43	23.44	30.29	26.75	36.75	36.9	29.5	27.8	
DT5	30.25	31.43	23.5	24.65	18.1	17.75	20.7	24.52	22.69	25.09	31.51	32.1	25.2	23.7	
DT6	29.98	31.38	29.95	26.03	23.65	24.84	23.39	22.59	26.71	30.1	33.93	38.25	28.4	26.7	
DT7	42.28	44.41	41.42	43.51	37.24	31.68	29.16	35	35.26	50.52	51.27	42.43	40.3	37.9	
DT8	41.5	41.28	-	36.82	30.44	32.03	22.04	27.61	32.17	43.55	41.37	41.7	35.5	33.4	
DT9	36.03	32.16	28.52	26.42	-	21.07	18.56	20.49	26.87	29.72	37.07	36.8	28.5	26.8	
DT10	23.27	21.94	24.15	21.05	16.94	17.27	12.43	13.43	19.24	23.93	29.22	30.65	21.1	19.9	
DT11	22.48	23.82	22.28	20.63	16.45	16.82	12.56	13.83	19.17	22.97	27.49	29.03	20.6	19.4	
DT12	22.51	24.92	24.04	20.11	16.35	9.31	11.66	14.25	19.26	24.47	26.77	30.12	20.3	19.1	
DT13	30.09	34.99	34.96	32.55	28.08	29.55	22.77	17.32	8.81	36.22	39.85	34.69	29.2	27.4	
DT14	43.81	42.41	34.81	34.21	28.22	25.85	25.67	24.29	33.48	33.74	43.23	44.04	34.5	32.4	
DT15	25.69	28.59	25.89	21.29	18.15	18.33	14.52	13.94	21	28.39	-	32.15	22.5	21.2	

Charnwood Borough Council

DT16	32.88	39.66	32.32	33.02	28.5	26.49	28.51	24.54	29.66	-	40.53	41.69	29.8	28.0	
DT17	33.63	33.43	28.06	26.69	25.71	24.21	23.13	22.97	29.63	32.56	33.14	32.42	28.8	27.1	
DT18	23.17	24.65	23.91	17.17	14.63	-	14.9	12.66	18.03	21.51	30.57	29.29	21.0	19.7	
DT19	41.15	40.19	34.39	33.54	27.04	25.43	25.48	27.53	30.04	33.67	41.33	44.81	33.7	31.7	
DT20	31.99	34.14	32.15	23.03	22.73	23.13	18.69	-	26.27	31.49	35.44	39.86	29.0	27.3	
DT21	37.98	-	41.18	43.87	31.76	32.59	30.66	30.9	32.96	39.83	43.16	54.35	38.1	35.8	
DT22	44.41	40.73	32.44	35.28	25.91	26.51	27.99	26.2	32.67	33.88	41.54	44.55	34.3	32.3	
DT23	43.59	44.68	36.3	39.47	35.54	29.53	25.43	29.6	29.55	37.73	37.46	46.54	36.3	34.1	31.5
DT24	40.63	43.58	35.71	38.82	32.56	30.11	27.36	29.29	32.61	33.91	43.01	45.35	36.1	33.9	
DT25	40.36	36.94	34.36	36.51	30.14	29.82	25.01	27.69	35.08	31.68	41.54	46.68	34.7	32.6	
DT26	35.28	28.91	31.34	28.6	25.18	22.95	19.12	20.7	27.81	25.7	41.48	41.04	29.0	27.3	
DT27	37.79	43.63	36.9	43.33	38.07	37.31	30.73	38	42.78	50.14	52.61	46.41	41.5	39.0	27.3
DT28	-	38.17	32.59	33.63	24.53	29.23	23.45	23.05	31.89	35.19	37.96	42.04	32.0	30.1	24.1
DT29	32.83	-	-	27.8	22.87	21.98	20.54	19.48	26.11	31.12	40.79	36.31	28.0	26.3	
DT30	26.7	27.36	26.94	22.94	18.65	17.78	17.72	19.03	23.1	24.48	-	34.03	23.5	22.1	
DT31	36.65	38.48	28.14	29.49	30.16	-	23.96	26.67	32.5	35.63	41.53	43.88	33.4	31.4	
DT32	36.8	36.74	30.83	27.39	22.73	22.05	20.72	23.26	29.6	28.62	42.84	42.55	30.3	28.5	
DT33	42.77	32.34	32.9	31.78	27.87	24.81	25.72	26.13	31.78	27.68	43.63	42.33	32.5	30.5	
DTT34	40.01	38.24	28.04	30.39	28.69	24.74	22.19	25.96	32.88	27.76	39.2	42.74	31.7	29.8	
DT35	39.97	38.12	30.45	30.68	26.47	22.63	25.09	24.08	30.34	28.77	39.75	43.48	31.7	29.8	
DT36	22.03	39.07	35.21	33.12	32.03	31.86	18.86	24.86	32.16	36.95	42.09	45.72	32.8	30.9	
DT37	36.49	35.34	34.16	35.58	30.33	30.24	18.39	23.7	31.44	39.4	44.89	44.54	33.7	31.7	
DT38	37.07	37.03	37.42	27.78	29.46	29.45	17.66	23.57	28.72	37.92	45.59	44	33.0	31.0	
DT39	41.76	41.79	41.79	36.58	31.43	34.81	25.71	27.94	36.35	38.89	48.58	44.24	37.5	35.2	
DT40	29.38	30.26	28.33	26.42	22.66	22.41	17.54	18.07	23.71	28.16	35.74	33.54	26.4	24.8	
DT41	32.94	31.91	26.71	23.27	22.06	19.75	17.31	17.73	23.06	26.95	36.29	36.35	26.2	24.6	
DT42	30.49	29.14	29.88	26.25	23.89	22.43	21.19	19.93	25	27.36	38.25	35.97	27.5	25.8	

Charnwood Borough Council

DT43	35.09	35.47	32.51	31.45	24.63	26.63	17.22	21.26	24.85	34.32	37.67	38.73	30.0	28.2	
DT44	44.85	39.61	31.12	26.7	22.49	19.23	16.25	18.69	24.65	26.36	-	39.6	28.1	26.5	
DT45	30.9	27.05	22.93	21.89	17.89	17.43	15.33	16.59	23.23	23.17	33.49	33.89	23.6	22.2	
DT46	24.92	22.49	25.61	22.03	20.42	23.56	12.9	16.59	24.87	27.57	30.33	32.36	23.6	22.2	
DT47	24.77	28.69	25.95	24.03	20.78	20.33	20.32	20.09	10.86	26.66	34.25	35.59	24.4	22.9	
DT48	20.86	21.36	17.6	15.57	11.14	-	-	10.33	16.24	18.35	26.76	29.31	18.8	17.6	
DT49	32.99	35.26	33.16	32.86	31.45	34.56	23.23	28.25	32.66	36.26	41.05	42.2	33.7	31.6	
DT50	35	31.72	30.56	-	22.76	22.35	16.65	19.58	27.37	27.36	36.54	41.8	28.3	26.6	
DT51	34.51	38.08	26.99	25.91	23	23.62	18.41	20.39	25.31	27.27	42.55	-	27.8	26.2	
DT52	27.91	25.68	21.74	19.67	16.68	16.06	14.47	15.11	21	19.7	31.03	36.17	22.1	20.8	

Local bias adjustment factor used

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 NO₂ 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

Historically, due to previously having 3 monitors in the Borough, we chose to apply the most appropriate correction factor against each of the individual tubes i.e. tubes in the south of the Borough are corrected against the Syston station factor, rather than the using the factors from the monitor(s) in the north of the Borough.

However, as data collection % from our automatic monitors has been significantly beneath acceptable values for recent years, we have therefore applied the bias correction factor as per The National Diffusion Tube Bias Adjustment Factor Spreadsheet v03/17.v2 which gives a factor of 0.94 (from 21 studies) for Gradko analysed 20% TEA in water, for all our 2016 samples.

Short-term to Long-term Data adjustment

There were no monitoring sites during 2016 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 “NO₂ with Distance from Roads Calculator” (v 4.1) available from the UK Air Quality Archive, it is possible for us to calculate the distance NO₂ 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 27.3µg/m⁻³

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Enter data into the red 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)?	13.28001	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	39	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	27.3	µg/m ³

Loughborough Rd (Hathern)

Using the calculator the concentration at the nearest receptor is shown below to be $24.1\mu\text{g}/\text{m}^3$

		Enter data into the red 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)?	14.19494	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	30.1	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	24.1	µg/m ³

A6 (Birstall)

Using the calculator the concentration at the nearest receptor is shown below to be $31.5\mu\text{g}/\text{m}^3$

		Enter data into the red 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)?	17.39731	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	34.1	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	31.5	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 (NO₂) 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 7 to 18 \(Apr 2015 - Feb 2017\)](#) (PDF 227KB)
-] [AIR-PT Rounds 6 to 16 \(Jan 2015 - Oct 2016\)](#) (PDF 226KB)

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)

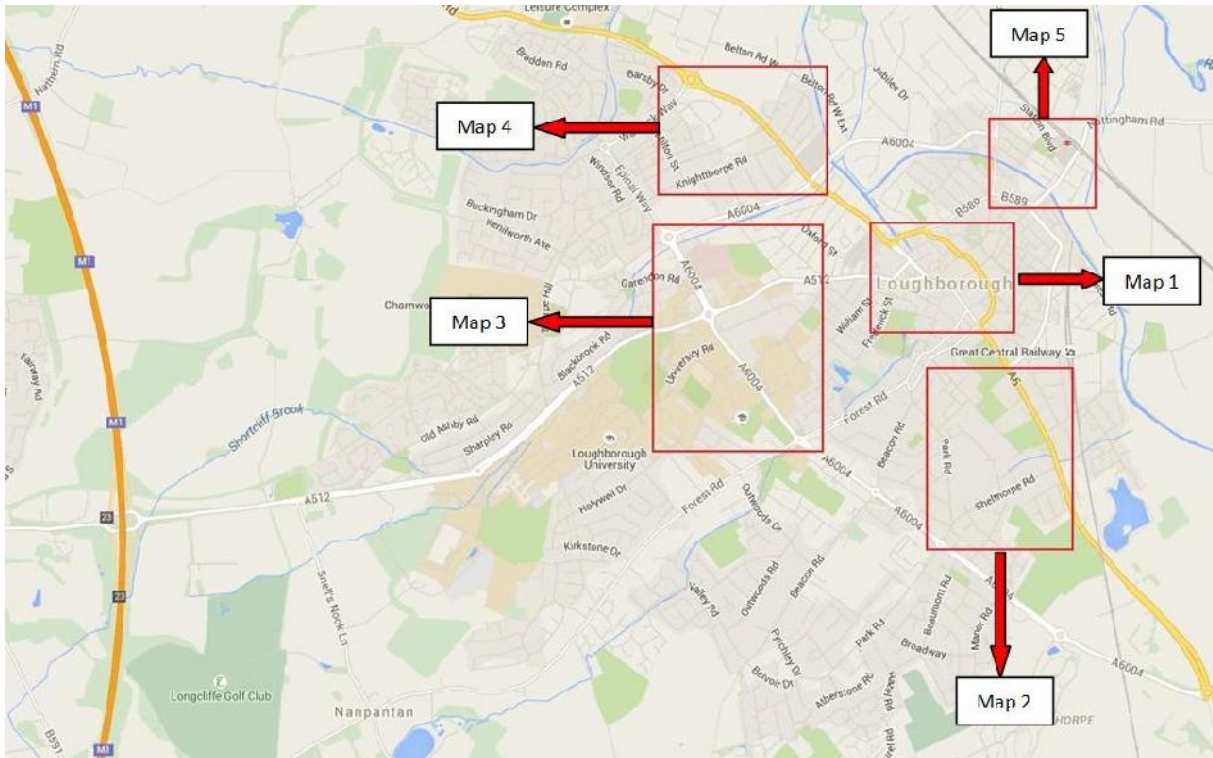
Appendix D: Map(s) of Monitoring Locations and AQMAs

Selected maps of key monitoring areas

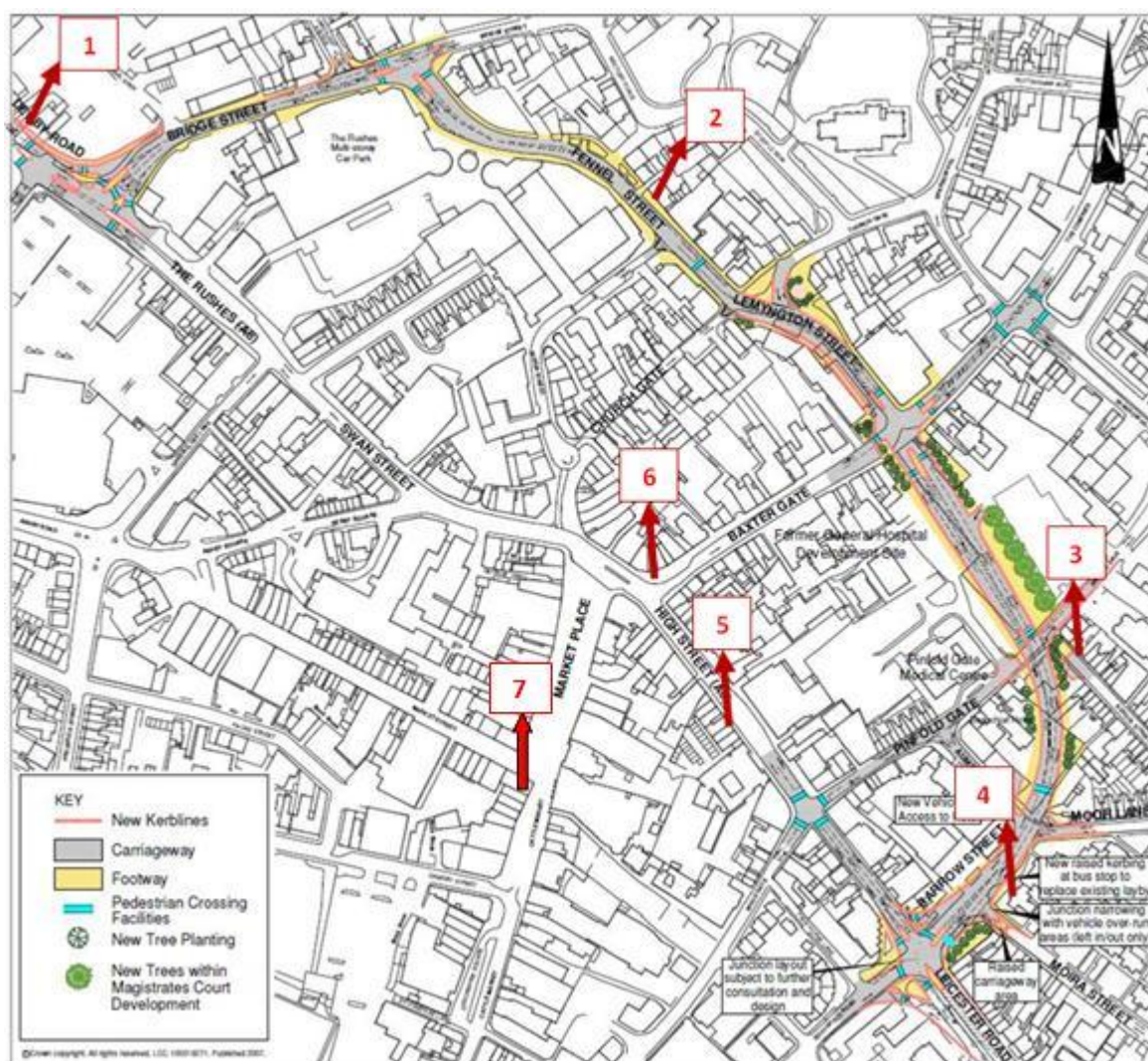
The Borough of Charnwood



Loughborough Area:



Map 1: Loughborough Town Centre



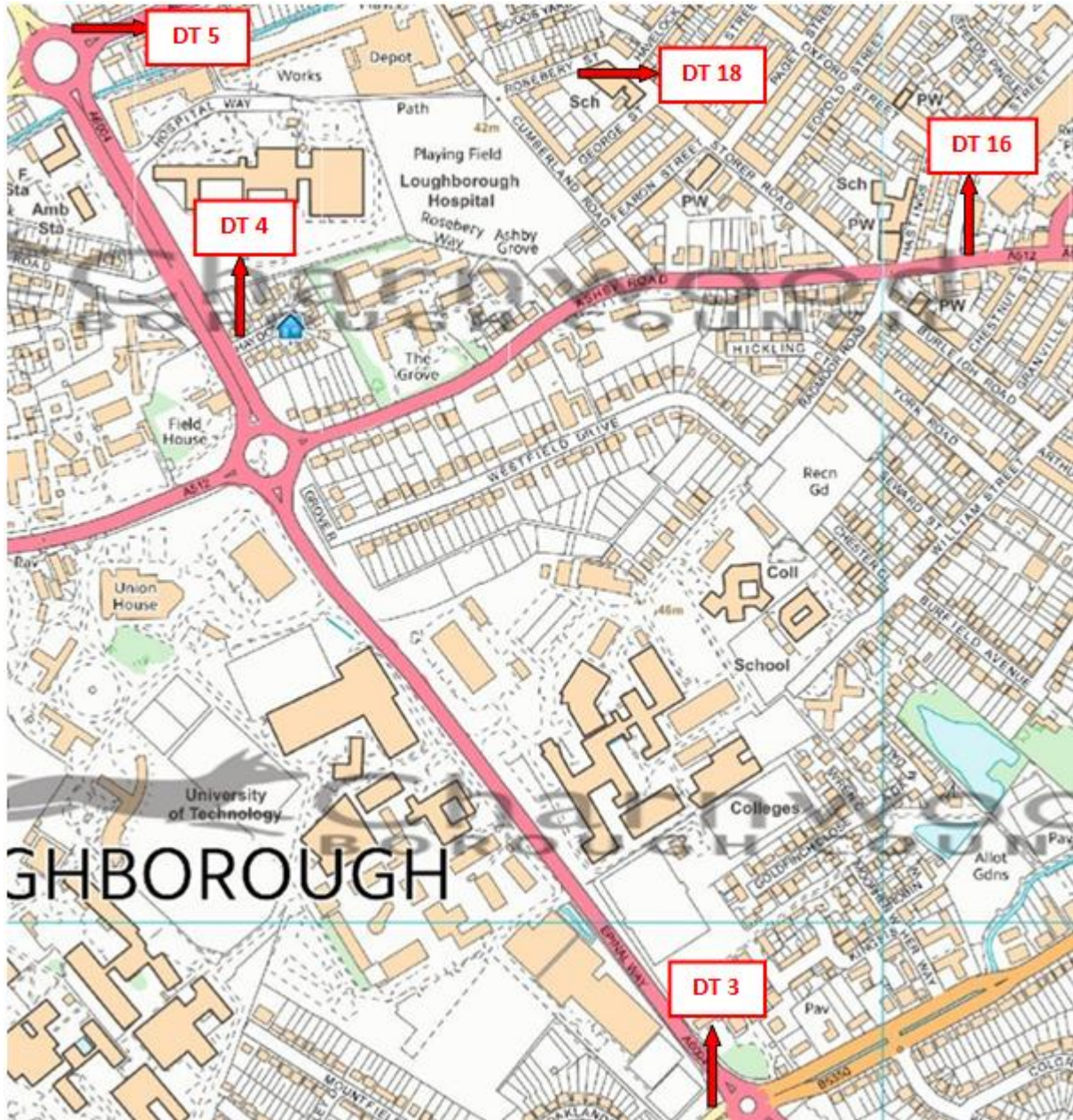
Map Position	Site ID	Site Name	Pollutant
1	DT8	Derby Road	NO ₂
2	DT31	Fennel Street	NO ₂
3	DT30	School Street	NO ₂
4	DT29	Barrow Street	NO ₂
5	DT14	High Street	NO ₂
6	DT36, DT37, DT38	Baxter Gate AQMS 1, 2, and 3	NO ₂

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.

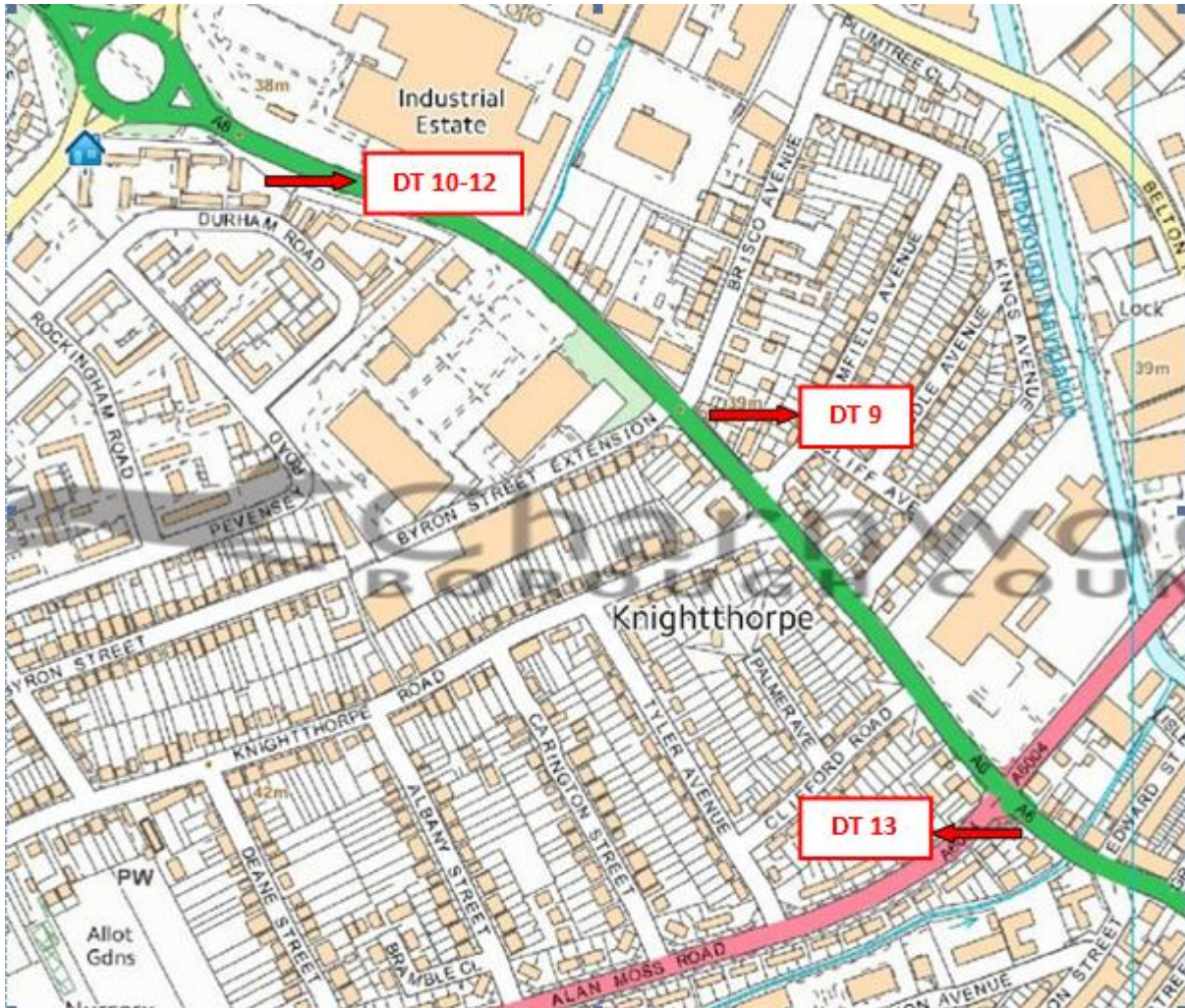
Map 2: Loughborough South



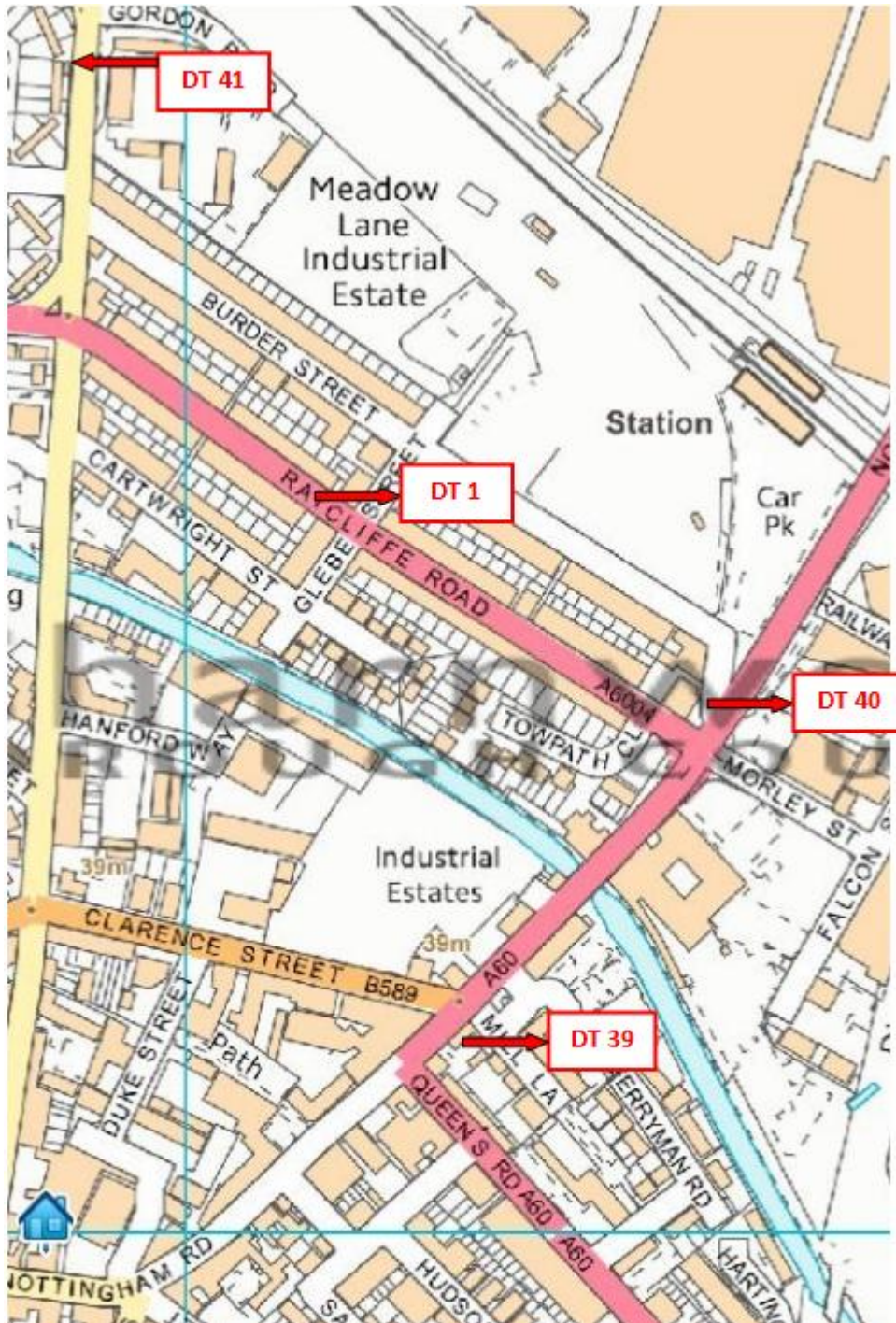
Map 3: Loughborough West



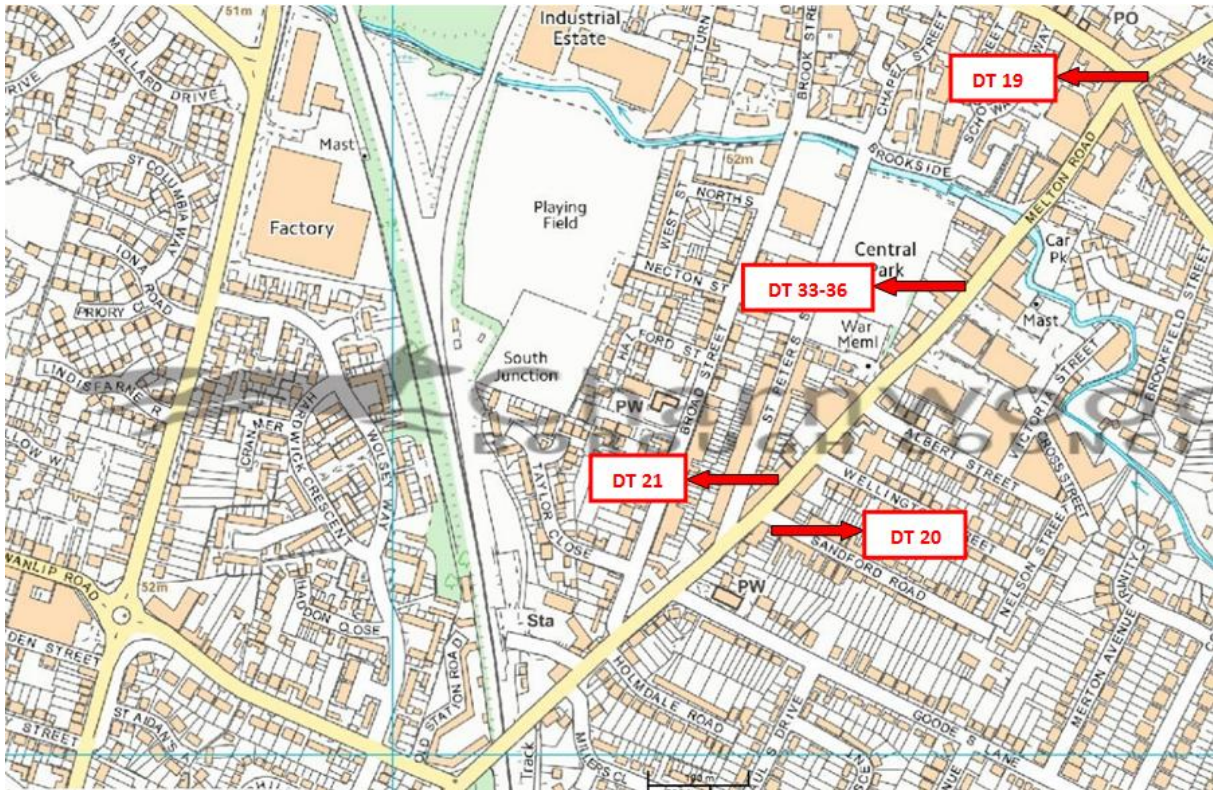
Map 4: Loughborough North



Map 5: Loughborough East



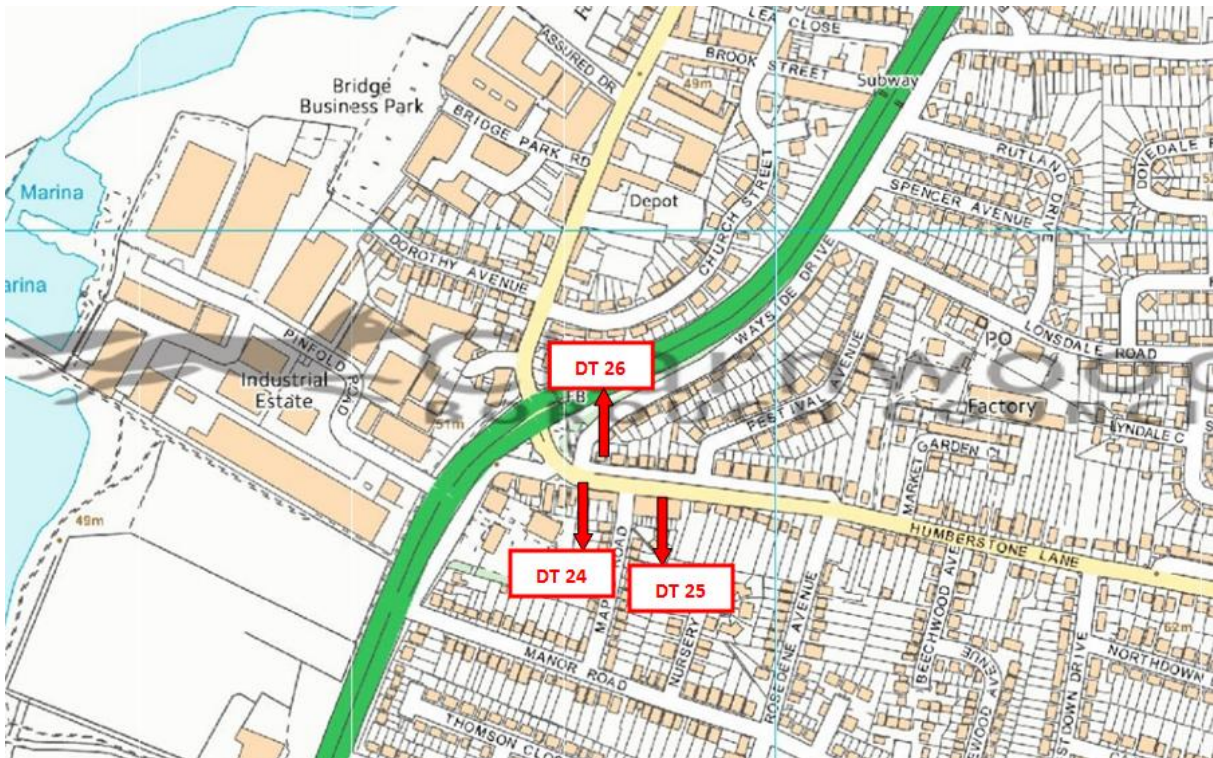
Map 6: Syston



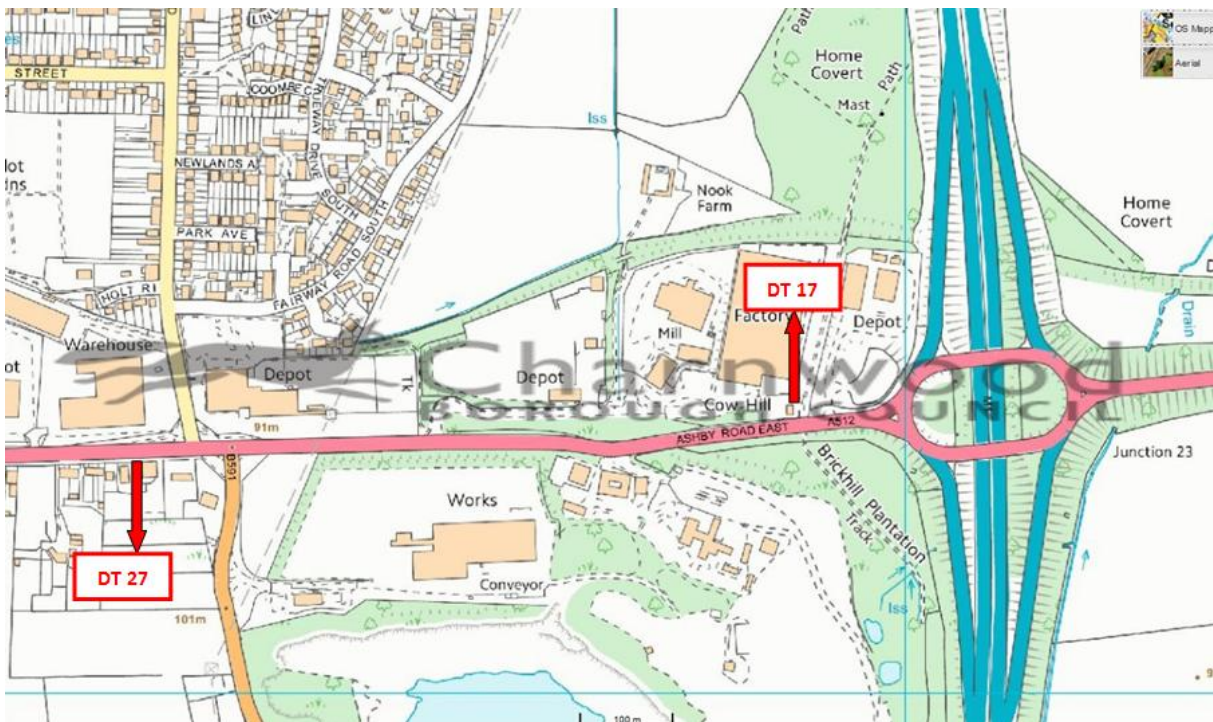
Map 7: Birstall



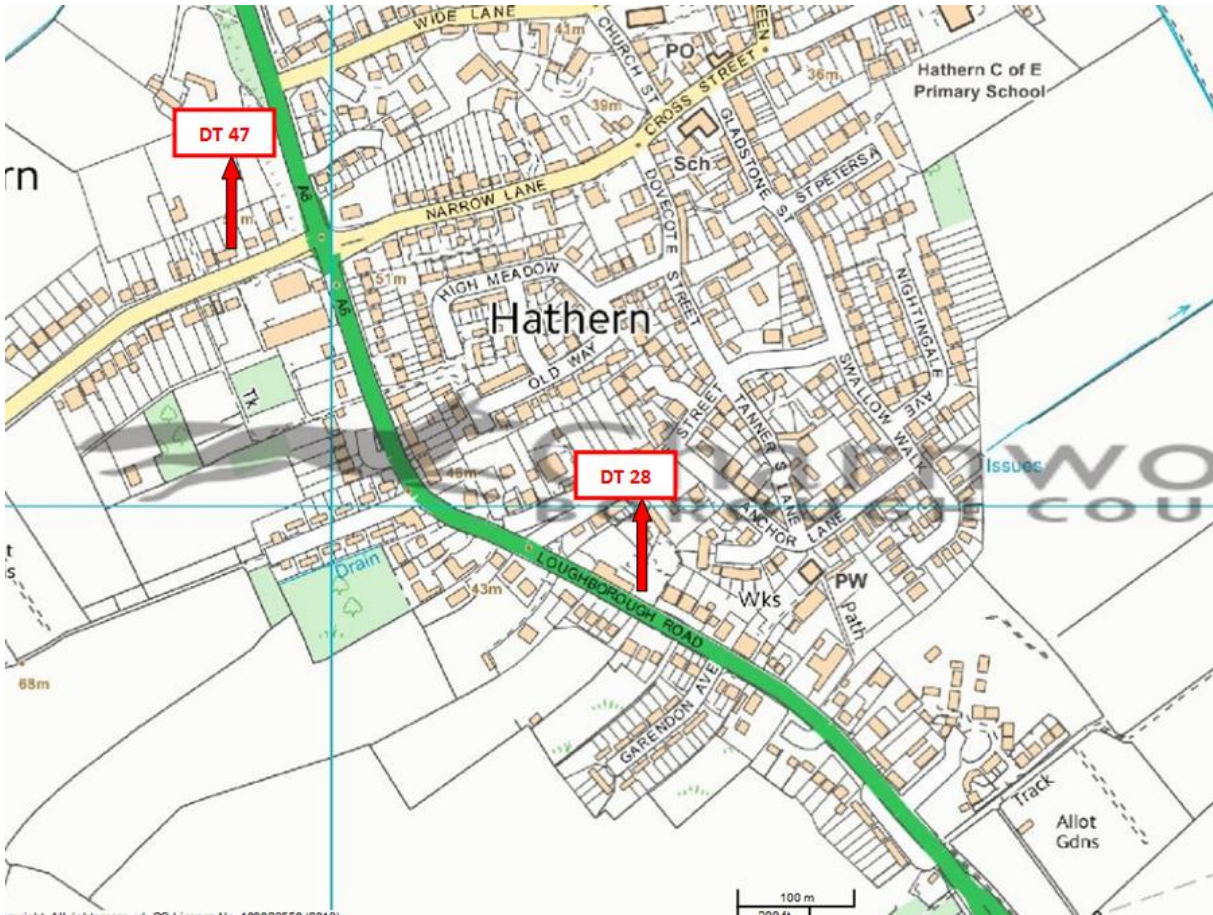
Map 8: Thurmaston



Map 9: Shepshed



Map 10: Hathern



Appendix E: Summary of Air Quality Objectives in England

Table E.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/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
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
...	...