2017 Air Quality Annual Status Report (ASR)

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

August 2017

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Executive Summary: Air Quality in Our Area

Air Quality in Nuneaton & Bedworth Borough Council

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

Nuneaton & Bedworth Borough Council has declared two Air Quality Management Areas (AQMAs) as a result of exceedances of the annual mean nitrogen dioxide (NO_2) objective, predominantly due to emissions from road traffic. Overall, concentrations of NO_2 have reduced since 2008, however, concentrations have stabilised in the last couple of years.

Actions to Improve Air Quality

Nuneaton & Bedworth Borough Council are a member of the Coventry and Warwickshire Air Quality Alliance. This group works together, sharing experience and expertise, to implement measures designed to reduce traffic pollution. Work to deliver the thirteen Air Quality Action Plan (AQAP) measures is ongoing, and progress was made on a number of measures in 2016.

Local Priorities and Challenges

The main priority for the Council is to meet the NO_2 annual mean objective across the Borough as soon as possible. Key challenges will be obtaining funding to implement the required measures; the Coventry and Warwickshire Air Quality Alliance bid for Defra Grant funding in 2016 was unsuccessful, and measures relating to improved public transport will not progress further unless funding opportunities arise.

[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

How to Get Involved

Everyone can help to improve air quality within Nuneaton & Bedworth. Travel choices can have a significant impact on pollutant emissions; reducing single occupancy car travel (car-sharing); using alternatives such as public transport; and walking and cycling for short journeys all help to reduce emissions. The AQAP sets out a number of measures which will improve the availability of sustainable travel options. Online tools are also available to help you plan your journey, including Warwickshire County Council's car share database (https://carsharewarwickshire.liftshare.com/default.asp), the 'Choose How You Move Facebook page (www.facebook.com/ChooseMoveWarks), walkit.com and cyclestreets.net.

When you must travel by car, avoiding excessive acceleration and hard braking will also reduce the pollution impact of the journey.

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1 Local Air Quality Management

This report provides an overview of air quality in Nuneaton & Bedworth Borough Council 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 AQMA and prepare an 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 Nuneaton & Bedworth 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

AQMAs are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an AQAP within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Nuneaton & Bedworth 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 here. The boundaries are also shown in Appendix D.

Although measured concentrations within the Leicester Road Gyratory AQMA have met the objectives in recent years, resulting in DEFRA recommending revocation of the AQMA declaration, there is a possibility that delivery of developments defined in the new Borough Plan for Nuneaton & Bedworth may impact upon air quality within this area in the short-term. This will be influenced in part by the speed at which the defined developments come forward. An assessment has been made of the impact of the Borough Plan proposals (here); this shows that, by 2030, the air quality objectives will be met. We propose, however, to review the Leicester Road Gyratory AQMA upon formal adoption of the Borough Plan for Nuneaton & Bedworth.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
AQMA 1 - Leicester Rd Gyratory, Nuneaton	NO_2 annual mean	Nuneaton	An area of Nuneaton centred on the Leicester Road Gyratory system and incorporating sections of the Leicester, Old Hinckley and Weddington Roads.	Nuneaton and Bedworth Borough Council, Air Quality Action Plan, 2011 Available here
AQMA 2 - Midland Road / Corporation Street, Nuneaton	NO_2 annual mean	Nuneaton	Centred on Midland Road and Corporation Street but also includes parts of Central Avenue and Manor Court Road.	

2.2 Progress and Impact of Measures to address Air Quality in Nuneaton & Bedworth Borough Council

Nuneaton & Bedworth Borough Council has taken forward a number of measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. More detail on these measures can be found in the AQAP (available here).

Progress on Quality Bus Corridor Schemes has stalled due to lack of funding opportunities to allow these to be delivered.

Nuneaton & Bedworth Borough Council is a member of the Coventry and Warwickshire Air Quality Alliance, which is a group comprising air quality, town planning, transport planning and public health colleagues from the Warwickshire District and Borough Councils, Coventry City Council, and Coventry and Warwickshire Public Health. As part of this group, Nuneaton & Bedworth Borough Council will continue to share air quality expertise and experiences, and will work on projects designed to reduce the impact of emissions from road traffic. The projects aim to raise awareness and promote active travel, and to assist by providing options for sustainable travel choices. The group made a bid in 2016 for Defra funding to purchase air quality monitoring equipment and variable messaging displays for roadside locations to enable real-time pollution concentrations to be displayed at key locations to raise awareness. Unfortunately, the group was unsuccessful in this bid. The group will continue to meet, share experiences, and propose measures to implement, subject to funding being available.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date
AQAP 1	Identify and bring forward traffic management improvements in Nuneaton Town Centre, particularly where they will benefit the two AQMAs.	Traffic Management	Strategic Highways Improvements and Road User Charging	WCC / N&BBC	On-going	On-going	Traffic Counts	1 - 2 µg/m^3	WCC are assessing transport implications of Borough Plan growth proposals and have identified a number of transport schemes[4] to mitigate the traffic growth impacts across the Borough including in the town centre. The Town centre transport schemes link to the Transforming Nuneaton Town Centre scheme. A Business Case was submitted to Coventry and Warwickshire Local Enterprise Partnership as part of Growth Deal 3. The bid was successful and a significant sum has been secured towards developing the scheme. Funding will also be sought through S106/CIL contributions. WCC is submitting a bid to the National Productivity and Investment Fund for the A47 between Leicester Rd Bridge and Eastboro Way/Long Shoot[5]. This scheme aims to address congestion issues, remove pinch points and provide pedestrian and cycle facilities	On-going
AQAP 2	Identify measures to reduce the impact of HGV movements within the area.	Freight and Delivery Management / Traffic Management	Route Management / Traffic Reduction	WCC / N&BBC	On-going	On-going	Traffic Counts	0.2 - 0.5 µg/m^3	The county-wide Lorry Map is kept under regular review by the County Council. The presence of important 'A' and 'B' roads such as the A444 and B4114 within the AQMAs mean that it is difficult to direct HGV and HDV traffic away from them.	On-going

[4] https://www.nuneatonandbedworth.gov.uk/downloads/21026/transport
[5] http://www.warwickshire.gov.uk/npif

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date
AQAP 3	Deliver further improvements for pedestrians and cyclists within the area.	Promoting Travel Alternatives / Transport Planning and Infrastructure	Promotion of Cycling and Walking / Cycle Network	WCC / N&BBC / Sustrans	On-going	On-going	Cycle / traffic counts	0.2 - 0.5 µg/m^3	Ongoing improvements through the LTP and as key development sites come forward. WCC have developed a new Cycle Network Development Plan for Nuneaton and Bedworth, which highlights desirable future cycling routes and infrastructure improvements which will help create a comprehensive cycle network in and around the towns. WCC / NBBC will continue to seek funding towards delivering the identified routes.	On-going
AQAP 4	Implement better integration of public transport in Nuneaton, including improvements for bus, rail and community transport infrastructure and services.	Transport Planning and Infrastructure	Public Transport Improvements	WCC / N&BBC / Public Transport Operators / DfT Rail / Network Rail	On-going	On-going	Usage figures	0.2 - 0.5 µg/m^3	The Transforming Nuneaton Town Centre scheme will improve access to Nuneaton Station by all modes including a dedicated bus route and bus station improvements. No Quality Bus Corridor (QBC) schemes have been progressed in Warwickshire in 2016 and this is likely to remain the case for the foreseeable future unless funding opportunities arise from recent changes to legislation, e.g. The Bus Services Bill. Rail improvements are being delivered between Bedworth and Coventry as part of the NUCKLE rail scheme. Phase 1.1 of NUCKLE included the delivery of new stations at Bermuda and Ricoh Arena which opened January 2016. NUCKLE 1.2 is intended to be completed by Spring 2018. This phase will see the increase in train frequencies to two trains per hour between Coventry-Bedworth-Nuneaton.	On-going
AQAP 5	Increase uptake and implementation of School and Workplace Travel Plans.	Promoting Travel Alternatives	School and Workplace Travel Plans	WCC / N&BBC	On-going	On-going	Usage figures	0.2 - 0.5 µg/m^3	Ongoing as opportunities arise, and through the development process.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date
AQAP 6	Develop, implement and monitor the N&BBC Travel Plan. Explore potential for a Car Club in Nuneaton.	Alternatives to Private Vehicle Use / Promoting Travel Alternatives	Car Clubs / Personalised Travel Planning	N&BBC	On-going	On-going	Usage figures	0 - 0.2 µg/m^3	Travel Plan Policy in place. Implementation and ongoing monitoring arrangements to be agreed.	On-going
AQAP 7	i) Include planning policies within the Borough Plan that seek to improve air quality, sustainable transport links and secure Travel Plan agreements. ii) Identify as part of the Borough Plan Infrastructure Delivery Plan specific infrastructure required within the AQMAs or that could relieve the AQMAs. These can then be prioritised alongside the Borough's other infrastructure demands for external funding and developer contributions/CIL. iii) Encourage developers to take part in pre-app discussions to ensure air quality is considered when formulating a planning application. Developers should ensure good design as a part of their proposals and actively endorse travel planning to minimise and mitigate the impacts of new development upon the AQMA. Where appropriate development proposals should be accompanied by air quality assessments.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	N&BBC	On-going	On-going	-	0 - 0.2 µg/m^3	The Borough Plan evidence has allowed Warwickshire County Council to identify schemes and initiatives to improve sustainable transport provision and improve the management of traffic on the network. These will be pursued as funding streams become available. The Transforming Nuneaton Town Centre and the A47 corridor schemes aim to reduce the level of delay within the identified area. The Nuneaton and Bedworth Borough Council Infrastructure Delivery Plan contains schemes which have been identified through the STA. The Council has also commissioned consultants to assess the impact of the Borough Plan on Air Quality within the Borough[6]	On-going

[6] https://www.nuneatonandbedworth.gov.uk/downloads/file/1412/g5_-_air_quality_assessment_updated_2016

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date
AQAP 8	Continue to work with WCC and other partners to deliver improvements in emissions standards, where practicable.	Promoting Low Emission Transport / Vehicle Fleet Efficiency	Other	WCC / N&BBC / Public Transport Operators	On-going	On-going	-	1 - 2 µg/m^3	Through capital investment arising from the MIRA Enterprise Zone, Arriva Midlands has funded the provision of four new vehicles to operate on the Service 66 (Nuneaton - MIRA - Hinckley) bus route. It is possible that further funding opportunities to secure the improvement of local bus fleets will arise in response to recent changes to legislation, e.g. The Bus Services Bill.	On-going
AQAP 9	Make details of the air quality measures and annual reports available on the website to ensure accessibility to the consultation and implementation process.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	N&BBC	On-going	On-going	-	0 µg/m^3	To be uploaded to website annually at the appropriate time.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date
AQAP 10	Continue to work with WCC and the Warwickshire District Authorities on air quality and travel awareness campaigns to raise the profile of air quality in the Borough and County-wide.	Public Information	Other	WCC / N&BBC / Warwickshire local authorities	On-going	On-going	Attendance numbers / Members registration	0 - 0.2 µg/m^3	WCC actively promotes sustainable travel modes via the following: - WCC car share databasehttps://carsharewarwickshire.liftshare.com/default.asp - Nuneaton Cycle Guide available in hard-copy and online - public transport maps and timetables available in hard-copy and online - Choose How You Move Facebook page https://www.facebook.com/ChooseMoveWarks - providing up-to-date information on WCC transport schemes and events - Warwickshire Direct website www.warwickshire.gov.uk/travel - providing all bus, travel and transport information - Pedal and Ride events – offering free bike registration to encourage cycling, when funding is available - WCC also liaises with British Cycling to promote Breeze Rides and Ride Social events to promote cycling	On-going
AQAP 11	Continue the commitment to undertake air quality monitoring within the Borough to ensure a high standard of data is achieved to assess against air quality objectives.	Policy Guidance and Development Control	Other	N&BBC	On-going	On-going	Data capture	0 µg/m^3	Monitoring continues across the Borough – data capture for 2016 was good at all passive locations	On-going
AQAP 12	Continue to enforce industrial pollution control and nuisance legislation to minimise pollutant emissions from these sources	Environmental Permits	Other	N&BBC	On-going	On-going	Number of inspections	0 - 0.2 µg/m^3	The Borough Council continue a high rate of inspections of industrial installations.	On-going

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date
AQAP 13	Continue to work together with partners to promote and implement energy efficiency measures in the Borough	Promoting Low Emission Plant	Other	N&BBC	On-going	On-going	Number of completed renovations	0 - 0.2 $\mu g/m^3$	The Community Energy Saving Programme saw the completion in 2015/16/17 of 61 external wall insulations, 491 central heating systems replacements and 32 loft insulations to properties.	On-going

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.

Nuneaton and Bedworth Borough Council is working to reduce emissions of air pollution across the Borough, to improve air quality within the declared AQMAs and the wider area. The following pollutant emission reduction measures included within the AQAP will also help to reduce emissions of $PM_{2.5}$:

- Traffic management improvements, including reduction of HGV movements;
- Improved integration of public transport, including improvements for bus, rail and community transport infrastructure;
- Encourage increased uptake and implementation of School Travel Plans, Workplace Travel Plans, and continue to implement and monitor the Nuneaton and Bedworth Borough Council Travel Planning Policy;
- Improve sustainable transport links, improvements for pedestrians and cyclists, endorse travel planning and promoting a Car Club; and
- Promote and implement energy efficiency measures across the Borough.

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

Nuneaton & Bedworth Borough Council undertook automatic (continuous) monitoring at one site during 2016. Table A.5 in Appendix A shows the details of the site.

Maps showing the location of the monitoring site 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.

Given the continued decline in NO_2 within AQMA1, a decision was made to decommission the automatic monitoring station at the end of 2016. Monitoring will recommence if sufficient evidence warrants this.

3.1.2 Non-Automatic Monitoring Sites

Nuneaton & Bedworth Borough Council undertook non-automatic (passive) monitoring of NO_2 at 36 sites during 2016, as well as exposing triplicate tubes with the automatic analyser to allow the calculation of a local bias adjustment factor. Table A.6 in Appendix A shows the details of the sites.

Three new diffusion tube monitoring locations were commissioned in 2016: NB46, NB47 and NB48. Three roadside sites were also decommissioned (NB10, NB11 and NB12) as the measurements required adjustments to estimate concentrations at the façades of residential properties (relevant exposure). Monitoring continues on the façades of nearby residential properties (NB20, NB21 and NB22); the measurements at these sites are representative of relevant exposure, and are directly comparable to the annual mean objective.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.7 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past nine years with the air quality objective of 40µg/m^3.

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

Table A.8 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past nine years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

In 2016, there was only one measured exceedance of the annual mean NO_2 objective. This was recorded at site NB29, which is located on the façade of a property on Midland Road, and is within the existing AQMA. At all other monitoring sites, the annual mean objective was met, although concentrations continue to approach the objective at a number of sites.

The hourly mean objective was not exceeded at the automatic monitor; there were no hours with concentrations >200µg/m^3, compared with the 18 allowed by the objective. Concentrations measured at each diffusion tube monitoring site are well below 60µg/m^3, and therefore it is unlikely that the hourly mean objective is exceeded.

Figures A.1 – A.4 in Appendix A present the trend in measured NO_2 concentrations at the automatic and diffusion tube monitoring sites since 2008. Overall, concentrations have reduced at all sites since 2008 or 2009, although concentrations have remained fairly stable in recent years.

3.2.2 Particulate Matter (PM_{10})

Nuneaton & Bedworth Borough Council do not currently monitor PM_{10} concentrations and have no plans to do so in the future.

3.2.3 Particulate Matter ($PM_{2.5}$)

Nuneaton & Bedworth Borough Council do not currently monitor $PM_{2.5}$ concentrations and have no plans to do so in the future.

3.2.4 Sulphur Dioxide (SO_2)

Nuneaton & Bedworth Borough Council do not currently monitor SO_2 concentrations and have no plans to do so in the future.

Appendix A: Monitoring Results

Table A.5 – 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)	Distance to kerb of nearest road (m)	Inlet Height (m)
AQM2	Leicester Road	Roadside	436850	292260	NO_2	Y	Chemiluminescent	2	3	1.6

Table A.6 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type[a]	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
NB1	Norman Avenue	UB	435969	291303	NO_2	N	3	N/A	N	2.0
NB2	Conifer Close	UB	436438	287627	NO_2	N	7.0	N/A	N	2.1
NB4	78 Coventry Road	R	435792	286540	NO_2	N	0	4.0	N	3.1
NB5	McDonnell Drive	R	434857	284737	NO_2	N	8.0	15	N	2.2
NB6	Tudor Court	R	434326	285323	NO_2	N	11	1.0	N	2.9
NB7	119 Newtown Road	R	435338	286991	NO_2	N	6.0	4.4	N	2.5
NB9	Manor Court Road	R	435634	292279	NO_2	N	1.5	2.2	N	2.9
NB10[b]	17 Old Hinckley Road	K	436600	292206	NO_2	Y	6.5	<1	N	1.9
NB11[b]	34 Old Hinckley Road	R	436680	292259	NO_2	Y	8.8	1	N	2.5
NB12[b]	64 Old Hinckley Road	R	436830	292308	NO_2	Y	4.1	4.5	N	2.6
NB13[c]	64 Watling Street	R	439256	293482	NO_2	N	14.3	1.1	N	2.1

Site ID	Site Name	Site Type[a]	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
NB14[c]	46 Leicester Road	R	436842	292274	NO_2	N	3.1	1.5	N	2.6
NB15	Bridge Grove Leicester Rd	R	436878	292300	NO_2	N	8.0	1.2	N	2.6
NB17	Bond Gate	R	436393	291989	NO_2	N	0	1.3	N	2.2
NB18	Wheat Street	R	436525	291862	NO_2	N	23.0	1.1	N	2.2
AQM2[d]	AQMA1a/b/c (Leicester Road)	R	436844	292251	NO_2	Y	2.0	3.0	Y	1.6
NB20	17 Old Hinckley Road	R	436604	292201	NO_2	Y	0	7.1	N	1.9
NB21	36 Old Hinckley Road	R	436690	292271	NO_2	Y	0	9.6	N	1.7
NB22	62 Old Hinckley Road	R	436813	292308	NO_2	Y	0	6.7	N	1.6
NB23	46 Leicester Road	R	436837	292274	NO_2	Y	0	3.4	N	1.8
NB24	31 Leicester Road	R	436814	292194	NO_2	Y	0	11	N	2.5
NB25	25 Central Avenue	R	435817	292273	NO_2	Y	0	6.8	N	1.8
NB26	26 Central Avenue	R	435758	292312	NO_2	Y	0	3.8	N	1.8
NB27	90 Corporation St	R	435949	292113	NO_2	Y	0	4.5	N	2.2
NB28	138 Corporation St	R	435894	292202	NO_2	Y	0	4.7	N	1.7
NB29	16 Midland Road	R	435626	292343	NO_2	Y	0	4.4	N	1.8
NB30	50 Midland Road	R	435559	292375	NO_2	Y	0	4.1	N	2.6
NB31	376 Longford Road	R	435149	284563	NO_2	N	0	12.7	N	2.0
NB35	62 Watling Street	R	439262	293461	NO_2	N	0	11.5	N	1.8
NB36	78 Bayton Road	R	435216	285245	NO_2	N	0	2.2	N	2.3
NB37	19 Croft Road	R	435050	291594	NO_2	N	0	5.6	N	1.8
NB38	115 Highfield Road	R	437198	290731	NO_2	N	0	7.2	N	1.7
NB41	61 Mill Street	R	435655	287050	NO_2	N	0	9.6	N	2.0
NB42	18 George Street	R	435657	287135	NO_2	N	0	8.3	N	1.8

Site ID	Site Name	Site Type[a]	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
NB43	42 Hanover Glebe	R	436294	290803	NO_2	N	0	11.6	N	2.0
NB44	503 Heath End Road	R	434299	290930	NO_2	N	2.0	2.3	N	2.2
NB45	1 Heath End Road	R	435729	290835	NO_2	N	0	10	N	2.2
NB46	30 Bermuda Road	R	435135	290583	NO_2	N	0	9.2	N	2.0
NB47	6 The Bridleways	R	435451	290087	NO_2	N	0	4.6	N	2.0
NB48	288 Heath End Road	R	435065	290689	NO_2	N	0	8.5	N	2.1

[a] Site type: UB – Urban Background; R – Roadside; K – Kerbside (as defined in Table 7.7 of LAQM.TG(16))

[b] Site discontinued at end of 2015, as monitoring not representative of relevant exposure. Monitoring continues at sites NB20, NB21 and NB22, which are located on the façades of the closest relevant exposure

[c] Site discontinued at end of 2016

[d] Triplicate tubes

Table A.7 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture 2016 (%)	NO_2 Annual Mean Concentration (µg/m^3) [a]								
				2008	2009	2010	2011	2012	2013	2014	2015	2016
AQM2	R	Automatic	93	40	39.1	-	-	39.6	33.5	37.7	32.4	36.2
AQM2[b]	R	DT	67	-	38.2	37.0	35.1	36.2	33.6	31.2	32.4	30.4
NB1	UB	DT	100	23	27.9	21.0	21.0	22.7	21.0	19.9	20.2	20.4
NB2	UB	DT	100	23	24.3	22.9	21.8	24.3	20.5	19.7	19.6	19.2
NB4	R	DT	100	39	37.0	36.1	35.1	34.7	35.5	32.4	33.3	33.9
NB5	K	DT	100	36	33.5	33.8	31.0	34.0	33.2	31.2	31.9	30.9
NB6	K	DT	100	36	36.1	34.6	34.7	36.2	34	33.7	34.6	34.9

Site ID	Site Type	Monitoring Type	Valid Data Capture 2016 (%)	NO_2 Annual Mean Concentration ($\mu g/m^3$) [a]								
				2008	2009	2010	2011	2012	2013	2014	2015	2016
NB7	K	DT	83	36	38.0	35.7	33.0	36.2	33.5	34.4	31.9	31.9
NB9	K	DT	100	34	37.8	33.7	31.1	31.5	30.6	31.0	29.5	30.3
NB10	K	DT	-	34	37.6	36.3	31.5	33.3	33.8	30.0	30.3	-
NB11	R	DT	-	**47**	**45.5**	**41**	**43.4**	**46.6**	**43.1**	**42.4**	**43.2**	-
NB12	R	DT	-	**44**	**41.3**	39.4	35.4	36.0	35.8	35.3	32.8	-
NB13	K	DT	92	40	**44.0**	**42.8**	36.3	38.4	37.0	37.4	34.2	37.4
NB14	R	DT	100	**45**	**45.0**	**40.3**	**41.1**	39.8	35.0	37.5	36.9	36.0
NB15	K	DT	100	30	35.5	31.5	30.7	33.2	31.5	28.6	30.3	29.8
NB17	K	DT	92	-	**41.9**	38.0	36.1	39.1	35.9	32.8	33.4	32.5
NB18	K	DT	83	36	38.0	38.9	37.9	38.9	34.3	30.9	31.9	32.8
NB20	R	DT	100	33	34.3	30.6	29.8	29.8	29.6	27.6	25.9	28.5
NB21	R	DT	100	37	36.1	33.1	32.9	32.3	29.6	30.6	29.4	30.0
NB22	R	DT	100	31	32.1	28.3	28.4	28.9	24.8	25.2	25.2	24.9
NB23	R	DT	100	39	37.9	36.8	35.2	35.7	31.4	33.2	32.0	32.9
NB24	R	DT	100	29	29.4	30.4	26.7	28.9	31.4	22.8	23.3	24.5
NB25	R	DT	100	37	38.4	34.3	34.5	36.9	25.0	31.1	31.7	32.2
NB26	R	DT	100	33	36.7	33.7	30.3	33.4	31.1	28.7	29.6	31.4
NB27	R	DT	100	**45**	**46.4**	**42.7**	39.5	**44.3**	37.4	37.2	**40.3**	39.9
NB28	R	DT	100	**46**	**41.9**	38.9	39.3	**41.8**	37.1	36.5	36.3	36.7
NB29	R	DT	100	**50**	**48.5**	**44.0**	**41.8**	**45.8**	**40.7**	**41.6**	**43.0**	**43.8**
NB30	R	DT	92	**42**	**47.8**	**43.1**	**42.5**	**46.0**	37.8	40.9	41.4	40.0
NB31	R	DT	100	36	35.5	37.2	32.8	36.2	37.1	34.2	33.4	34.3
NB35	R	DT	100	28	29.6	28.0	26.1	28.2	26.2	24.8	24.8	24.8
NB36	R	DT	100	34	**41.5**	**41.0**	35.1	39.1	38.1	35.0	36.5	37.6
NB37	R	DT	100	30	34.8	36.0	31.6	33.2	32.0	31.6	31.8	33.0
NB38	R	DT	100	24	34.5	31.8	28.6	33.9	29.6	28.6	27.4	30.5
NB41	R	DT	58	-	-	-	-	35.2	34.8	31.4	32.1	31.2

Site ID	Site Type	Monitoring Type	Valid Data Capture 2016 (%)	NO_2 Annual Mean Concentration ($\mu g/m^3$) [a]								
				2008	2009	2010	2011	2012	2013	2014	2015	2016
NB42	R	DT	83	-	-	-	-	29.2	28.7	30.4	28.2	28.1
NB43	R	DT	100	-	-	-	-	-	-	-	27.4	26.9
NB44	R	DT	92	-	-	-	-	-	-	-	30.1	30.5
NB45	R	DT	67	-	-	-	-	-	-	-	26.3	29.6
NB46	R	DT	75	-	-	-	-	-	-	-	-	19.8
NB47	R	DT	75	-	-	-	-	-	-	-	-	18.9
NB48	R	DT	75	-	-	-	-	-	-	-	-	25.2

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.**

[a] Means for diffusion tubes have been corrected for bias. If valid data capture for the full calendar year is less than 75%, the mean has also been "annualised" as per Technical Guidance LAQM.TG16. See Appendix C for details.

[b] Average of triplicate tubes.

Table A.8 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture 2016 (%)	NO_2 1-Hour Means > 200µg/m^3 [a]								
				2008	2009	2010	2011	2012	2013	2014	2015	2016
AQM2	R	Automatic	93	0	11 (191.4)	-	-	0 (121.7)	0	0	0	0

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.**

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

Figure A.1 – Trend in Annual Mean NO_2 Concentrations Measured at the Leicester Road (AQM2) Automatic Monitoring Site

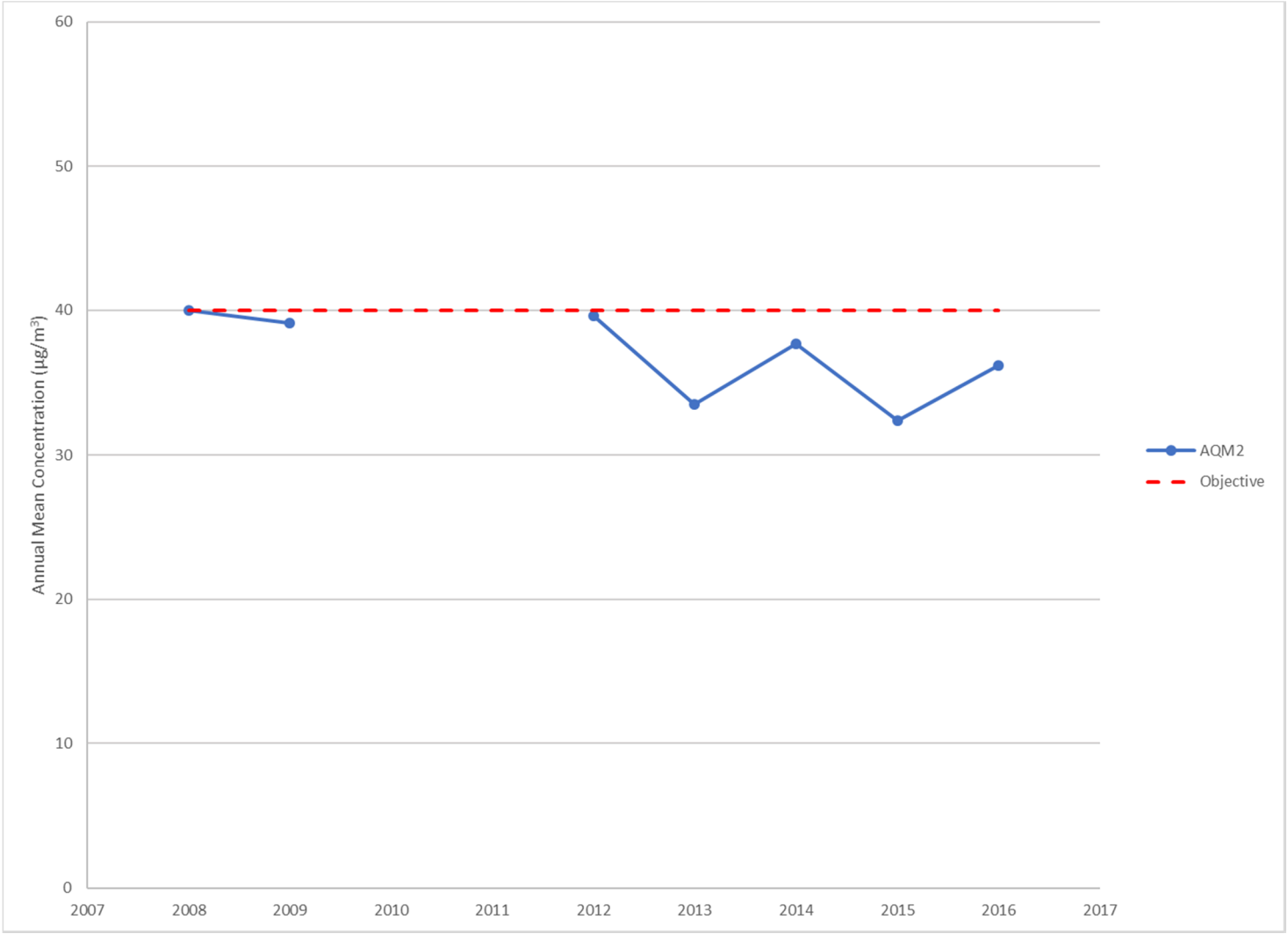


Figure A.2 – Trend in Annual Mean NO_2 Concentrations Measured at Diffusion Tube Monitoring Sites NB1 – NB14

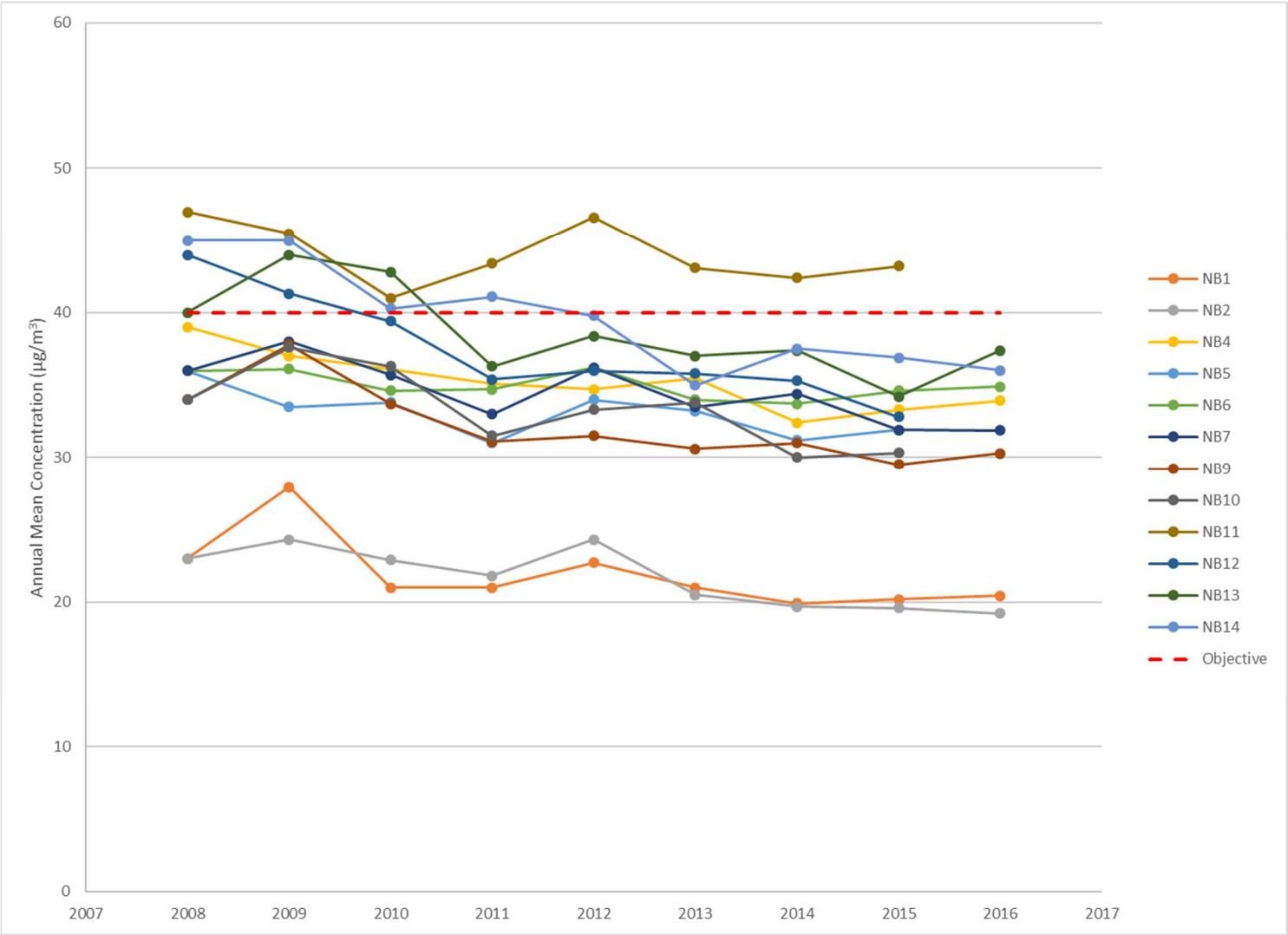


Figure A.3 – Trend in Annual Mean NO_2 Concentrations Measured at Diffusion Tube Monitoring Sites NB15 – NB28

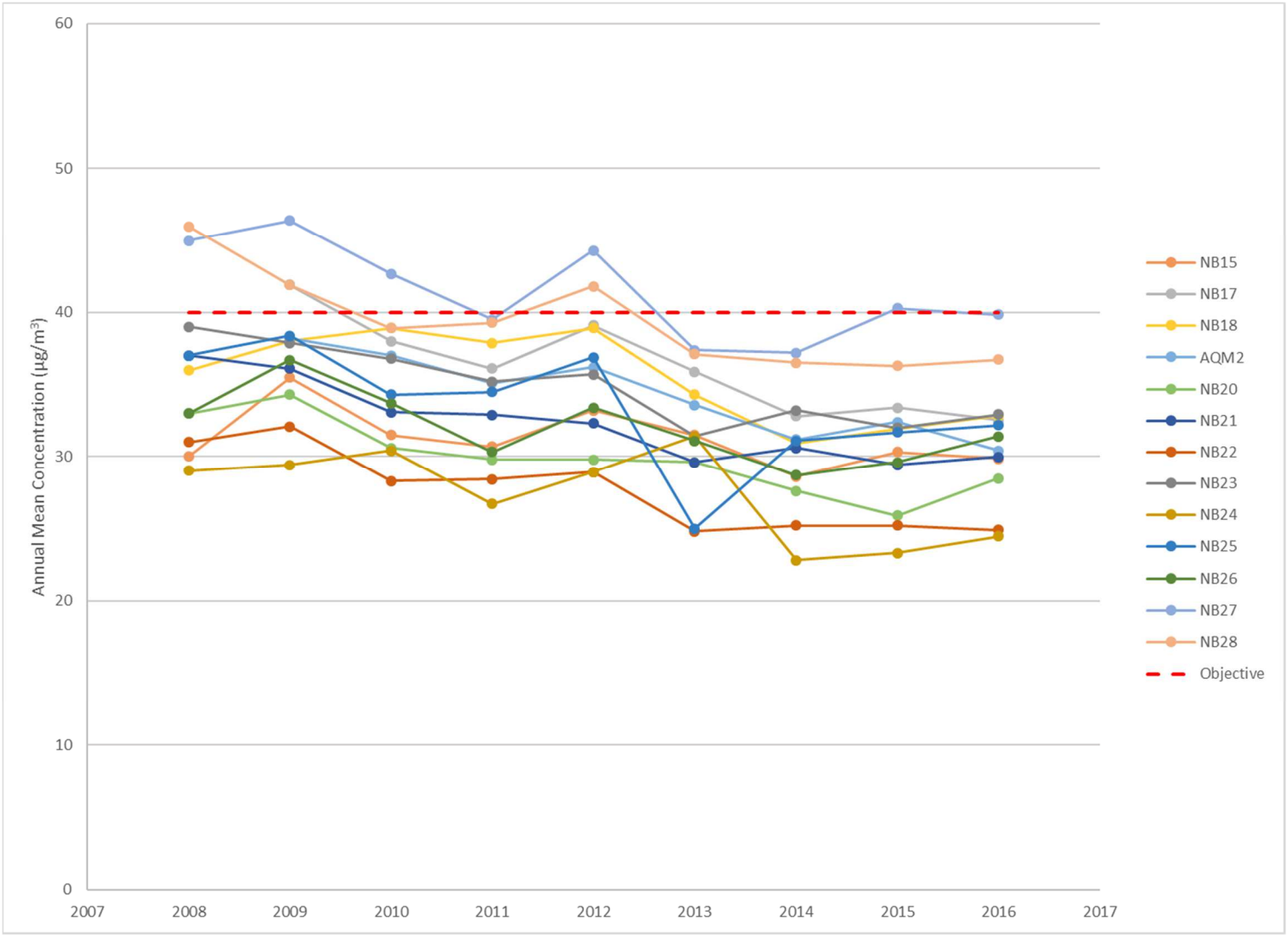
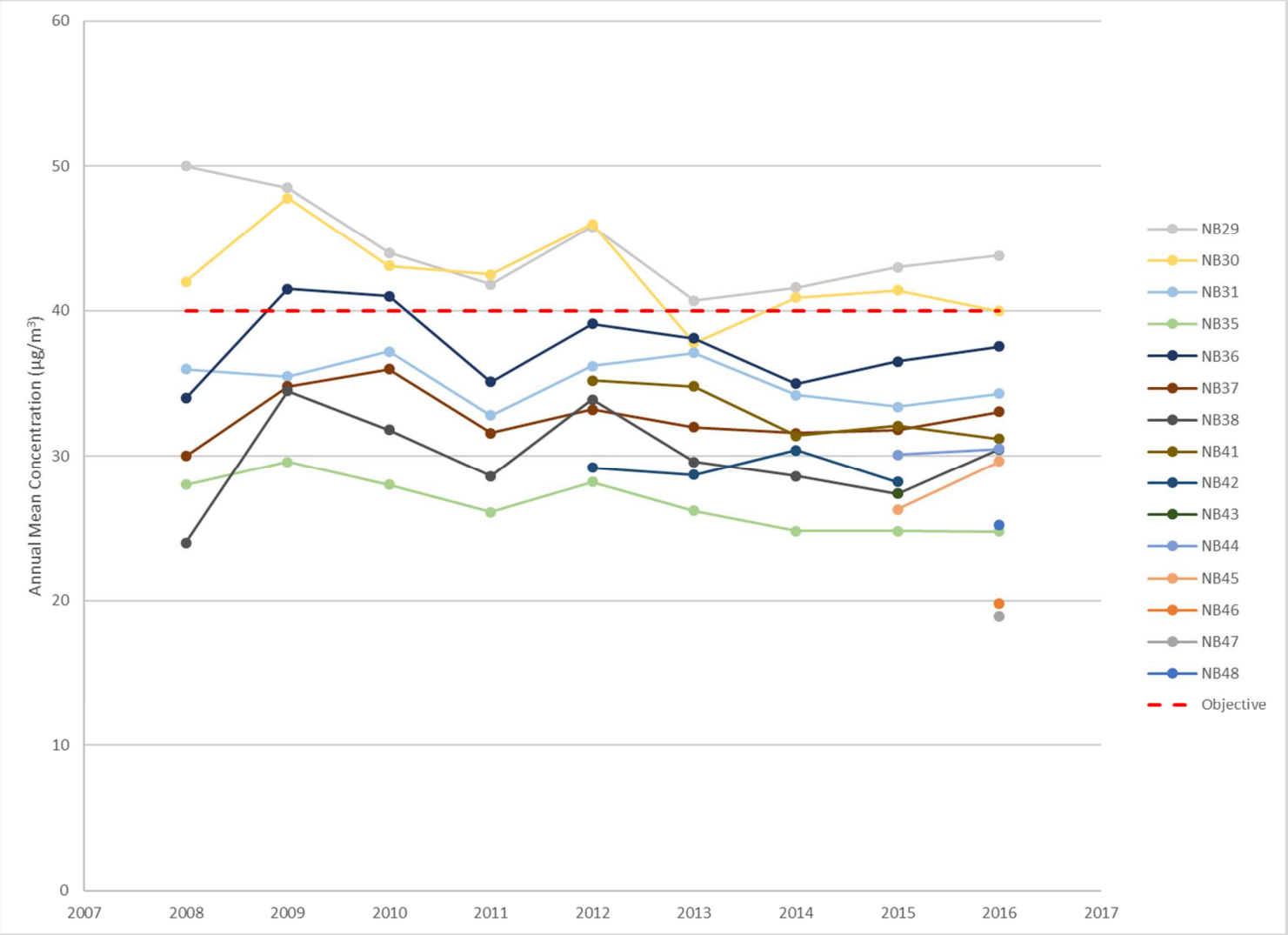


Figure A.4 – Trend in Annual Mean NO_2 Concentrations Measured at Diffusion Tube Monitoring Sites NB29 – NB48



Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.2 – NO_2 Monthly Diffusion Tube Results - 2016

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[a]
AQM2	42.4	31.2	34.3	41.7	-	-	-	-	34.8	29.4	35.9	46.3	37.0	34.8
AQM2	41.6	37.6	33.1	40.5	-	-	-	-	38.5	28.9	34.8	47.7	37.8	35.5
AQM2	43.8	31.5	34.9	41.8	-	-	-	-	35.2	28.6	40.9	45.1	37.7	35.4
NB1	29.3	22.0	23.5	20.0	20.6	16.6	13.0	12.3	19.8	21.8	27.5	34.5	21.7	20.4
NB2	26.0	22.4	22.8	17.3	15.4	14.0	13.3	13.2	21.7	21.3	21.4	36.7	20.5	19.2
NB4	42.8	35.0	36.0	36.0	39.4	33.2	26.9	29.8	35.0	41.3	40.3	47.8	36.9	34.7
NB5	38.2	34.7	40.2	33.4	34.7	30.5	21.0	21.8	27.2	37.2	38.3	37.6	32.9	30.9
NB6	47.5	33.6	33.1	34.5	38.1	32.0	35.7	32.5	35.1	32.8	44.3	46.5	37.1	34.9
NB7	-	-	35.5	31.7	36.7	31.8	24.3	26.2	34.7	34.9	37.7	45.8	33.9	31.9
NB9	35.4	33.6	35.5	29.3	28.8	27.1	22.2	23.8	33.7	35.5	36.8	45.0	32.2	30.3
NB13	44.7	36.4	39.4	35.3	37.1	37.5	-	30.3	37.7	41.7	43.0	54.7	39.8	37.4
NB14	46.6	39.1	37.5	34.3	37.1	32.8	37.4	33.2	37.2	36.2	41.9	46.4	38.3	36.0
NB15	40.9	30.5	30.1	30.2	28.6	26.1	23.4	23.7	29.7	32.3	40.1	45.5	31.8	29.8
NB17	34.4	32.6	37.1	36.4	37.8	33.2	24.8	26.6	37.2	40.5	40.0	-	34.6	32.5
NB18	41.8	-	33.2	30.4	27.6	29.3	30.9	27.7	-	32.7	43.5	52.4	34.9	32.8

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[a]
NB20	33.4	29.0	30.7	30.9	30.7	26.0	23.0	24.1	28.7	33.2	35.8	38.2	30.3	28.5
NB21	33.2	33.0	28.2	28.4	30.0	27.2	30.1	26.4	32.7	32.7	35.5	45.3	31.9	30.0
NB22	34.3	25.2	26.0	24.0	24.3	21.1	22.0	20.9	28.3	24.7	30.2	36.8	26.5	24.9
NB23	40.6	34.0	33.6	30.0	33.9	31.3	33.4	31.0	35.1	31.8	40.3	45.6	35.0	32.9
NB24	31.9	28.9	26.6	24.4	22.8	12.0	20.6	20.3	27.0	28.4	31.8	37.7	26.0	24.5
NB25	41.0	32.5	34.3	30.5	29.2	26.7	36.8	31.5	38.7	29.0	37.9	43.1	34.3	32.2
NB26	33.8	31.7	35.3	34.1	34.8	31.4	25.0	27.5	32.6	36.7	36.3	41.9	33.4	31.4
NB27	43.7	40.0	43.1	35.1	43.8	42.1	42.0	37.9	47.0	41.2	47.9	45.2	42.4	39.9
NB28	43.8	35.4	37.9	35.8	38.5	34.9	34.7	33.9	38.1	37.8	45.8	52.6	39.1	36.7
NB29	55.7	45.4	40.6	42.8	48.7	37.2	48.5	44.4	51.5	41.3	48.7	54.7	46.6	**43.8**
NB30	46.2	39.2	40.4	38.1	41.4	37.4	41.8	39.5	43.9	-	43.9	56.0	42.5	40.0
NB31	34.7	33.8	42.4	35.1	38.9	38.5	26.2	29.8	34.9	39.6	40.6	43.5	36.5	34.3
NB35	29.4	26.6	26.1	25.3	24.7	22.2	18.3	21.4	26.1	30.6	30.7	34.9	26.4	24.8
NB36	45.3	36.4	36.0	37.1	37.2	35.7	30.2	31.5	42.5	40.2	46.3	61.1	40.0	37.6
NB37	37.5	34.3	39.4	32.9	36.3	33.6	28.8	27.4	33.2	35.5	39.0	44.1	35.2	33.0
NB38	39.5	29.1	35.5	29.7	32.8	28.8	27.8	25.6	30.1	32.0	34.5	43.8	32.4	30.5
NB41	38.0	31.9	34.2	32.8	23.9	31.1	22.0	-	-	-	-	-	30.6	28.7
NB42	34.0	27.6	-	29.6	-	24.7	23.5	22.3	24.8	31.9	36.3	44.1	29.9	28.1

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[a]
NB43	36.1	29.1	32.4	31.1	24.4	24.5	20.6	21.9	20.8	27.8	36.3	38.6	28.6	26.9
NB44	38.5	32.1	38.9	34.3	33.3	-	24.5	23.9	31.8	31.5	27.6	40.8	32.5	30.5
NB45	36.3	29.9	33.7	30.0	28.5	24.2	17.9	21.5	-	-	-	-	27.8	26.1
NB46	-	-	-	19.6	18.3	17.4	16.0	16.4	20.1	21.9	25.6	34.4	21.1	19.8
NB47	-	-	-	18.3	18.5	15.6	12.4	13.9	19.8	23.6	27.1	32.3	20.1	18.9
NB48	-	-	-	23.8	21.4	21.0	22.9	23.7	29.5	27.3	32.5	39.7	26.8	25.2

[a] See Appendix C for details on bias adjustment

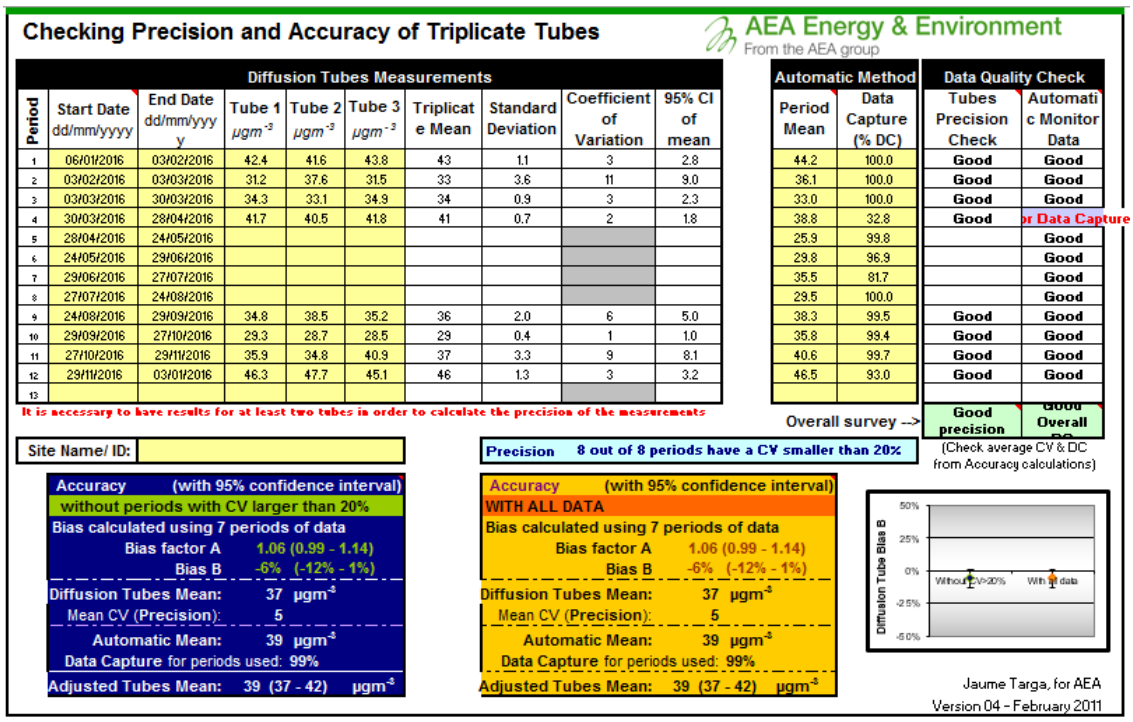
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Diffusion Tube QA/QC

Nuneaton and Bedworth Borough Council deploys diffusion tubes prepared and analysed by Gradko (20% TEA in water method). Tubes are changed monthly.

Bias Adjustment Factors from Local Co-location Studies

Nuneaton and Bedworth Borough Council carried out a co-location study at the Leicester Road automatic monitor in 2016. A local bias adjustment factor has been calculated, however, due to missing diffusion tubes, data capture is not adequate to provide an accurate factor.



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation	95% CI of mean
1	06/01/2016	03/02/2016	42.4	41.6	43.8	43	1.1	3	2.8
2	03/02/2016	03/03/2016	31.2	37.6	31.5	33	3.6	11	9.0
3	03/03/2016	30/03/2016	34.3	33.1	34.9	34	0.9	3	2.3
4	30/03/2016	28/04/2016	41.7	40.5	41.8	41	0.7	2	1.8
5	28/04/2016	24/05/2016							
6	24/05/2016	29/06/2016							
7	29/06/2016	27/07/2016							
8	27/07/2016	24/08/2016							
9	24/08/2016	29/09/2016	34.8	38.5	35.2	36	2.0	6	5.0
10	29/09/2016	27/10/2016	29.3	28.7	28.5	29	0.4	1	1.0
11	27/10/2016	29/11/2016	35.9	34.8	40.9	37	3.3	9	8.1
12	29/11/2016	03/01/2016	46.3	47.7	45.1	46	1.3	3	3.2
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
44.2	100.0	Good	Good
36.1	100.0	Good	Good
33.0	100.0	Good	Good
38.8	32.8	Good	or Data Capture
25.9	99.8		Good
29.8	96.9		Good
35.5	81.7		Good
29.5	100.0		Good
38.3	99.5	Good	Good
35.8	99.4	Good	Good
40.6	99.7	Good	Good
46.5	93.0	Good	Good
Overall survey -->		Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 8 out of 8 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 7 periods of data
Bias factor A 1.06 (0.99 - 1.14)
Bias B -6% (-12% - 1%)
Diffusion Tubes Mean: 37 µgm⁻³
Mean CV (Precision): 5
Automatic Mean: 39 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 39 (37 - 42) µgm⁻³

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 7 periods of data
Bias factor A 1.06 (0.99 - 1.14)
Bias B -6% (-12% - 1%)
Diffusion Tubes Mean: 37 µgm⁻³
Mean CV (Precision): 5
Automatic Mean: 39 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 39 (37 - 42) µgm⁻³

Jaume Targa, for AEA
Version 04 - February 2011

National Bias Adjustment Factor

The national bias adjustment factor for Gradko, 20% TEA in water in 2016 is 0.94 (taken from spreadsheet 03/17 v2, based on 21 studies; available at: http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html). This factor has been applied to all 2016 diffusion tube data.

Air Proficiency Testing

Gradko take part in the UKAS accredited proficiency testing scheme Air PT, operated by LGC and the Health and Safety Laboratory (HSL). Available data for Gradko in 2016 are provided below:

Air PT Round	AR012	AR013	AR015	AR016
Period	Jan – Feb 2016	April – May 2016	July – Aug 2016	Sept – Oct 2016
Satisfactory Results (%)	100	100	100	100

During 2016, 100% of samples submitted were determined to have been satisfactory.

Short-term to Long-term Data Adjustment (Annualisation)

Missing diffusion tubes meant that, during 2016, three monitoring locations did not achieve the minimum data requirements (75%). The data for these three sites (the triplicate tubes co-located with the automatic analyser (AQM2), NB41 and NB45) have therefore been adjusted to an annual mean, based on the ratio of concentrations during the short-term monitoring period to those over the 2016 calendar year. This has utilised data from the six closest urban background monitoring sites whose data are available from the Automatic Urban and Rural Network (AURN; https://uk-air.defra.gov.uk) where long-term data are available (with data capture >90%).

AQM2; 6 Jan – 28 April, 24 Aug – 3 Jan

Site	2016 Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	21.3	24.8	0.859
Birmingham Tyburn	29.0	33.2	0.873
Coventry Allesley	22.6	26.2	0.862
Leamington Spa	21.4	25.3	0.844
Leicester University	28.4	32.1	0.884
Walsall Woodlands	18.4	21.6	0.851
		Average	0.862

NB41; 6 Jan – 24 Aug

Site	2016 Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	21.3	18.7	1.141
Birmingham Tyburn	29.0	26.0	1.114
Coventry Allesley	22.6	20.2	1.117
Leamington Spa	21.4	18.5	1.154
Leicester University	28.4	25.9	1.097
Walsall Woodlands	18.4	15.4	1.193
		Average	1.136

NB45; 6 Jan – 27 July

Site	2016 Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	21.3	19.7	1.082
Birmingham Tyburn	29.0	27.1	1.070
Coventry Allesley	22.6	21.2	1.067
Leamington Spa	21.4	19.3	1.108
Leicester University	28.4	27.1	1.047
Walsall Woodlands	18.4	16.1	1.140
		Average	1.086

Automatic Monitoring QA/QC

The continuous monitor station located at Leicester Road was maintained during 2016 by We Care 4 Air. Fortnightly site visits and servicing were completed by We Care 4 Air, who then ratified the data and uploaded it to the Council and the We Care 4 Air website. The station was decommissioned at the end of 2016.

Appendix D: Maps of Monitoring Locations

Figure D.1: Monitoring in and around the Leicester Rd Gyratory, Nuneaton AQMA

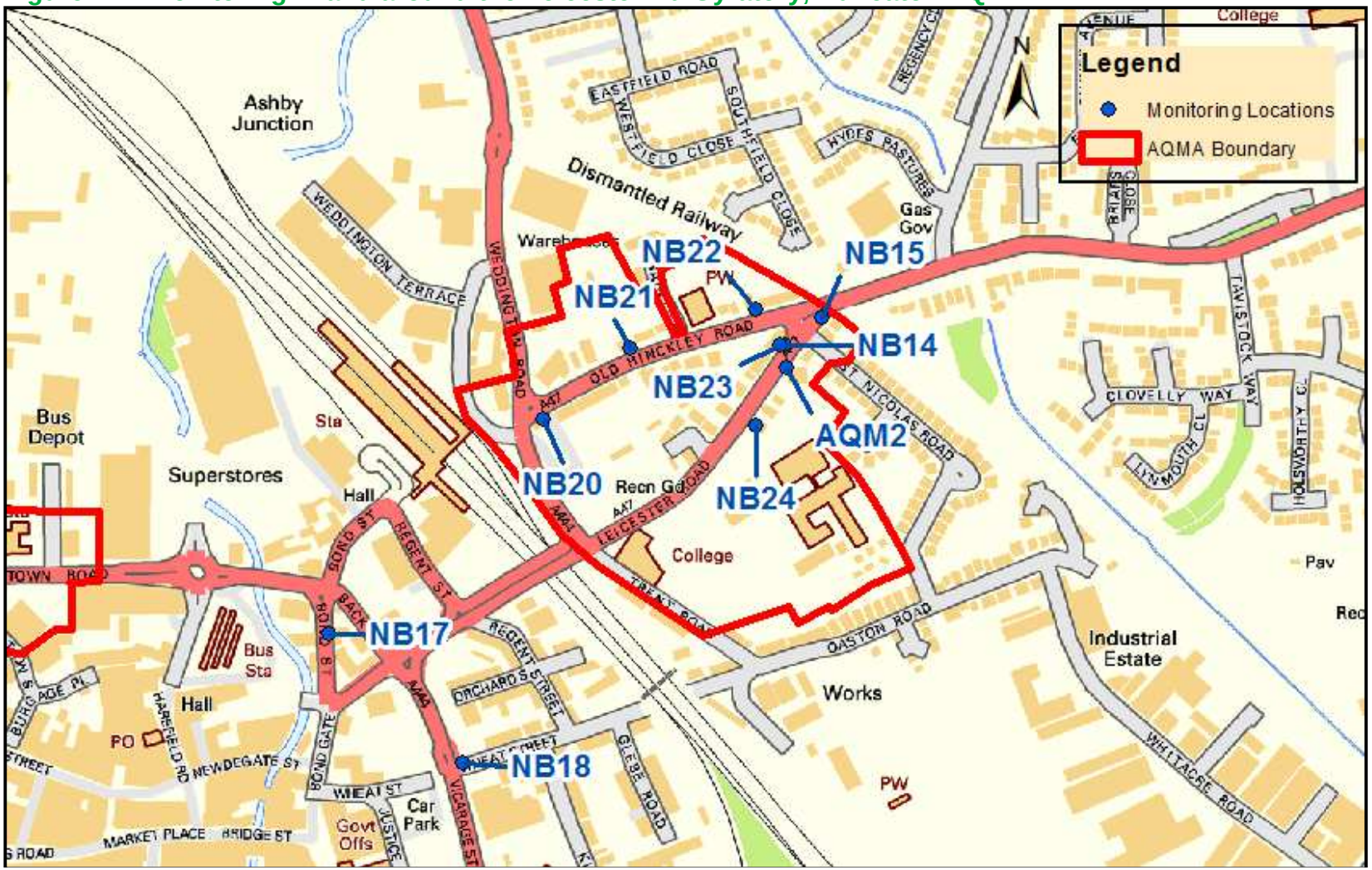


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Figure D.2: Monitoring in the Midlands Road / Corporation Street AQMA

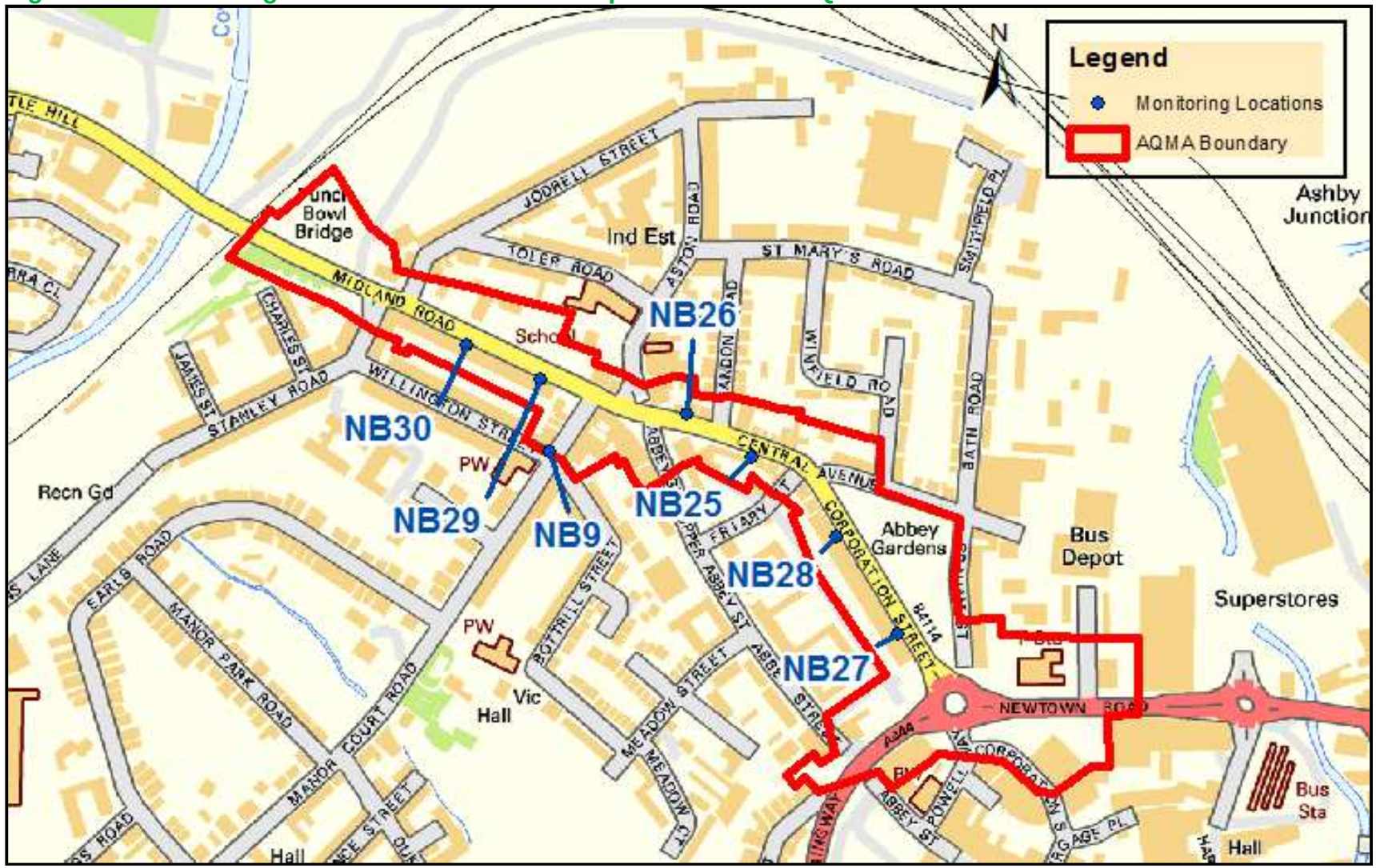

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Figure D.3: Monitoring in Chilvers Coton and Attleborough

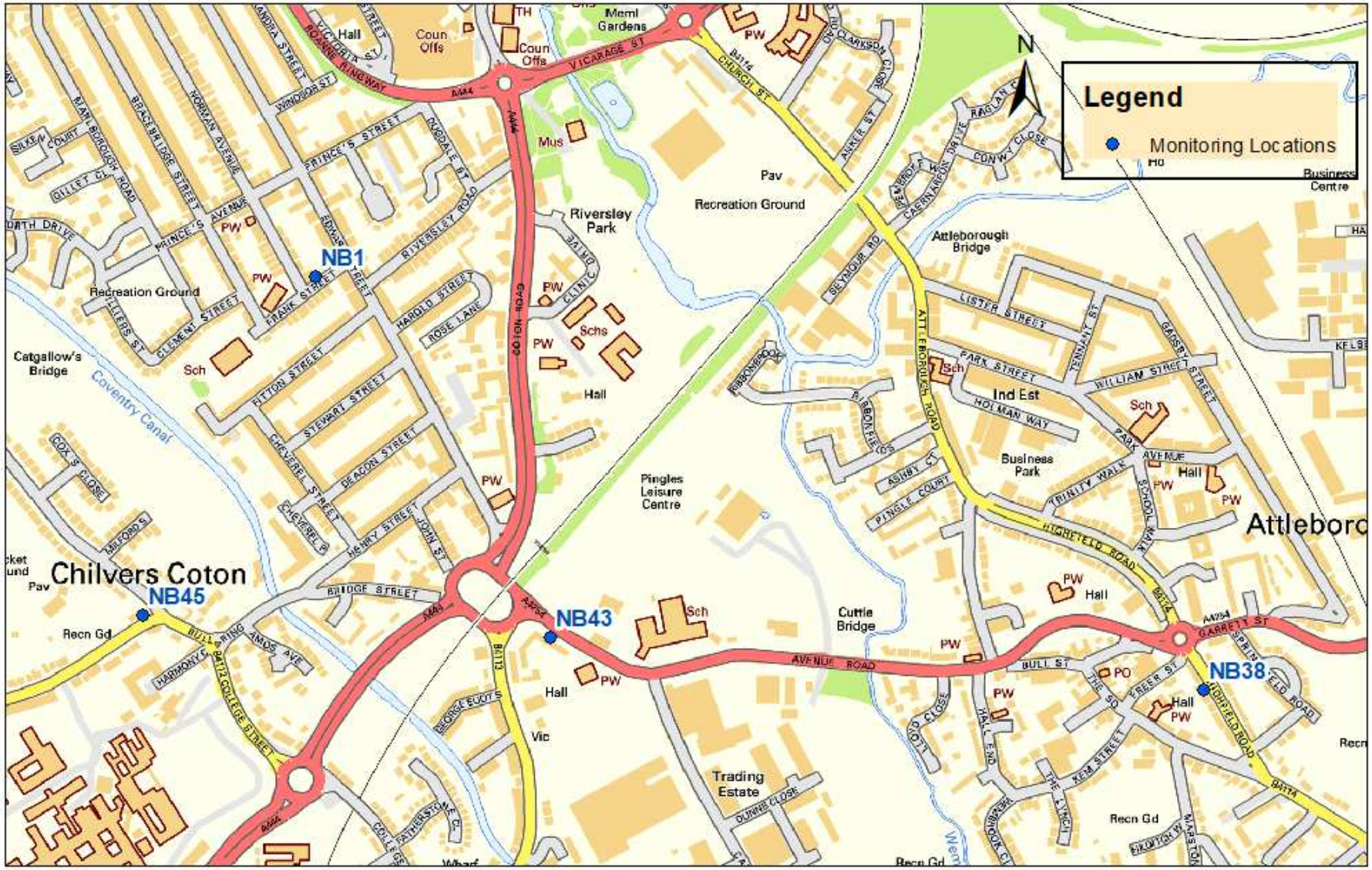

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Figure D.4: Monitoring in Bedworth

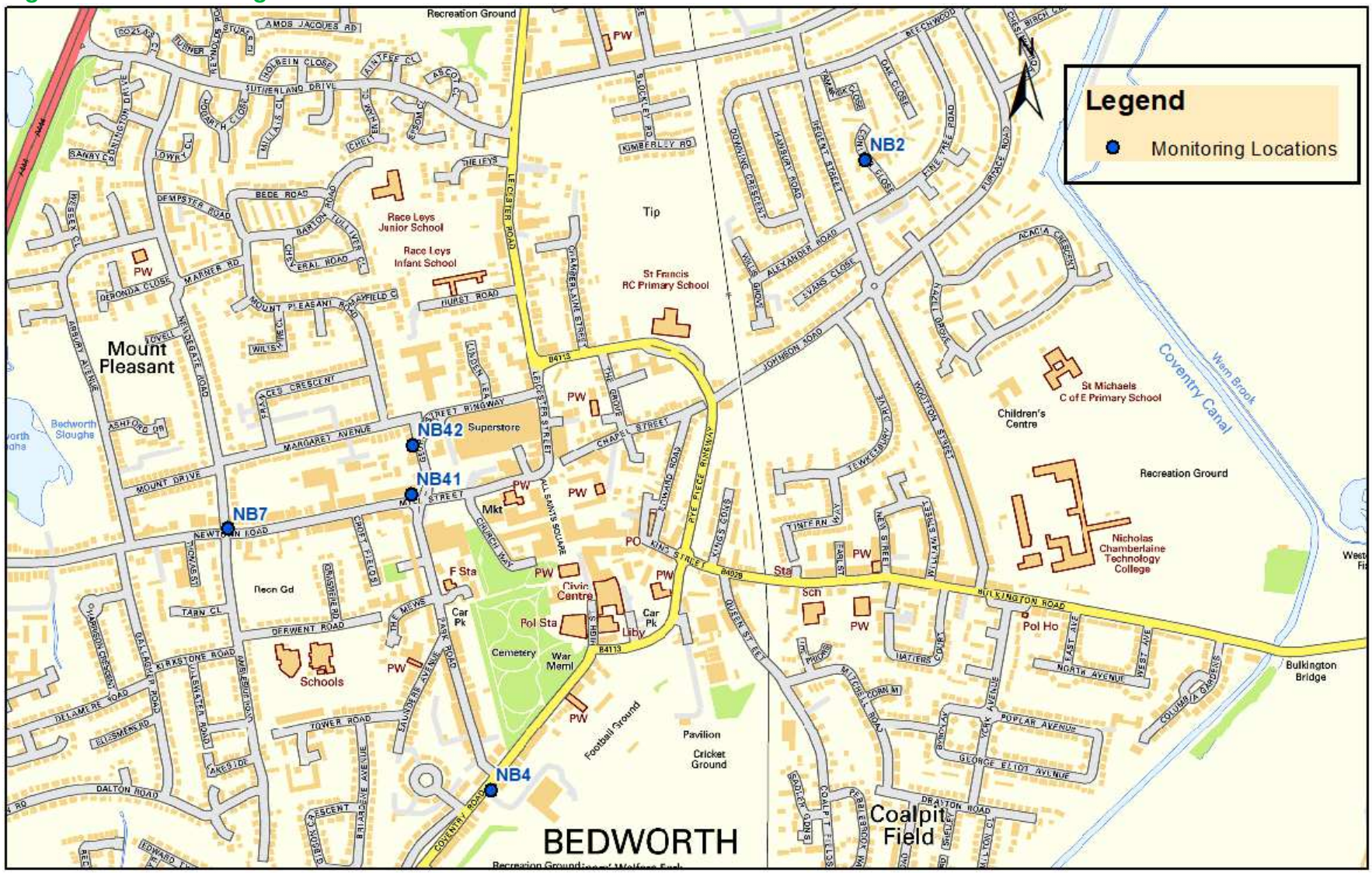

Figure D.5: Monitoring in Exhall

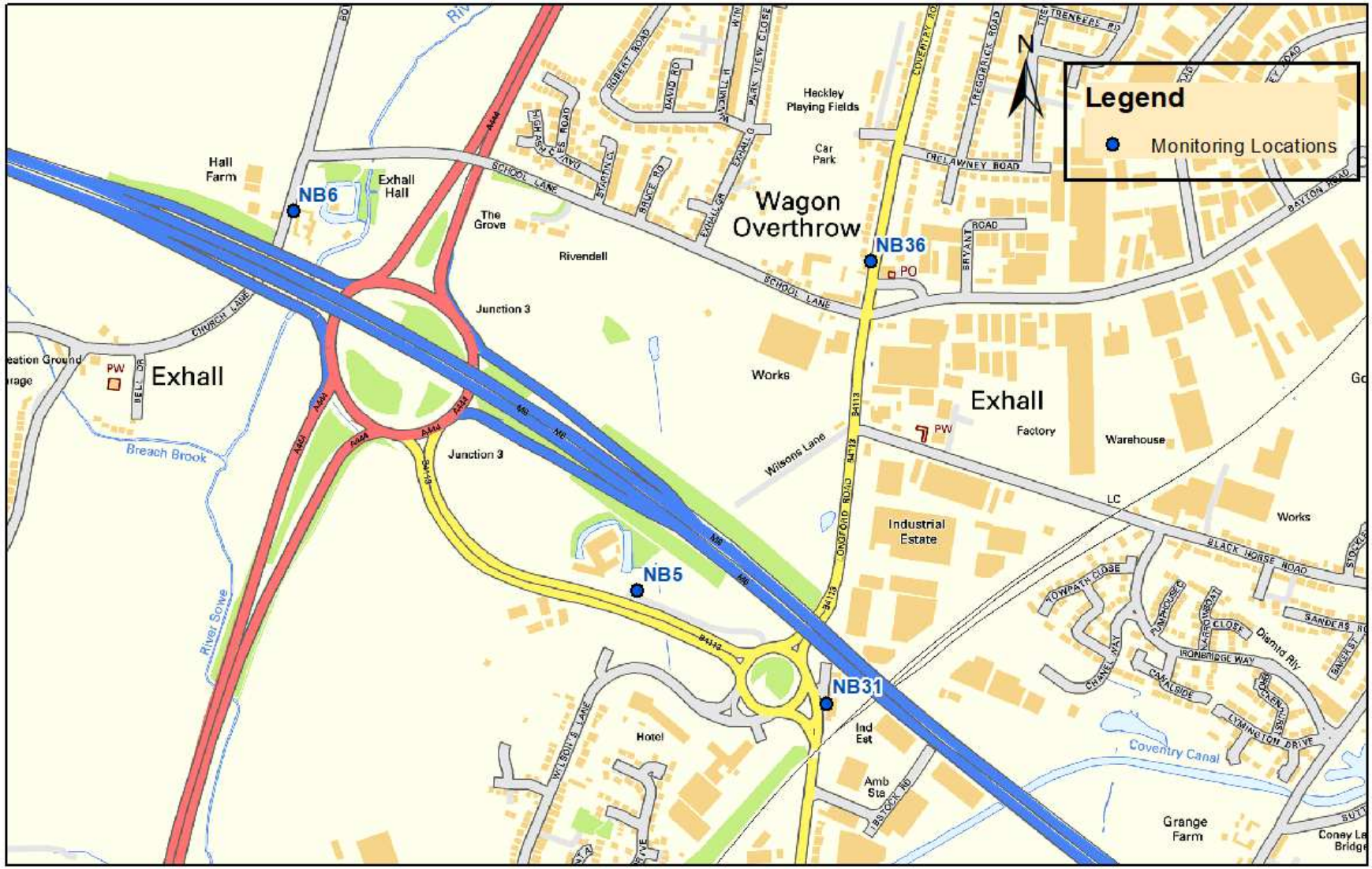

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Figure D.6: Monitoring in Watling Street

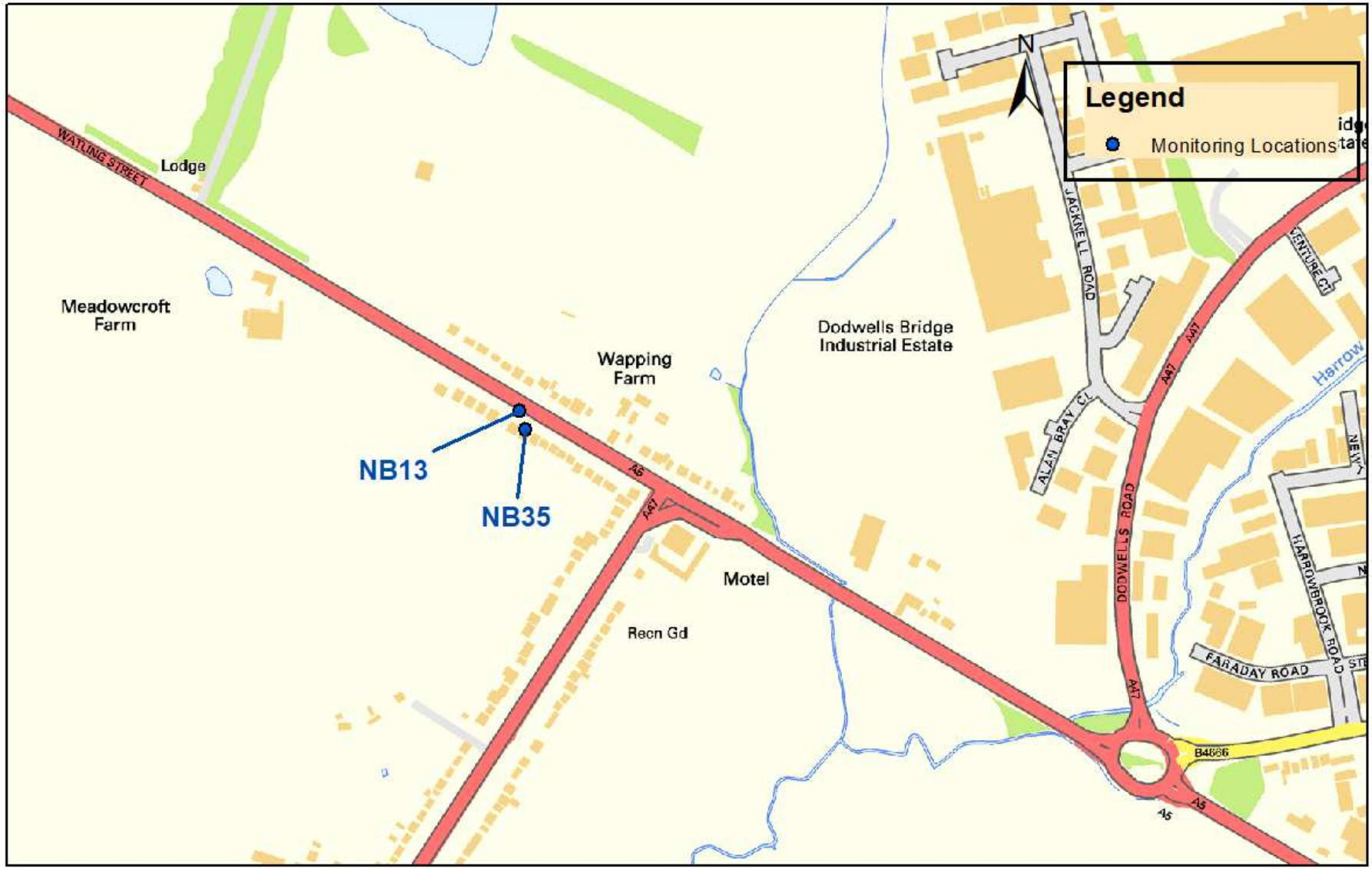

Figure D.7: Monitoring in Heath End

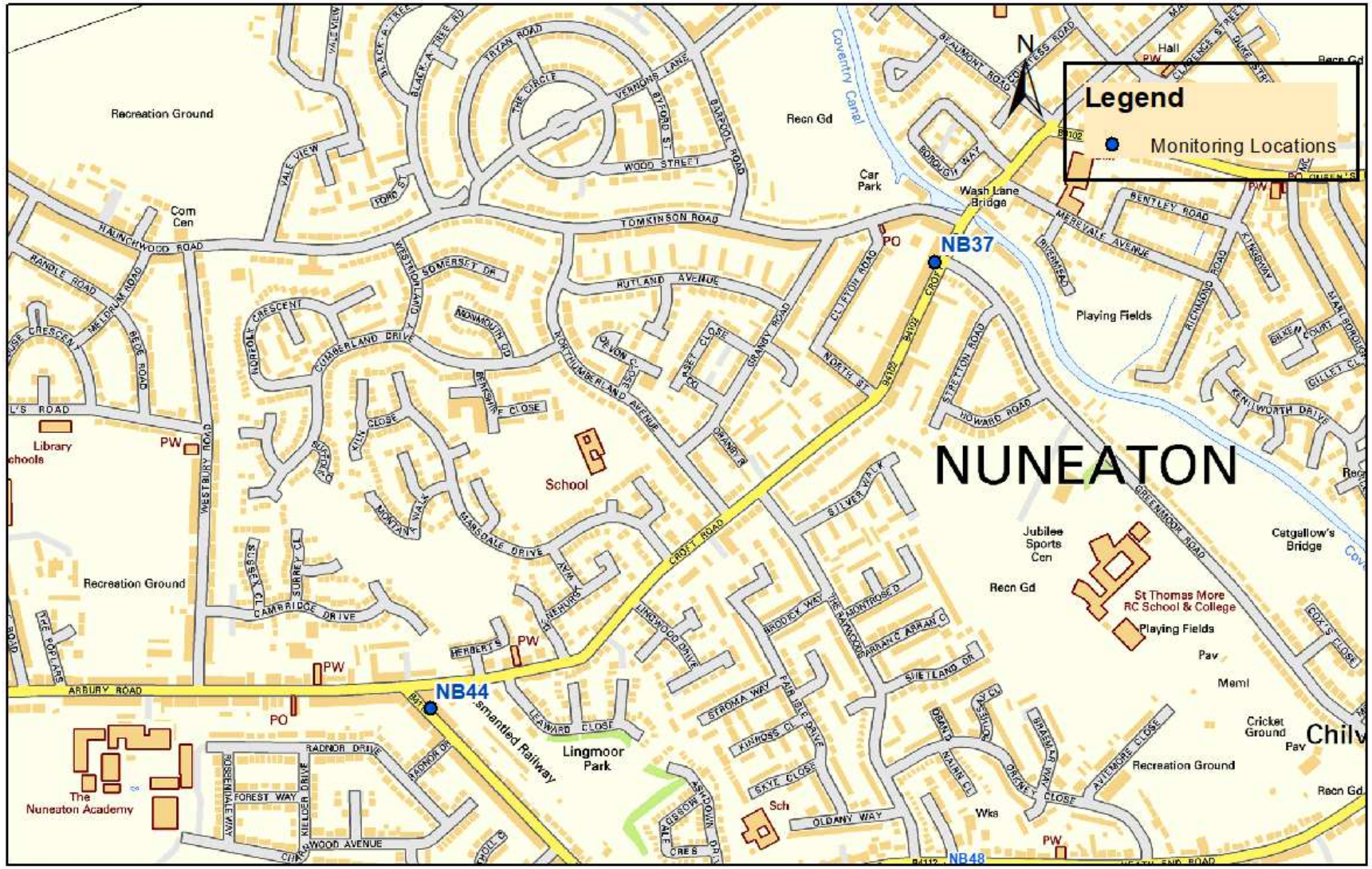

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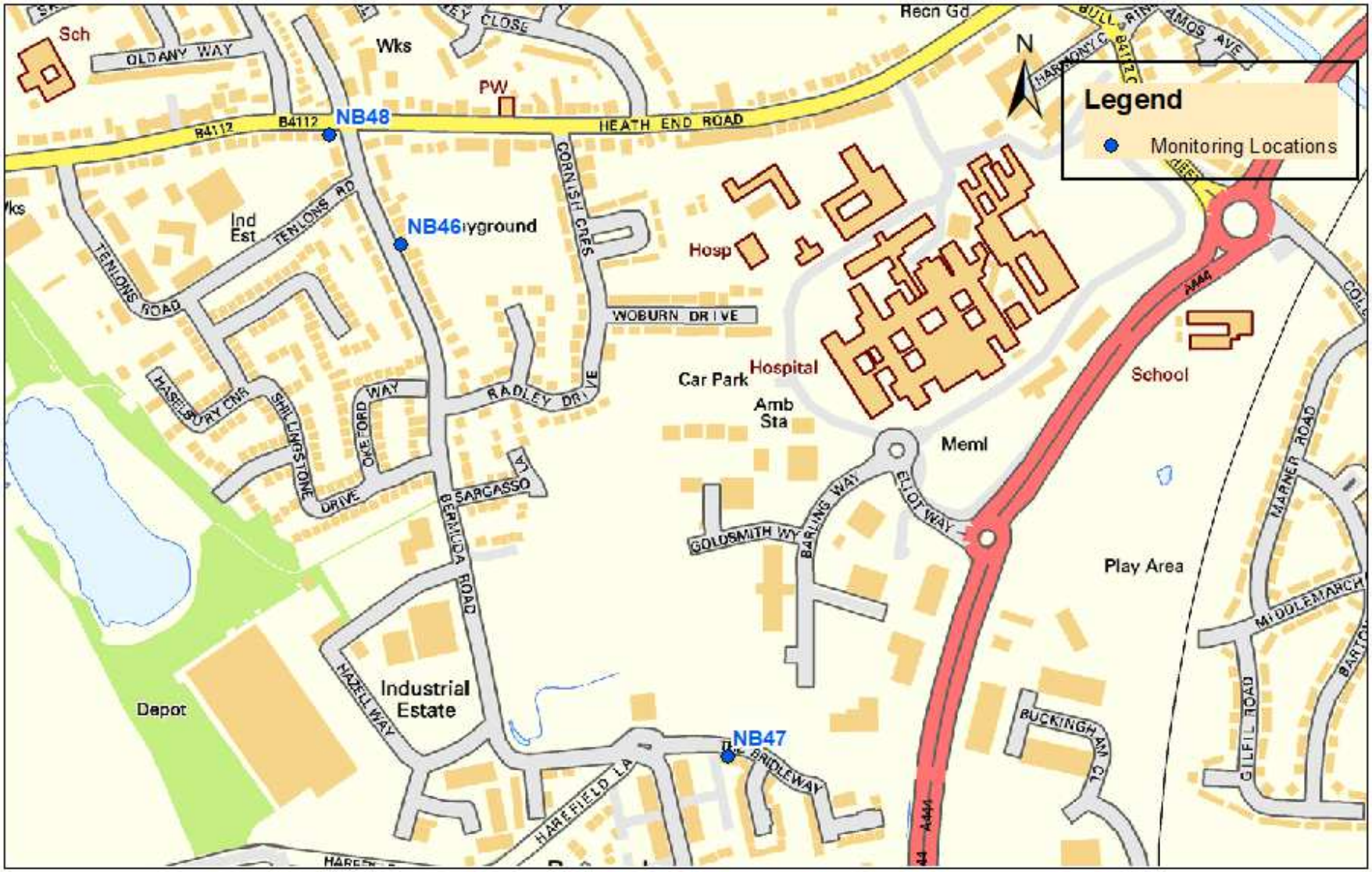
Figure D.8: Monitoring in Heath End – New Monitoring Locations



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	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

[7] The units are in micrograms 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
EU	European Union
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
STP	School Travel Plan
TEA	Triethanolamine
WTP	Workplace Travel Plan