Bassetlaw District Council

2017 Air Quality Annual Status Report (ASR)

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

July 2017

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Executive Summary: Air Quality in Our Area

About Bassetlaw

Bassetlaw is the northern most of the seven Nottinghamshire authorities. It covers an area of approximately 240 square miles and has a population of approximately 112,000. The population density (as of 2011 census information) is 176/km^2. The borough is predominantly rural with the two main settlements being the market towns of Worksop and Retford. The A1 trunk road runs straight through the borough from the north-west (at Harworth) to the south-east (at Tuxford). The traditional industry in the west of the borough (around Worksop) is coal mining. Since 1980, the deep mines of Shireoaks, Welbeck, Firbeck, Harworth, Manton and Bevercoats have all closed. The River Trent forms the eastern boundary of the borough with Lincolnshire, and apart from the coal-fired power stations on the Trent there is little or no heavy industry in the east. The land becomes flatter in the east of the borough and arable farmland covers much of the area.

Air Quality in Bassetlaw

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].

In the status report **(BDC/SR/2016)** Bassetlaw District Council compared the monitoring data obtained during a twelve-month period (January 2015 – December 2015) with the annual air quality objectives as defined in the Air Quality Regulations. The report concluded that there were **no** exceedances of the air quality objectives. However, a number of tubes were close to the limit and these were therefore kept under review during the 2016 sampling programme.

Bassetlaw District Council has continued to monitor levels of Nitrogen Dioxide at key locations across Bassetlaw during the 2016 sampling programme. The results of the monitoring data obtained during a twelve-month period (January 2016 – December 2016) have been compared with the annual air quality objectives as defined in the Air Quality Regulations.

[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

The conclusion from the 2016 round of sampling and analysis **(BDC/ASR/2017)** is a promising downward trend in emissions at all the locations which last year showed elevated levels close to the objectives. There has either been no change or a slight downward trend in NO2 emissions at all locations which have previously given cause for concern.

Actions to Improve Air Quality

As demonstrated over many years of sampling and analysis, the residents of Bassetlaw benefit from very good air quality except in a few very specific locations where levels have traditionally been quite close to the legal limits. The main concern is the A1 which runs directly across the district from the north west to the south east. This is an immensely busy trunk road which carries significant cross-country traffic, most of which does not originate from Bassetlaw or have Bassetlaw as a destination. The district therefore suffers the effects of pollution which the authority has no direct control over or can put direct measures in place to control.

As the A1 slices across the district it intersects in a number of key locations with some of Bassetlaw's roads. At these locations the A1 either passes under, over or directly alongside the local road network and residents in the immediate vicinity are impacted by increased levels of pollution. These are areas which are kept under very close review to ensure that rising traffic levels on the A1 are not increasing pollution for Bassetlaw residents above the health-based objectives.

There are also a small number of 'hot-spot' locations where pollution has been shown over a number of years to be close to the legal limits. These are in the towns of Worksop and Retford in locations where standing traffic during busy periods causes air quality to be impacted.

Besides these specific concerns which the council keeps under review, the district is predominantly rural and benefits from good air quality.

However, taking the regions good air quality for granted is not a notion which is supported by Bassetlaw District Council. As an authority we are extremely keen to promote more sustainable transport methods and ensure that the region remains a green, present and healthy environment for all.

Action plans for Air Quality in Bassetlaw

1) Permitting Regime - inspections

Bassetlaw Council take their responsibilities under the IPPC regulations very seriously. The council have a large number of complex, polluting industries covering a wide range of prescribed functions. The gradual de-regulation of the permitting sector and introduction of simplified permits across a number of industries has always been of concern to Bassetlaw Council. Businesses change hands regularly and from experience a compliant site can deteriorate and become non-compliant very quickly. Therefore in an attempt to maintain high standards across the industrial sector, the Council has supported the continued use of annual or twice annual inspections rather than relying on the minimum inspection frequency recommended by Defra. This approach impacts on the staffing and resources of the Pollution Control Team at Bassetlaw but is considered to be extremely important and is something that the Authority is very keen to continue to promote.

2) Permitting Regime – permit conditions

The council are routinely including stricter conditions on environmental permits in an attempt to bring low-performing industries up to standard. The types of measures include introducing permit conditions that go beyond BAT with the aim of reducing pollution through IPPC regime. To date, no company imposed with stricter conditions has appealed against their permits therefore demonstrating that working with industry to improve pollution can be very successful.

3) Collaborative working in Nottinghamshire

Representatives of the pollution team attend a regional working group on air quality with officers from the other Nottinghamshire authorities. Regional groups co-ordinate programmes to develop area wide strategies to reduce emissions and improve air quality.

4) Education and awareness

This an area that Bassetlaw Council have neglected in the past, perhaps through a complacency born out of having good air quality. The council have an education and awareness officer who is based in Environmental Health and schemes which promotion sustainable transport choices will feature in the event planning for 2017.

5) Planning for improvement

The Environmental Health department are working in collaboration with the Planning department to establish protocols which can limit or mitigate against poor air quality. The action plan being prepared considers how future development can be designed and located to better protect occupiers from poor air quality and prevent new

developments from making air quality worse. The action plan includes information on areas of the district identified as 'being of concern' because they are close to main roads and already subjected to elevated levels of nitrogen dioxide. Advice and/or conditions will be placed on planning application in these areas to require developers to consider air quality as part of their designs.

How to Get Involved

Speak to me….My name is Amy Ogden and I am the Council's Team leader in the Pollution Team in Environmental Health.

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"I am passionate about maintaining a clean, healthy environment and improving the life, prospects and health equality of the residents of Bassetlaw. I'd love to talk to you about the content of this report and answer any questions you may have. I am extremely aware that making changes to your transport choices can be difficult and must fit your lifestyle. I am far from being the perfect example – I drive a car because it is extremely convenient and makes my life better. However, I view car ownership as a privilege and not a right, so I

walk and ride a bike whenever possible and endeavour to make choices that are 'part of the solution, not part of the problem'. I'd encourage you to do the same – make small changes in your transport choices and between us these small changes add up and contribute to maintaining good air quality in the district of Bassetlaw".

Some of my suggestions include:

- Walk more, cycle more and drive less.
- Try using public transport
- Try not to drive at busy times
- Try to avoid driving in the town centre
- Consider carefully if you need a diesel vehicle. Petrol cars are cleaner and less polluting than diesels
- Drive at slower speeds on the A1, trunk roads and duel carriageways
- Don't accelerate quickly and break suddenly, move slowly through the gears and accelerate gently
- Don't allow your vehicle to idle when stationary
- Talk to your children about how poor air quality can affect health

Thank you for taking time to read this report

Amy Ogden BSc. (Hons) MEHRB MCIEH

Environmental Health Team Leader

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1 Local Air Quality Management

This report provides an overview of air quality in Bassetlaw 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 Bassetlaw 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 Progress and Impact of Measures to address Air Quality in Bassetlaw

Bassetlaw 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 2.1.

Table 2.1 – 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	Comments
1	Stricter conditions on environmental permits	Environmental Permits	Measures to reduce pollution through IPPC permits going beyond BAT	Bassetlaw	Complete 2015	Complete 2016	None	N/A	Ongoing	Ongoing	
2	Attendance at regional working group	Control	Regional groups co-ordinating programmes to develop area wide strategies to reduce emissions and improve air quality	Notts City	Complete	Ongoing	None	N/A	Ongoing	Ongoing	
3	Education and awareness campaigns	Promoting travel awareness	Promotion of cycling / walking	Bassetlaw	Complete	April 2017	Yes	N/A	Ongoing	Ongoing	
4	New campaign leaflets	Public information	Via leaflets	Bassetlaw	Complete	April 2017	None	N/A	Ongoing	Ongoing	
5	Info on social media	Public information	Via other mechanisms	Bassetlaw	complete	April 2017	None	N/A	Ongoing	June 2017	

2.2 $PM_{2.5}$ – 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.

Bassetlaw District Council consider PM2.5 a priority when planning measures to reduce levels of pollutants. As levels are considered to be within the air quality objectives no plans have been devised that target PM2.5 specifically. However, more work is being undertaken by Bassetlaw to promote messages of air quality and encourage greater understanding. These ‘soft’ measures – (ie. education and awareness) are deemed to fulfil the requirement to consider and seek to reduce levels of PM2.5.

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

Bassetlaw does not have any automatic monitoring sites

3.1.2 Non-Automatic Monitoring Sites

Bassetlaw undertook non-automatic (passive) monitoring of NO_2 at 24 sites during 2016.

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)

Nitrogen dioxide was monitored at 24 sites across the district. At the start of the recording year an assessment of all the tube locations was carried out to ensure that they were all situated in the most appropriate and suitable location to represent relevant exposure. No changes were made to the location of the tubes during this reporting period.

Of the 24 tubes, six are considered to be of concern and kept under close review. The results and trend data of those specific tubes are presented in appendix A.

Tube number 28 is situated at Elkesley and is on the side of the A1 trunk road. At this location the A1 passes very close to the houses in Elkesley and is an area the council have significant concerns over. Throughout 2015/2016 the A1 underwent significant redevelopment as a bridge was put over the road to allow access to the village of Elkesley. There were two years of road works (with 50mph speed restrictions) and during that period it was not considered worthwhile continuing with monitoring. Also the location we’d always used (on a lamp post on the outskirts of the village) had been removed and this area formed part of the compound used by the contractors.

The new road and bridge opened in early 2017 and tube 28 has been re-located as close to the original position as possible. This is going to be a very important study site during 2017 and care is being taken to ensure a 100% data capture rate.

Tube 29 is also close to the A1 and is located in Tuxford where the A1 passes over the local road network. This is an area that the council have concerns about because it is set very low in a canyon and dispersion is poor. There are houses quite close to the road and they are impacted by the local road network traffic and the traffic from the A1. The speed limit ion the A1 at this point is 70mph and this means that concerns about local air quality are greater. Unfortunately the data capture rate at this location was very poor during 2015 because the tube kept going missing. There was no obvious explanation for this, although at was on a road leading to and from the local secondary school. We concluded that the tube had probably been seen by children and was just getting frequently removed. The tube has been re-located to the other side of the road and on the other side of the bridge. It’s further from a sensitive receptor so more data adjustments will need to be made, but it’s considered

more important to get a complete data set. Up to now the tube seems to be remaining in place.

Appendix A - Includes the details of the 2016 monitoring sites

Appendix B contains tables which compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. and the full 2016 dataset of monthly mean values.

Appendix C – Details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the 2016 diffusion tubes

Appendix D - Maps showing the location of the monitoring sites

3.2.2 Particulate Matter (PM_{10})

Bassetlaw District Council do not monitor for Particulate Matter (PM_{10})

3.2.3 Particulate Matter ($PM_{2.5}$)

Bassetlaw District Council do not monitor for Particulate Matter ($PM_{2.5}$)

3.2.4 Sulphur Dioxide (SO_2)

Bassetlaw District Council do not monitor for sulphur dioxide

Appendix A: Monitoring Results

Table A.1 – Details of the 2016 Automatic Monitoring Sites

Bassetlaw District Council does not have any automatic monitoring sites

Table A.2 – Details of the 2016 non-automatic Monitoring Sites

Site ID	Site name	Site type	X OS Grid ref	Y OS Grid ref	Pollutant	In AQMA	Distance to relevant receptor	Distance to kerb of nearest road	Tube height
2	Cuckney	Suburban	456490	371245	NO_2	NO	1m	1m	2
3	7a Kings Head, Carlton Rd, Worksop	Urban Centre	458564	379284	NO_2	NO	1m	1m	2
5	Newcastle Avenue, Worksop	Urban Centre	458230	378909	NO_2	NO	1m	1m	2
12	Watson Road, Worksop (1)	Urban Centre	458569	379162	NO_2	NO	0.5m	1m	2
15	Blyth Rd, Ranby	Urban Centre	464921	381197	NO_2	NO	0.5m	1m	2
22	Little Styrrup, DunhamTuxford	Urban Centre	481325	374504	NO_2	NO	4m	1m	2
25	London Rd Junction, Retford	Urban Centre	470759	380698	NO_2	NO	5m	1m	2

26	Hospital Road, Retford	Urban Centre	470095	381292	NO_2	NO	2m	1m	2
27	Arlington Way / Grove Street, Retford	Urban Centre	470793	381106	NO_2	NO	1m	1m	2
28	Elkesley, A1	Urban Centre	468518	375695	NO_2	NO	1m	1m	2
29	Lincoln Road, A1 Overpass, Tuxford	Urban Centre	473779	371093	NO_2	NO	1m	1m	2
30	Beaufort Road, NrA57 bypass	Urban Centre	457557	379081	NO_2	NO	2m	1m	2
31	Claylands Ave, Worksop	Urban Centre	457837	380581	NO_2	NO	2m	1m	2
32	Birch Court, Tuxford	Urban Centre	473911	370840	NO_2	NO	2m	1m	2
34	Watson Road, Worksop (2)	Urban Centre	458639	379009	NO_2	NO	2m	2m	2
35	Selby Road, Styrrup, A1	Urban Centre	461104	390658	NO_2	NO	5m	2m	2
36	Retford Road, A1, Blyth	Urban Centre	463022	386937	NO_2	NO	2m	2m	2
37	Scrooby Road	Urban Centre	461636	391547	NO_2	NO	25m	1m	2
39	Carlton Road - New Tesco	Urban Centre	458685	379893	NO_2	NO	17m	1m	2
40	Scrroby Road - New ASDA	Urban Centre	462598	391521	NO_2	NO	2m	1m	2
41	Kilton Road - New Morrisons	Urban Centre	459376	379451	NO_2	NO	1m	1m	2
42	Hall Drive, Worksop (St. Annes Roundabout)	Urban Centre	457738	378729	NO_2	NO	1m	1m	2

43	Mansfield Road, Worksop	Urban Centre	457556	378743	NO_2	NO	1m	1m	2
44	Shireoaks Common (Background)	Suburban	456313	381183	NO_2	NO	1m	1m	2

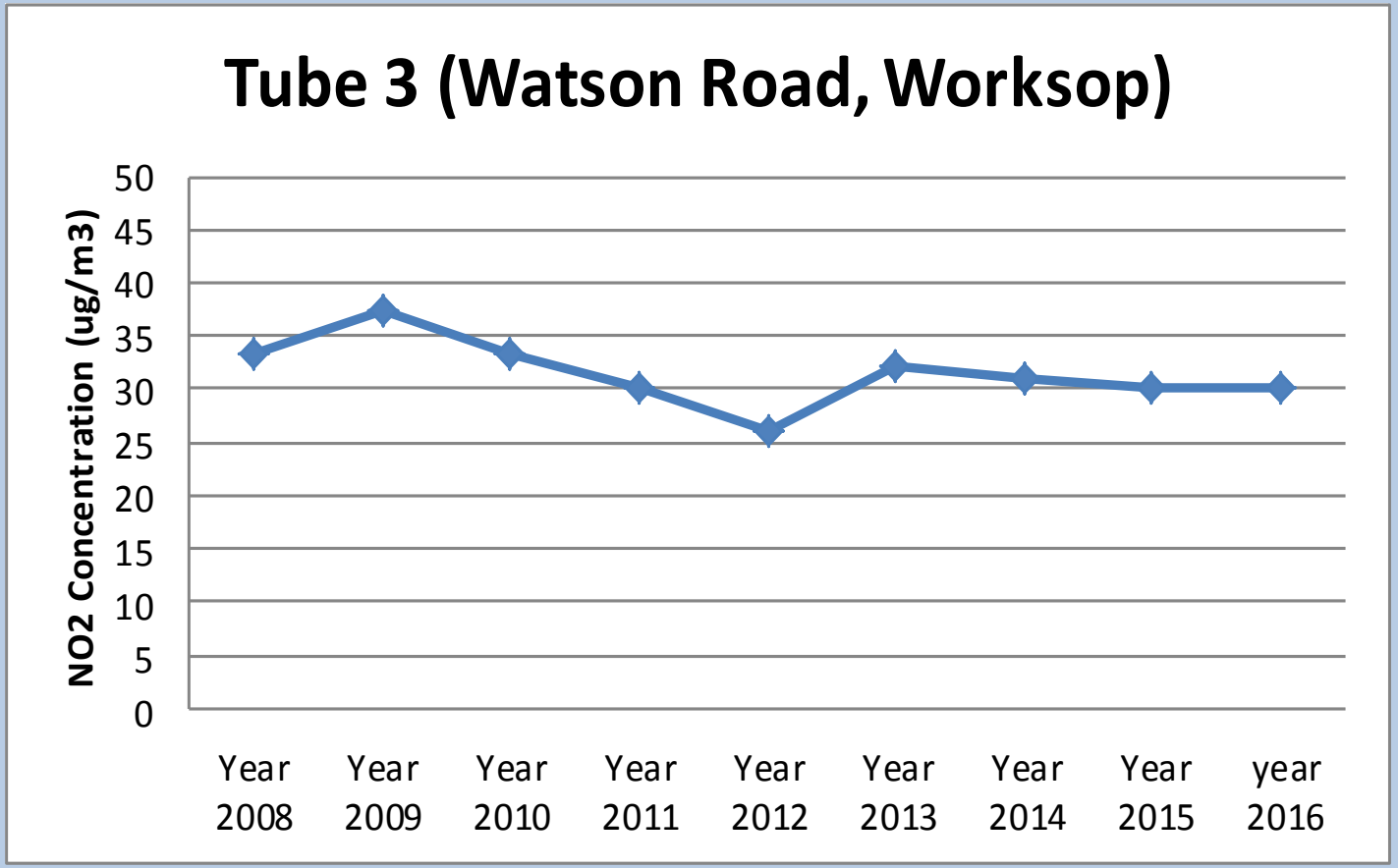
Table A.3 – Annual Mean NO2 Monitoring Results

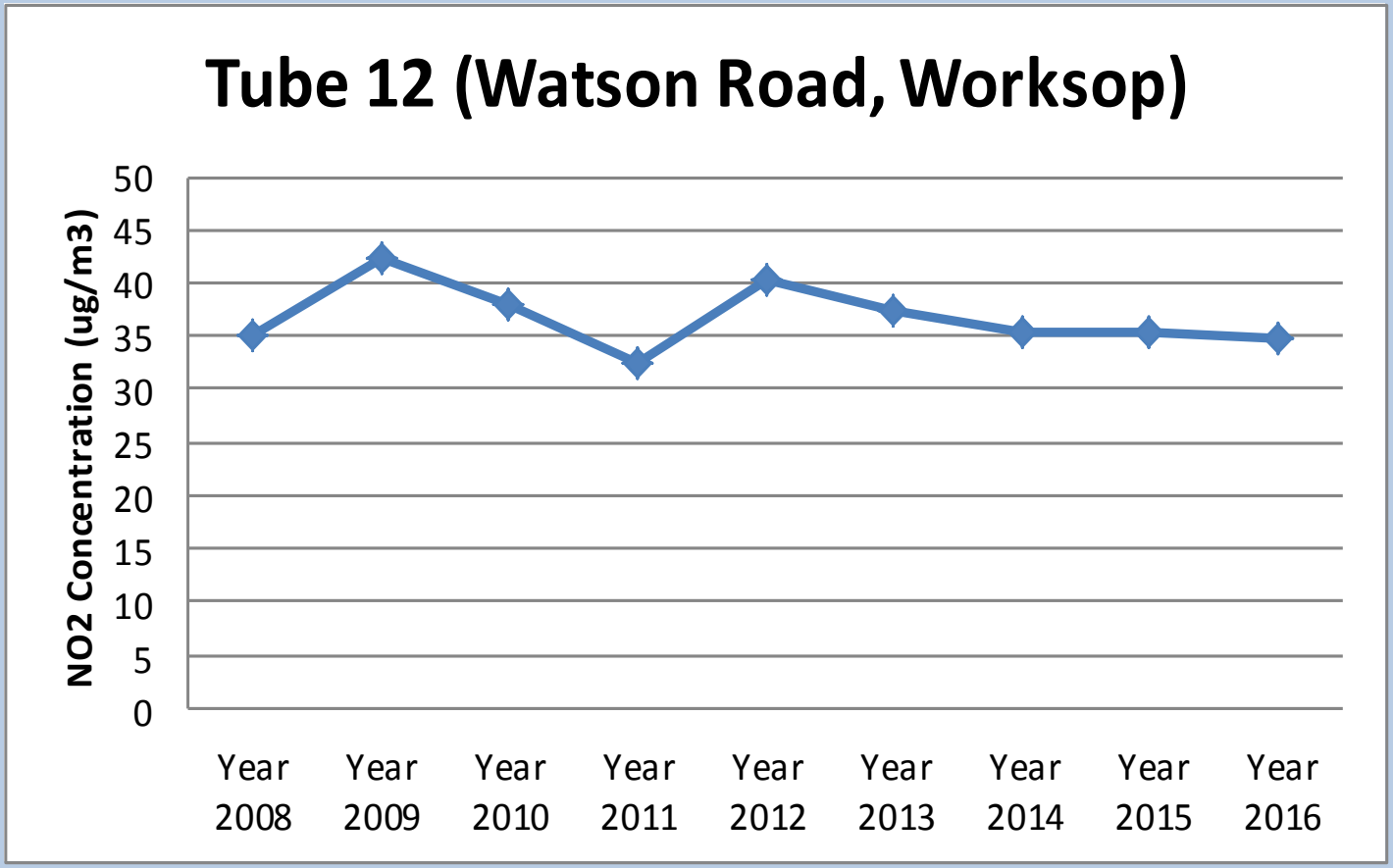
					NO2 Annual Mean concentration (ug/m^3)				
Site Name	Site Type	Monitoring type	Valid data capture for monitoring period	Valid data capture for (2016)	2012	2013	2014	2015	2016
2	Suburban	Diffusion Tube	100%	100%	25.7	26.1	22.9	23.6	22.3
3	Urban Centre	Diffusion Tube	100%	100%	36	32.1	31.1	31.2	31.2
5	Urban Centre	Diffusion Tube	100%	100%	32	28.6	27.4	29.8	29.4
12	Urban Centre	Diffusion Tube	100%	100%	40.4	37.3	35.3	32.2	32.2
15	Urban Centre	Diffusion Tube	100%	100%	28	23.8	21.2	25.8	25.8
22	Urban Centre	Diffusion Tube	100%	100%	19.5	33.3	29.1	25.9	25.9
25	Urban Centre	Diffusion Tube	100%	100%	35.7	31	28.8	31.4	30.7
26	Urban Centre	Diffusion Tube	92%	92%	29.1	34.3	33.8	32	32.1
27	Urban Centre	Diffusion Tube	100%	100%	37.7	31.4	30.5	32.8	32.7
28	Urban Centre	Diffusion Tube			43.1	39.6	34.3		
29	Urban Centre	Diffusion Tube	75%	42%	46.7	44.6	40.1	39.1	39.4
30	Urban Centre	Diffusion Tube	92%	92%	27.6	23.3	23.3	24.3	24.5
31	Urban Centre	Diffusion Tube	100%	100%	30.8	28.4	27.7	27.7	27.7

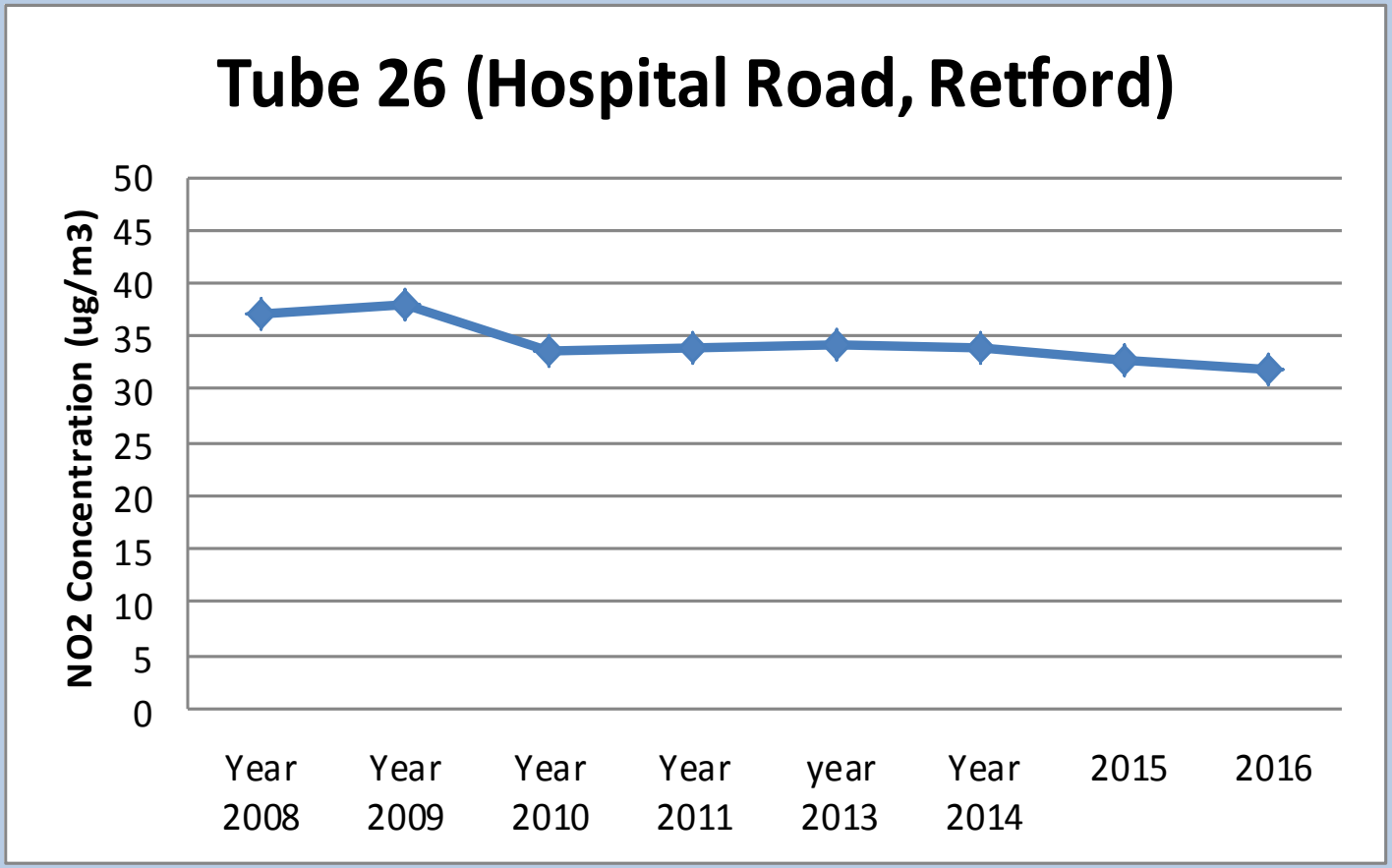
32	Urban Centre	Diffusion Tube	100%	100%	31.3	33.2	28.8	26.7	26.7
34	Urban Centre	Diffusion Tube	92%	92%	39.4	34.3	31.6	32.4	32.4
35	Urban Centre	Diffusion Tube	92%	92%	35.7	29.2	27.5	27.7	27.7
36	Urban Centre	Diffusion Tube	83%	83%	37.6	33.1	32.6	30.4	30.4
37	Urban Centre	Diffusion Tube	100%	100%	36.3	30	28.2	32.5	32.5
39	Urban Centre	Diffusion Tube	75%	75%		31.4	29.3	26.3	26.3
40	Urban Centre	Diffusion Tube	75%	75%		31.6	28	32.9	32.9
41	Urban Centre	Diffusion Tube	100%	100%			29.8	31.5	31.5
42	Urban Centre	Diffusion Tube	83%	25%				31.5	31.5
43	Urban Centre	Diffusion Tube	93%	93%				26.9	26.5
44	Suburban	Diffusion Tube	83%	83%				25.7	25.5

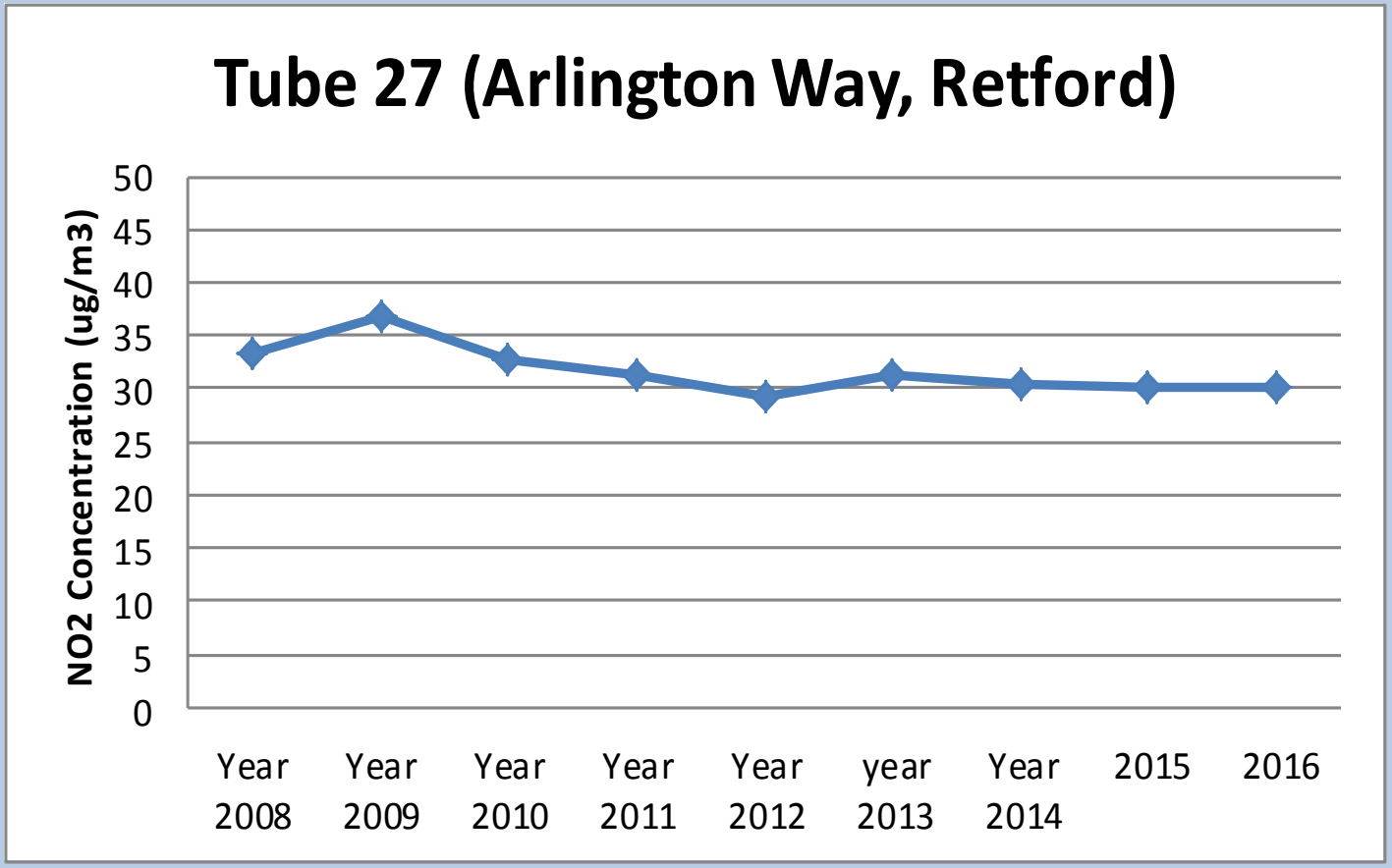
Figure A.1 – Trends in Annual Mean NO_2 concentration

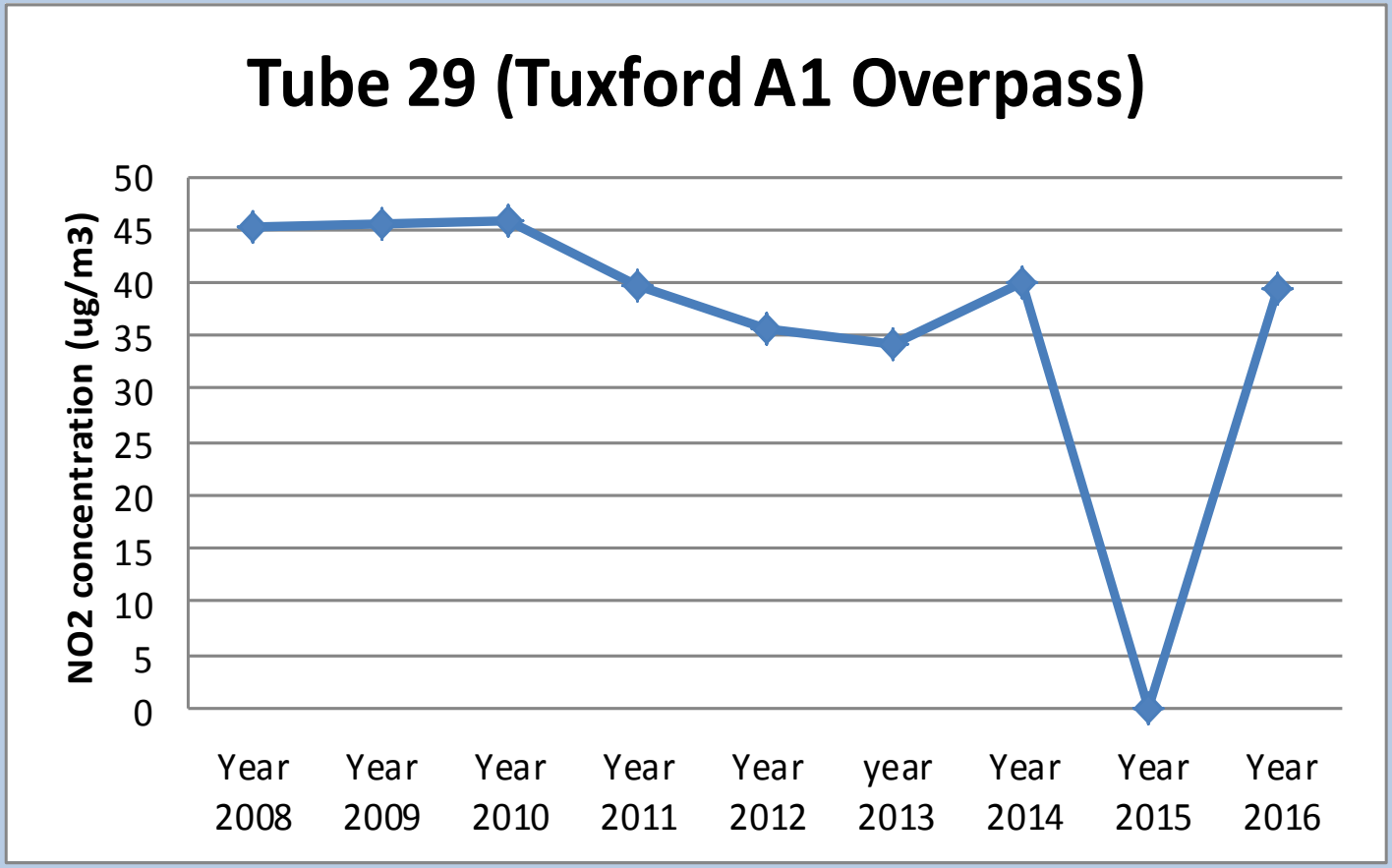
The following figures show the results of six tube locations over the last 9 years. These six tubes have been selected for further detailed trend data because they are the ones that have always been close to the annual mean exceedance level for nitrogen dioxide.



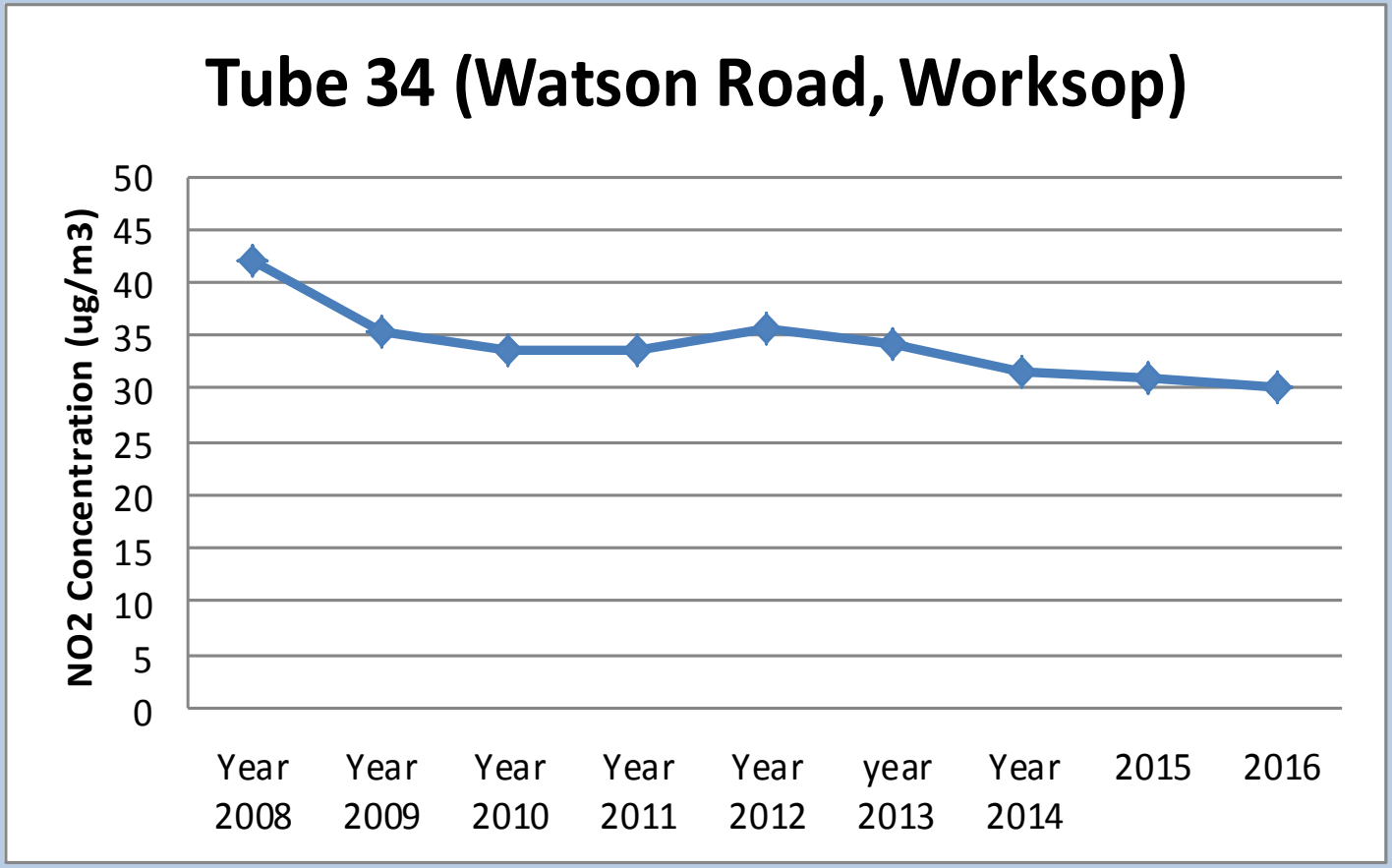

Tube 12 (Watson Road, Worksop)
NO2 Concentration (ug/m3)
50
45
40
35
30
25
20
15
10
5
0
Year 2008
Year 2009
Year 2010
Year 2011
Year 2012
Year 2013
Year 2014
Year 2015
Year 2016


Tube 26 (Hospital Road, Retford)
NO2 Concentration (ug/m3)
50
45
40
35
30
25
20
15
10
5
0
Year 2008
Year 2009
Year 2010
Year 2011
year 2013
Year 2014
2015
2016


Tube 27 (Arlington Way, Retford)
NO2 Concentration (ug/m3)
50
45
40
35
30
25
20
15
10
5
0
Year 2008
Year 2009
Year 2010
Year 2011
Year 2012
year 2013
Year 2014
2015
2016



No Valid Data in 2015


Tube 34 (Watson Road, Worksop)
NO2 Concentration (ug/m3)
50
45
40
35
30
25
20
15
10
5
0
Year 2008
Year 2009
Year 2010
Year 2011
Year 2012
year 2013
Year 2014
2015
2016

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 Monthly Diffusion Tube Results – 2016

Site No.	Distance from kerb	Distance to relevant exposure	Site Name	Jan '16	Feb '16	Mar '16	Apr '16	May '16	June '16	July '16	Aug '16	Sep '16	Oct '16	Nov '16	Dec '16	Annual Average	Bias Adjusted data	Data Capture (%)
2	1m	5m	Cuckney	22.5	26.4	29.00	21.50	26.1	30.1	20	22.9	22.4	33	23.5	26.1	**25.3**	**22.3**	**100%**
3	1m	4m	7a Kings Head, Carlton Rd, Worksop	43.9	36.9	38.60	43.80	30.3	30.9	29.1	32.9	36.1	40.2	33	30.3	**35.5**	**31.2**	**100%**
5	1m	10m	Newcastle Avenue, Worksop	42.8	36.4	38.00	36.90	29	40.1	27.3	28.3	36.4	33.5	22.6	29	**33.4**	**29.4**	**100%**
12	1m	15m	Watson Road, Worksop (1)	38.2	38.6	39.20	47.50	32.5	37	27.6	33.9	37.2	46.3	29.2	32.5	**36.6**	**32.2**	**100%**
15	1m	2m	Blyth Rd, Ranby	34.9	32.8	37.70	32.00	26.2	27.9	21.8	25.7	26.9	31.3	27.9	26.2	**29.3**	**25.8**	**100%**
22	1m	9m	Little Styrrup, DunhamTuxford	31.9	31.9	38.80	36.00	24.2	25.1	23.7	27.7	32.3	31.6	25.9	24.2	**29.4**	**25.9**	**100%**
25	1m	Tube on façade	London Rd Junction, Retford	44	38.9	40.40	31.50	35.4	40.9	26.7	28.5	32.4	33	31	35.4	**34.8**	**30.7**	**100%**

26	1m	3m	Hospital Road, Retford	40.7	40.1	41.50	44.10	31	nil	29	31.9	38.7	39.1	34.5	30.7	**36.5**	**32.1**	**92%**
27	1m	14m	Arlington Way / Grove Street, Retford	36.6	38.1	36.60	45.70	36.6	40	41.1	29.5	31.7	42.8	30.1	36.6	**37.1**	**32.7**	**100%**
28	1m	7m	Elkesley, A1	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	**N/A**	**N/A**	**N/A**
29	1m	30m	Lincoln Road, A1 Overpass, Tuxford	nil	44.6	49.40	nil	nil	40.9	49.1	45.9	53.6	44.7	30	nil	**44.8**	**39.4**	**42%**
30	1m	15m	Beaufort Road, NrA57 bypass	29.3	31.7	32.60	33.70	nil	25.1	23.3	21.9	25.2	29.4	24.5	29.6	**27.8**	**24.5**	**92%**
31	1m	52m	Claylands Ave, Worksop	37	31.5	33.90	35.40	30	30.2	25.7	25.9	33.9	32.8	31.8	29.1	**31.4**	**27.7**	**100%**
32	1m	6m	Birch Court, Tuxford	23.7	30.7	26.70	40.80	25.4	29.8	29.9	32.8	35.6	42	20.8	25.4	**30.3**	**26.7**	**100%**
34	2m	22m	Watson Road, Worksop (2)	42.2	42.6	35.90	nil	34.3	36.1	32	34.7	42.5	40.8	29.2	34.3	**36.8**	**32.4**	**92%**
35	2m	4m	Selby Road, Styrrup, A1	30.7	28	29.60	42.50	33.2	35.9	25.7	27.5	37	nil	22.7	33.2	**31.5**	**27.7**	**92%**
36	2m	17m	Retford Road, A1, Blyth	36	nil	32.50	45.70	32.7	33.7	30.7	34.4	38.9	nil	27.8	32.7	**34.5**	**30.4**	**83%**

37	1m	19m	Scrooby Road	43.5	42.8	36.40	40.50	35.4	37.1	31.6	28.6	36.5	40.4	34.9	35.4	**36.9**	**32.5**	**100%**
39	1m	4m	Carlton Road - New Tesco	40.1	nil	40.20	nil	25.5	31.9	23.9	24.7	30.4	nil	26.6	25.5	**29.9**	**26.3**	**75%**
40	1m	4m	Scrroby Road - New ASDA	44.8	38.1	40.00	35.80	39.7	35	34.1	30.1	36.5	nil	37.3	39.7	**37.4**	**32.9**	**75%**
41	1m	2m	Kilton Road - New Morrisons	45	42.1	41.30	30.90	31.7	35.1	31.3	33.9	38.2	37.8	31.2	31.7	**35.9**	**31.5**	**100%**
42	1m	2m	Hall Drive, Worksop (St. Annes Roundabout)	34.6	38.7	30.90	31.20	33.8	32.7	32.7	31.8	nil	33.8	nil	33.9	**33.4**	**31.5**	**83%**
43	1m	3m	Mansfield Road, Worksop	nil	26.5	33.40	33.70	32.8	27.1	24.8	26.1	31.7	34.3	28.5	32.8	**30.2**	**26.5**	**93%**
44	1m	2m	Shireoaks Common (Background)	nil	nil	35.50	33.00	25.8	32.9	25.9	22.8	32.8	30.6	25	25.8	**29.0**	**25.5**	**83%**

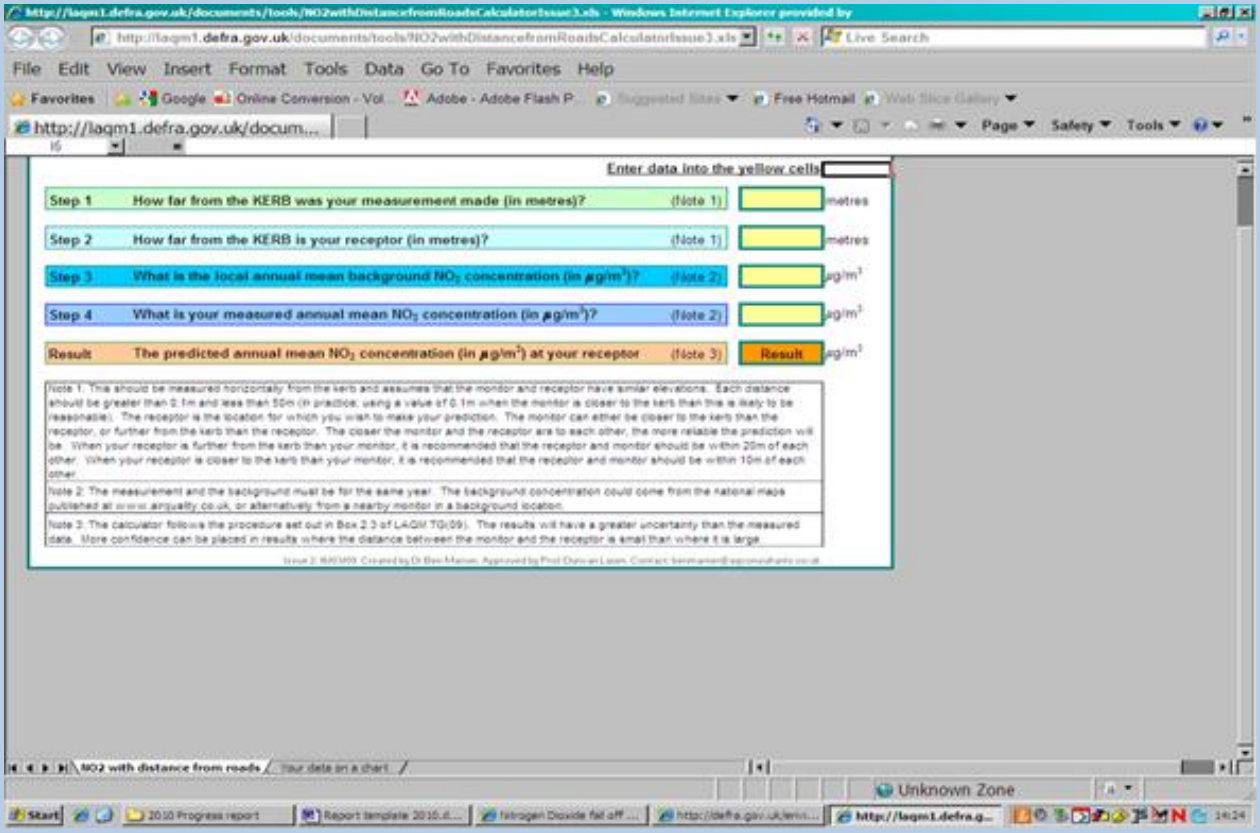
B.2 Predicting nitrogen dioxide concentrations at different distances from roads

A method has been developed to allow NO2 measurements made at one distance from a road to be used to predict concentrations at a different distance from the same road. It is appropriate for distances between 0.1 m and 140 m of the kerb. In table B2 below is the methodology used for predicting nitrogen dioxide concentrations at different distances from roads.

Table B2 Methodology for predicting nitrogen dioxide concentrations at different distances from roads

Step 1:	Identify the local background concentration in µg/m3, either from local monitoring or from the national maps published at www.airquality.co.uk.
Step 2:	Apply the following calculation: CZ = ((Cy-Cb) / (-0.5476 x Ln(Dy) + 2.7171)) x (-0.5476*Ln(Dz)+2.7171) + Cb Where: Cz is the total predicted concentration (µg/m3) at distance Dz; Cy is the total measured concentration (µg/m3) at distance Dy; Cb is the background concentration (µg/m3); Dy is the distance from the kerb at which concentrations were measured; and Dz is the distance from the kerb (m) at which concentrations are to be predicted. Ln(D) is the natural log of the number D.

Figure B.1 below shows the spread sheet tool used to calculate the predicted nitrogen dioxide concentrations at different distances from roads



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

Quality Assurance and quality control

LAQM.TG(09) specifically encourages local authorities to select sampling labs that maintain high standards of quality assurance and quality control. The lab selected by Bassetlaw District Council for purchasing and analysing the nitrogen dioxide tubes is Gradko International. Gradko participate in the Workplace Analysis Scheme for Proficiency (WASP). The scheme is an independent analytical performance testing scheme operated by the Health and Safety Laboratory (HSL). WASP is an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). At quarterly intervals HSL supplies the labs with 4 samplers doped with unknown amounts of nitrite. It then assesses and calculates a performance index from the results. Gradko's analytical laboratory is assessed annually by UKAS to establish conformance of our Laboratory Quality Procedures to the requirements of ISO/IEC 17025 Standard. Gradko employ the use of travel blanks as recommended TG (09).

Selection of suitable bias factor

Bassetlaw District Council do not have any chemiluminescense analysers so the precision and accuracy of the nitrogen dioxide tubes cannot be validated by the use of a local co-location study. Hence an appropriate bias adjustment factor derived from nationally available bias factors must be applied to the mean values of the tube results. The spreadsheet tool referenced below and shown in figure 2.5 has been used to calculate an appropriate bias factor of 0.91

http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Figure C.1 – Selection of bias adjustment factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 06/17

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2017
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4:

Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method To add your selection, choose (All) from the pop-up list	Year[2] To add your selection, choose (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2016	R	Gateshead Council	12	29	26	10.5%	G	**0.90**
Gradko	20% TEA in water	2016	R	Gateshead Council	11	35	37	-6.0%	G	**1.06**
Gradko	20% TEA in water	2016	R	Gateshead Council	12	37	31	19.0%	G	**0.84**
Gradko	20% TEA in water	2016	R	Wokingham Borough Council	11	45	41	9.0%	G	**0.92**
Gradko	20% TEA in water	2016	R	Wokingham Borough Council	11	37	34	9.5%	G	**0.91**
Gradko	20% TEA in water	2016	R	Cheshire West and Chester	12	37	39	-5.3%	G	**1.06**
Gradko	20% TEA in water	2016	R	Thurrock Borough Council	12	29	26	11.0%	G	**0.90**
Gradko	20% TEA in water	2016	R	Borough Council of King's Lynn & West Norf	11	30	25	18.2%	G	**0.85**
Gradko	20% TEA in water	2016	UB	Eastleigh Borough Council	11	29	30	-4.7%	G	**1.05**
Gradko	20% TEA in water	2016	R	Eastleigh Borough Council	12	44	42	2.9%	G	**0.97**
Gradko	20% TEA in water	2016	R	Brighton & Hove City Council	12	52	48	8.8%	G	**0.92**
Gradko	20% TEA in water	2016	R	Eastleigh Borough Council	11	29	37	-22.0%	G	**1.28**
Gradko	20% TEA in water	2016	KS	Marylebone Road Intercomparison	12	99	79	25.2%	G	**0.80**
Gradko	20% TEA in water	2016	R	Monmouthshire County Council	11	39	34	16.6%	G	**0.86**
Gradko	20% TEA in Water	2016	R	Preston City Council	10	30	27	10.0%	G	**0.91**
Gradko	20% TEA in water	2016	R	Dudley MBC	12	37	34	11.0%	G	**0.90**
Gradko	20% TEA in water	2016	UB	Dudley MBC	12	26	22	18.6%	G	**0.84**
Gradko	20% TEA in water	2016	R	Dudley MBC	11	43	38	12.4%	G	**0.89**
Gradko	20% TEA in water	2016	R	Dudley MBC	12	51	54	-5.6%	G	**1.06**
Gradko	20% TEA in water	2016	B	LB Waltham Forest	12	31	30	2.3%	G	**0.98**
Gradko	20% TEA in water	2016	R	NOTTINGHAM CITY COUNCIL	12	37	39	-5.4%	G	**1.06**
Gradko	20% TEA in water	2016	R	LB Hounslow	9	75	58	28.0%	G	**0.78**
Gradko	20% TEA in water	2016	UB	LB Hounslow	9	33	33	0.1%	G	**1.00**
Gradko	20% TEA in water	2016	R	Lisburn & Castlereagh City Council	12	39	26	46.4%	G	**0.68**
Gradko	20% TEA in water	2016	B	Pembrokeshire Council	11	4	3	27.5%	G	**0.78**
Gradko	20% TEA in water	2016	R	Cheltenham Borough Council	11	32	32	-0.9%	G	**1.01**
Gradko	20% TEA in water	2016	R	Lancaster City Council	11	33	32	2.8%	G	**0.97**
Gradko	20% TEA in water	2016		**Overall Factor[3] (27 studies)**					**Use**	**0.92**

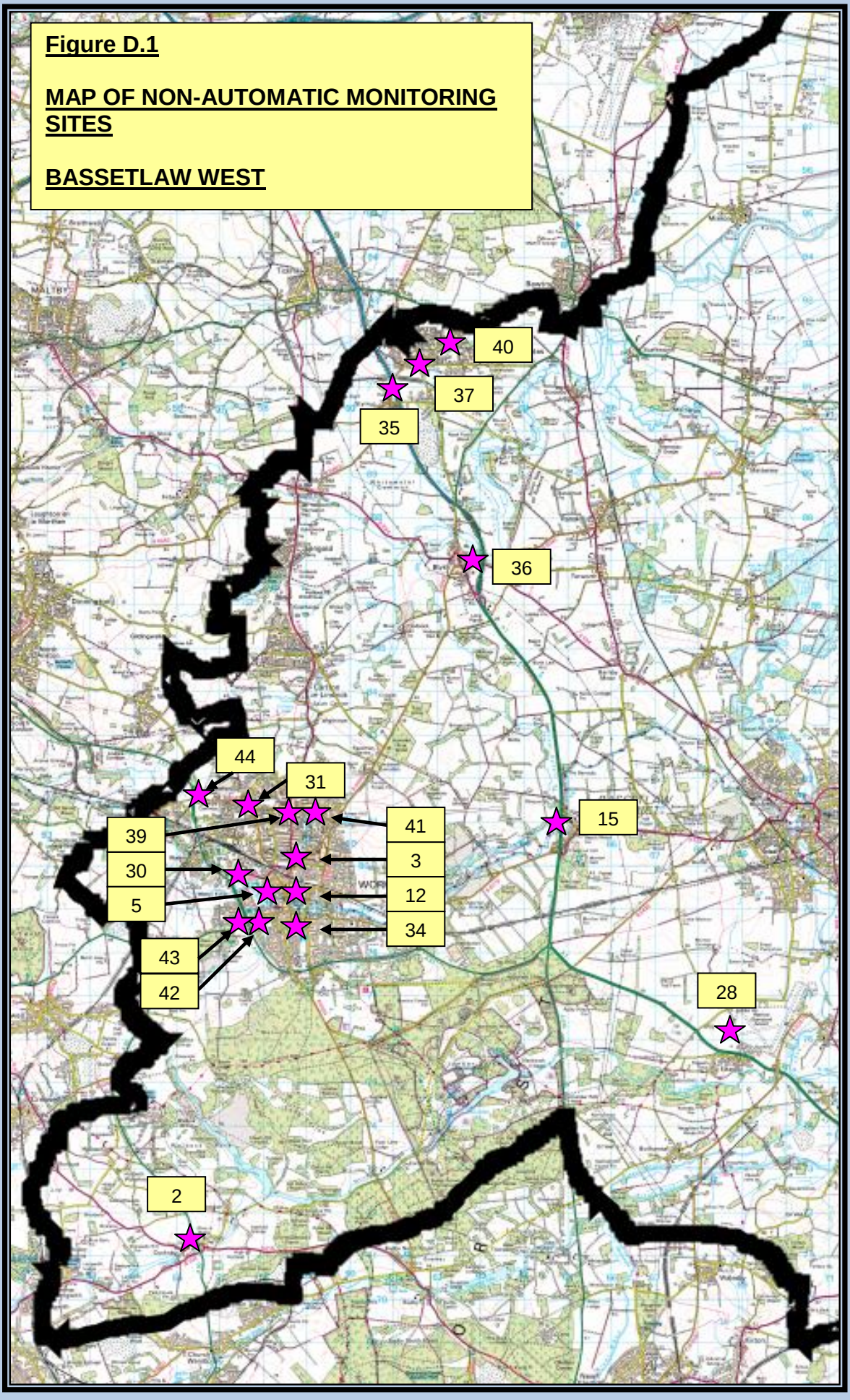
A bias factor of **0.92** has been calculated from the Defra spread-sheet tool which includes the results of nationwide diffusion tube co-location studies. The bias factor is applied to the 2016 data set

Appendix D: Map(s) of Monitoring Locations

Figure D.1

MAP OF NON-AUTOMATIC MONITORING SITES

BASSETLAW WEST



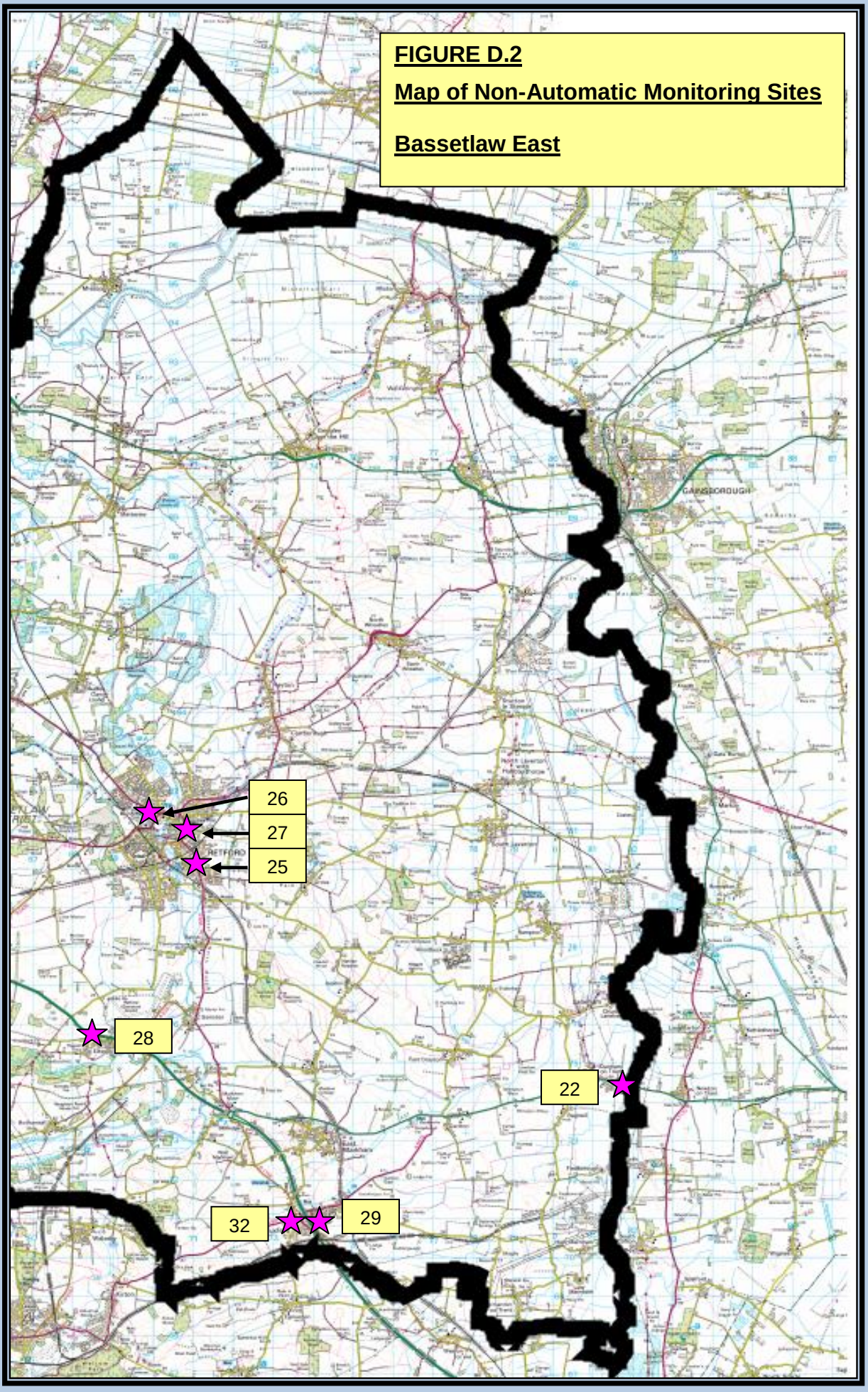


FIGURE D.2
Map of Non-Automatic Monitoring Sites
Bassetlaw East
26
27
25
28
22
32
29

FIGURE D.3

Map of Non-Automatic Monitoring Sites (Worksop Town Centre – Detailed)

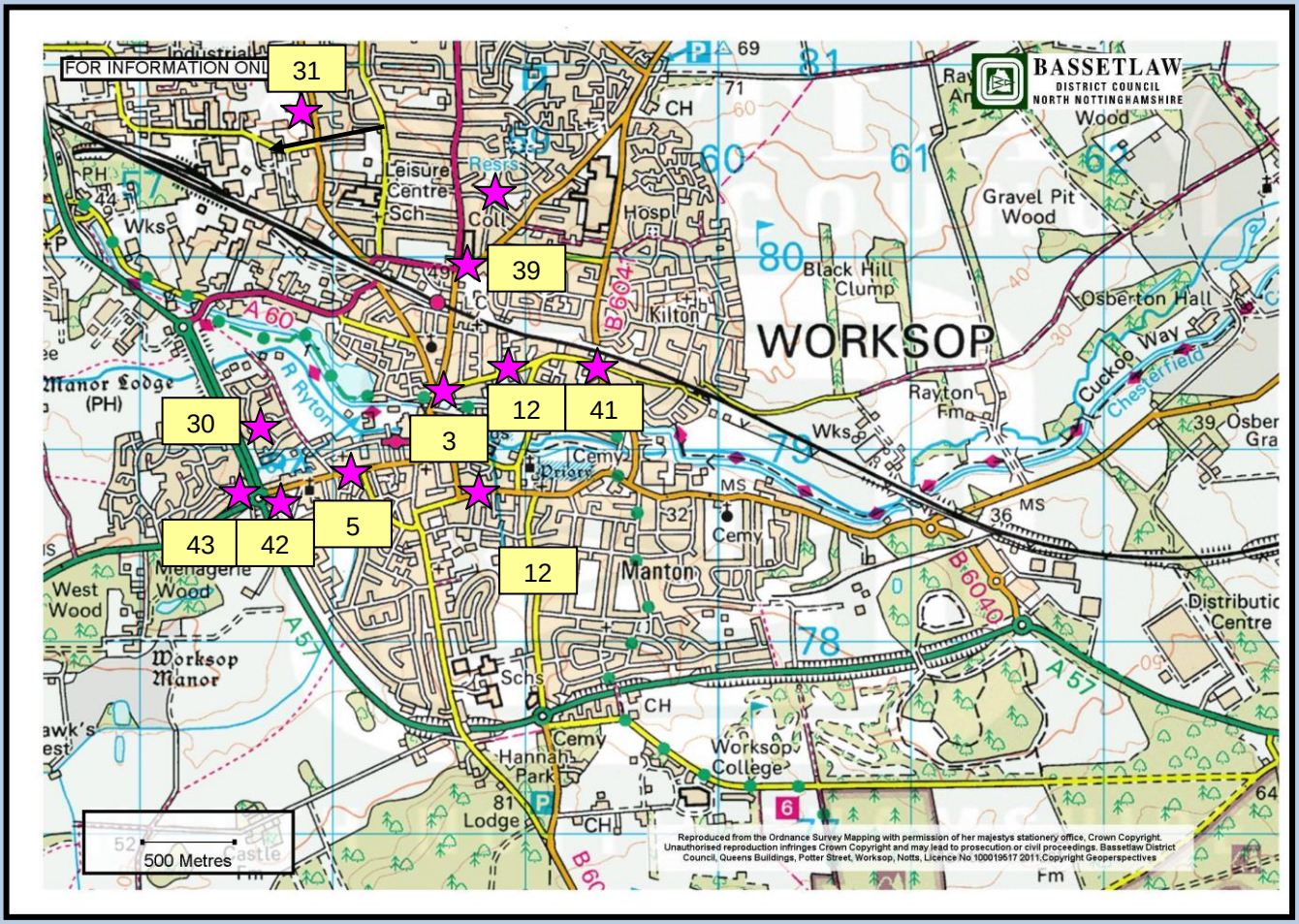
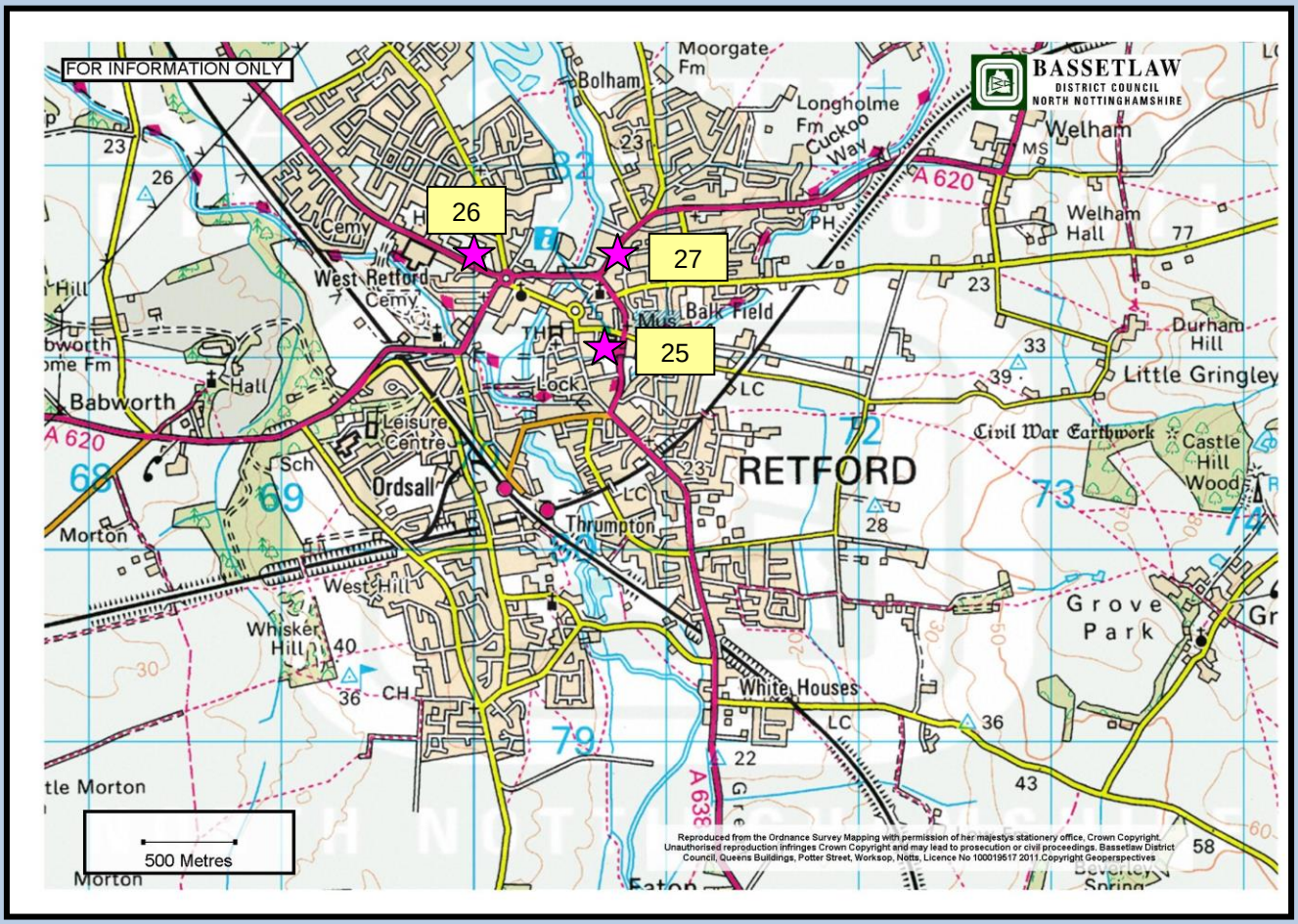


FIGURE D.4

Map of Non-Automatic Monitoring Sites (Retford Town Centre – Detailed)



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/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
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
…	…

Thank you for taking the time to read the Bassetlaw District Council Annual Air Quality Status Report. I hope you have a happy and pollution-free day ☺

END OF REPORT