2015 Updating and Screening Assessment for Central Bedfordshire Council

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

Date: August, 2015

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Executive Summary

Central Bedfordshire Council came into force on 1st April 2009 comprising of the legacy authorities of Mid Bedfordshire District Council, South Bedfordshire District Council and parts of Bedfordshire County Council.

Data is collected by a continuous analyser - monitoring nitrogen dioxide (NO_2), Particulate Matter (PM_{10} and $PM_{2.5}$) and diffusion tubes (NO_2).

The Air Quality Management Area in Dunstable was declared in 2004 in respect of the annual NO_2 objective.

Work has now commenced on building the A5 – M1 Link Road (Dunstable northern bypass) and Woodside Link Road.

Following public consultations, two new Air Quality Management Areas have now been declared in Ampthill (for the annual NO_2 objective) and Sandy (for the annual and hourly NO_2 objective). Work will now concentrate on developing draft Action Plans.

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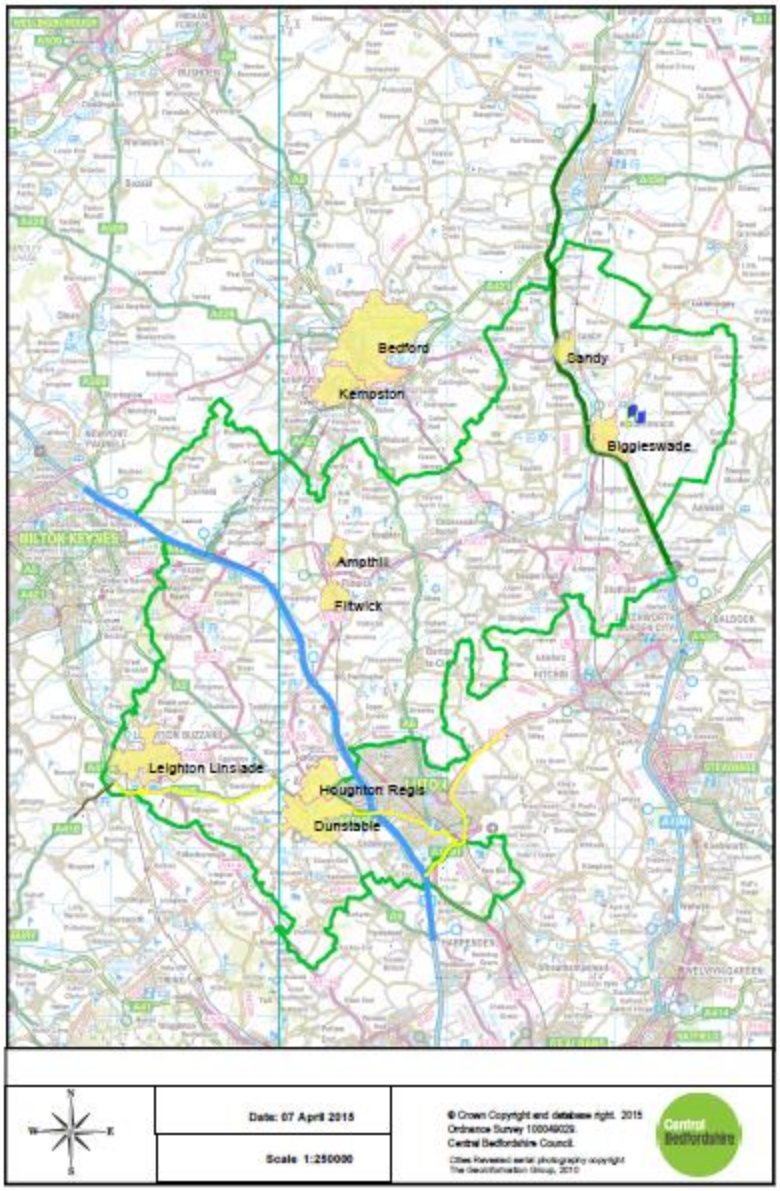
1 Introduction

1.1 Description of Local Authority Area

Central Bedfordshire Council came into force on the 1st April 2009. The legacy authorities were South Bedfordshire District Council, Mid Bedfordshire District Council and aspects of Bedfordshire County Council.

Central Bedfordshire covers an area of 716 square kilometres (see map below). The estimated population of is 254,400 (based on 2011 census figures). The area is mainly rural but has some market and larger towns distributed throughout.



Central Bedfordshire is situated some 30 miles to the north of London and has excellent links to the national motorway network having the M1, A1, A5 and the A6 running through the area and the ease of access to the M25, M11 and M40.

Rail links from Leighton Buzzard mean London Euston can be reached in forty minutes. Arlesey, Biggleswade and Sandy are served by the Peterborough to Kings Cross line whilst Harlington and Flitwick are served by the Bedford to St Pancras International line. Rail freight services are also available from nearby Luton railway station.

Central Bedfordshire Council is a member of the Herts and Beds Air Quality Monitoring Network comprising of all the local authorities in the two counties, plus Luton Airport.

Data is collected by continuous analysers and nitrogen dioxide diffusion tubes

The major source of pollution in the district is from road transportation.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedences are considered likely, the local authority must then 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Table 1.2 Summary of previous reviews and assessments

Authority	Reports produced	Dates produced	Report conclusions
SBDC	1st stage air quality review	1999/2000	CO / 1,3 butadiene / SO_2 / Benzene unlikely to exceed objectives anywhere in district. NO_2 / PM_{10} to proceed to 2nd stage
SBDC	Air Quality review & assessment (2nd stage)	April 2000	Concluded 3rd stage review for NO_2 & PM_{10} not necessary as levels within objectives. Monitoring to continue.
MBDC	1st review & assessment	2000	This assessment concluded that the air quality objectives contained in the Air Quality Regulations 1997 would be achieved throughout the District.
SBDC	USA	April 2003	Concluded that due to a number of changes in circumstances, it was considered that nitrogen dioxide (NO_2) and particulate matter (PM_{10}) were in danger of being breached. However objectives for CO / SO_2 / benzene / 1, 3 – butadiene and lead would be met.
MBDC	USA	2003	Due to a number of changes in circumstances, although it was thought that the objectives for carbon monoxide, benzene, 1, 3 – butadiene and lead would be met, it was considered that the objectives for SO_2, NO_2 and PM_{10} were in danger of being breached.
SBDC	Detailed Assessment	2004	Concentrated on levels of NO_2 and particulate matter in Dunstable town centre as a result of traffic using the A5, A505 and B489. The conclusion of the report was that the annual mean nitrogen dioxide objective was likely to be breached at the facades of buildings along all roads at the town centre junction and recommended that an Air Quality Management Area (AQMA) be declared. The report also predicted that the 2004 annual mean and 24-hour objectives for PM_{10} are unlikely to be exceeded.
MBDC	Detailed Assessment	2004	Concentrated on ground level ambient concentrations of SO_2 as a result of emissions from Stewartby Brickworks and levels of NO_2 / PM_{10} as a result of traffic using the A1 Sandy roundabout. Conclusions resulted in the AQMA declaration for SO_2 levels around the brickworks and that more monitoring was required for the A1 Sandy roundabout junction to accurately assess current levels of NO_2.
SBDC	Declaration of AQMA in Dunstable	January 2005	AQMA officially declared by Council
SBDC	Progress Report	December 2005	Following the recent declaration of an

			Air Quality Management Area, the next phase of the process is the production of Stage 4 report (including source apportionment) and an Action Plan (to identify options to reduce concentrations of pollutant(s) in order to achieve the objective(s)).
SBDC	Stage 4 Report / source apportionment	2005	The source apportionment study indicated that background NO_X levels are generally the major contributor to ambient NO_X concentrations at the receptors included in the study. Emissions from taxis idling in ranks and vehicles in car parks are a minor source of NO_X. However, there are two large sources of NO_X over which the council has some control: Cars and HGVs travelling along the roads in question are major source of NO_X. In particular, HGVs are responsible for a large portion of these emissions despite their relatively small flows. ▪ Buses idling at stops contribute large amounts of NO_X to the immediate surroundings and create small areas of high concentrations that may affect nearby buildings. Reductions in NO_2 concentration of 22% and 5% respectively are required at the receptors near the High Street North and Church Street bus stops to reduce the ambient concentration to meet the 40 µg/m^3 objective.
MBDC	Progress Report	2005	Updating on changes since the last review and assessment report
MBDC	Declaration of AQMA in the vicinity of Stewartby	2005	AQMA officially declared by Council
SBDC	USA	2006	Identified Chalton as another possible area where Air Quality Objectives might be breached and further monitoring (via diffusion tubes) commenced.
MBDC	USA	2006	identified the risk of objectives being exceeded for CO, benzene, 1,3 – butadiene, lead, nitrogen dioxide and particulate matter (PM_{10}) is not significant. The Stewartby Brickworks will be subject to a Further Assessment.
SBDC	Progress Report	2007	Changes needed to AQAP after consultation
MBDC	Further Assessment	2007	Concluded that the AQMA remain in place as originally declared
MBDC	Air Quality Action Plan	2007	Identified actions to address the SO_2 levels – accepted by Defra
SBDC	Detailed Assessment	2008	Identified possibility of annual mean NO_2 objective likely to be exceeded at

			4 receptors out of six. NO_2 hourly objectives unlikely to be breached.
CBC	USA	2009	Following Detailed Assessments carried out in 2008 by both Mid and South Beds District Councils; it was recommended that AQMAs be declared in Sandy and Chalton, both in relation to the annual NO_2 Air Quality Objective. Consultations will be carried out, followed by declarations and Further Assessments by Central Bedfordshire Council. Two new narrow congested streets with a traffic flow of over 5000 vehicles per day identified. CBC will review these areas (Bedford Street and Dunstable Street, Ampthill) and carry out a Detailed Assessment if necessary. The major source of pollution in the district is from road transportation as Stewartby Brickworks have now closed.
CBC	Air Quality Revocation Order	2009	Since the closure of the Stewartby Brickworks (early 2008) the ambient levels of SO_2 have dropped off dramatically. The data from the Marston Vale Forest Centre indicates that the peaks do not rise above 40 mg/m^3 as a 15 minute average, clearly below the objective level. Additionally, both the 1hour mean and 24hour mean SO_2 objectives continue to be met across the Hertfordshire and Bedfordshire monitoring network. AMQA revoked due to closure of the Brickworks.
CBC	Detailed Assessment 2010 (Ampthill)	2011	Recommended to declare AQMA on basis of NO_2 diffusion tube monitoring along Bedford Street (by Park Street junction) and Dunstable Street (adj no 103); to clarify areas of relevant exposure and to continue monitoring.
CBC	Progress Report	2011	Updating on changes since last R&A report
CBC	USA	2012	Reported that a Public Inquiry for the M1 – A5 link road (Dunstable Northern bypass) would proceed.
CBC	Progress Report	2013	To work towards declaring two AQMAs in Ampthill (NO_2 annual) and Sandy (NO_2 annual and hourly). Work on AQMA declaration at Chalton ceased due as approved development is to proceed removing receptors.
CBC	Progress Report	2014	Working towards declaring two AQMAs (Ampthill & Sandy) relating to exceedences of the annual & hourly NO2 objectives.

SBDC – South Beds District Council; MBDC – Mid Beds District Council (pre April 2009); CBC - Central Bedfordshire Council (post 1st April 2009)

Figure 1.1 Map(s) of AQMA Boundaries (if applicable)

A map of the existing AQMA in Dunstable is shown below.

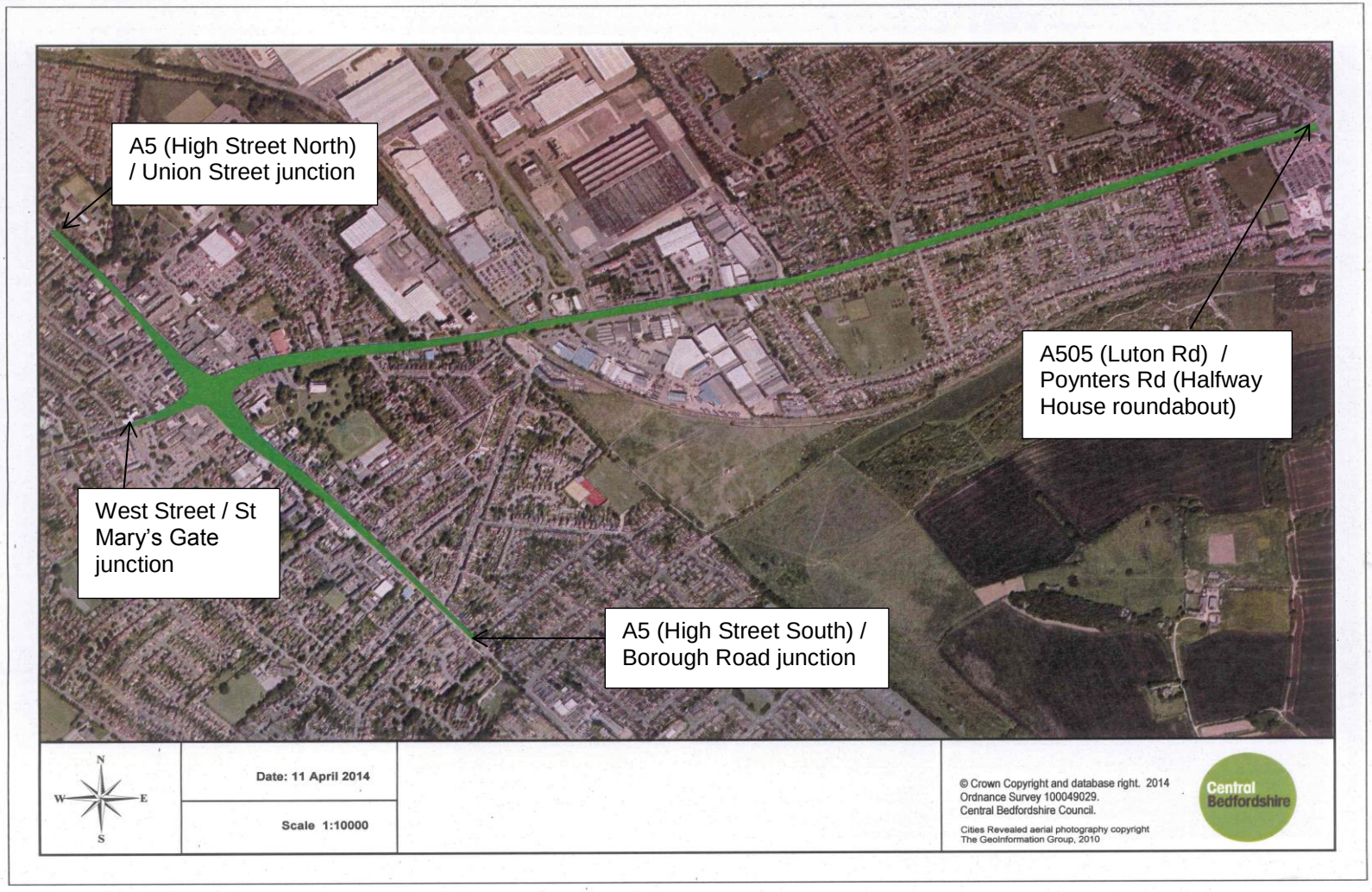


Figure 1.2 Map(s) of AQMA Boundaries (if applicable)

A map of the Ampthill Air Quality Management Area is below

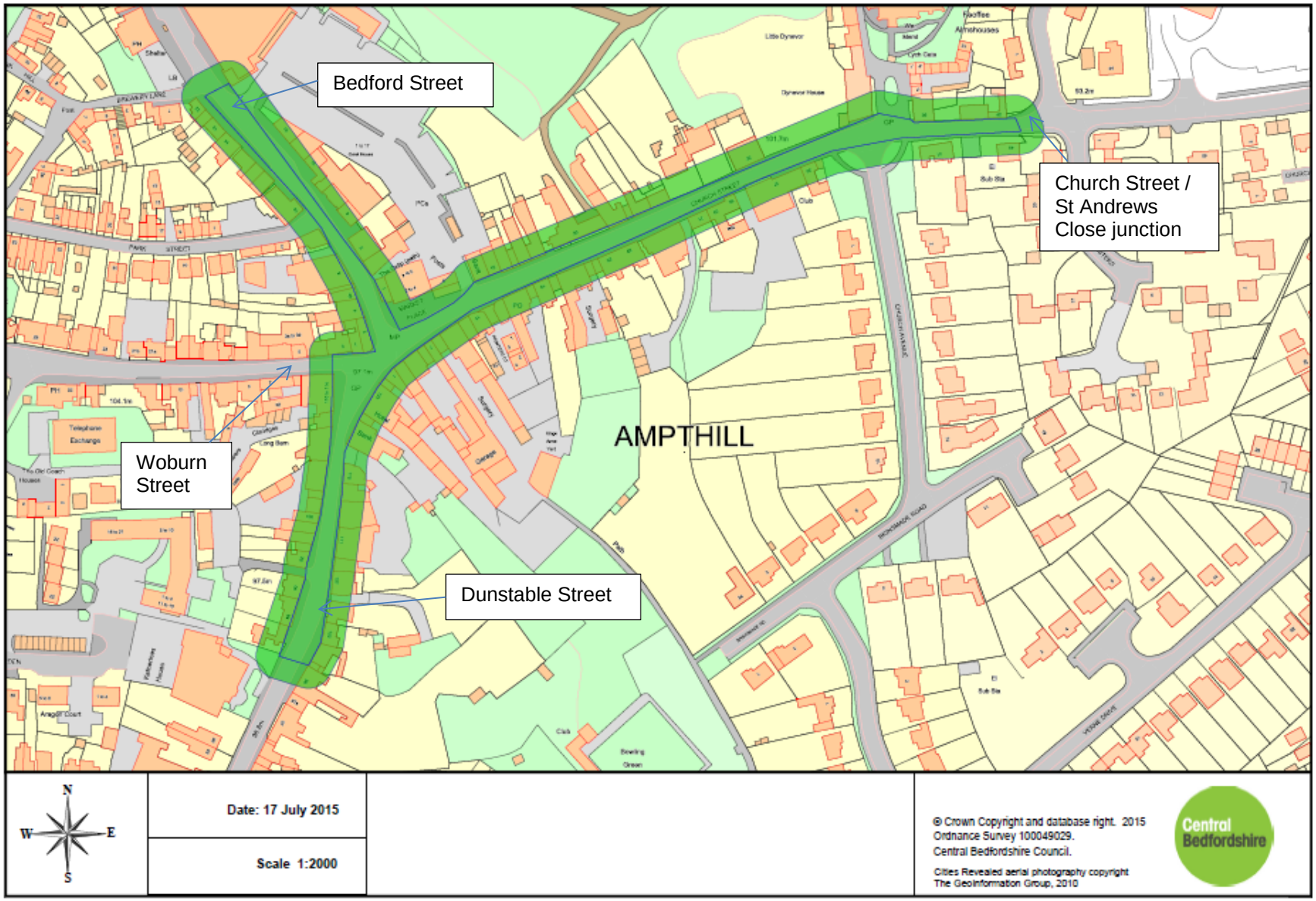
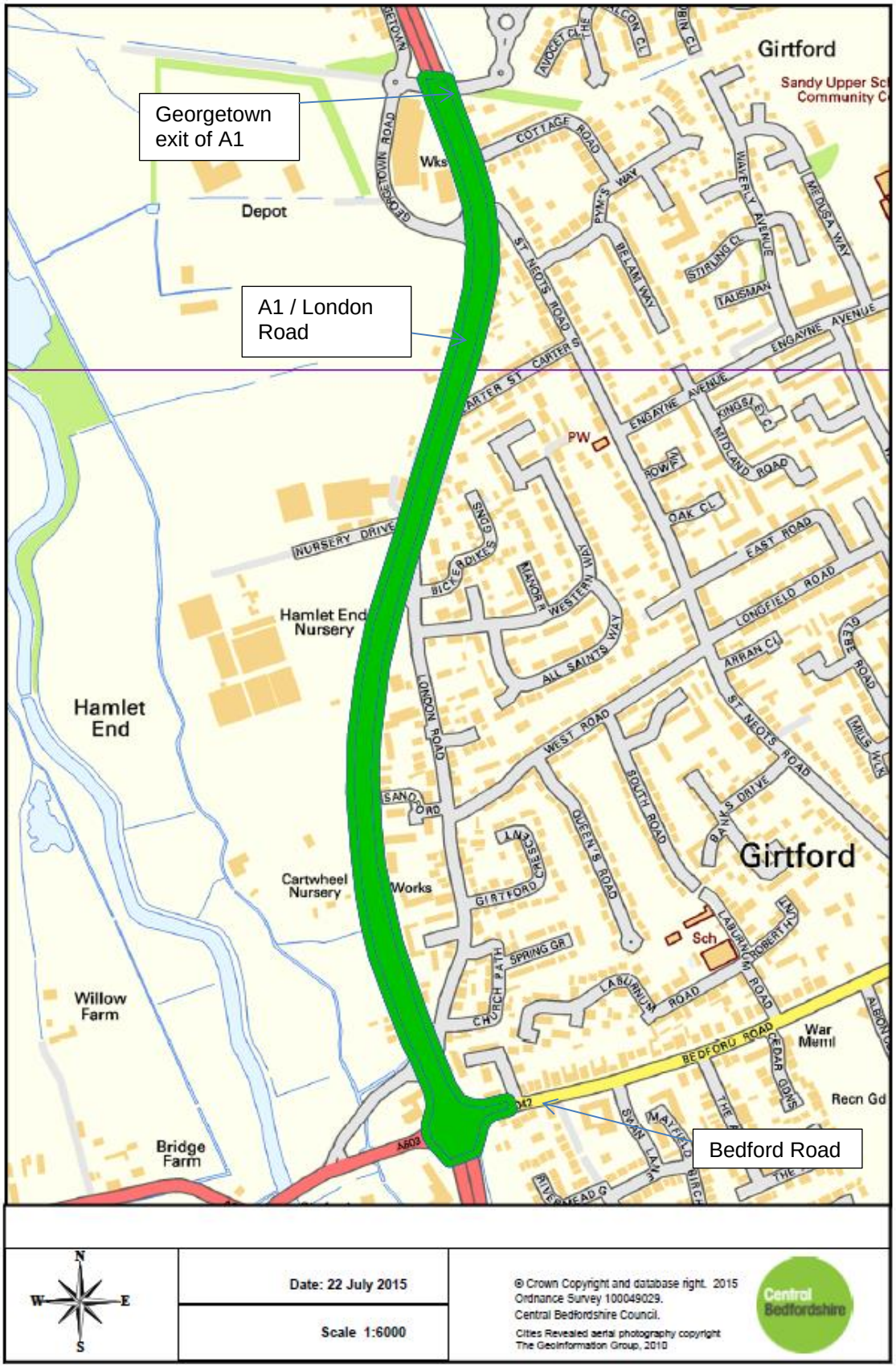


Figure 1.3 Map(s) of AQMA Boundaries (if applicable)

A map of the Sandy Air Quality Management Area is below



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

This section provides a summary of the automatic air quality monitoring results available since the last air quality report (Progress Report 2014).

The Sandy site (MD3) became an affiliated site in the AURN National Network in January 2009, which resulted in an FDMS upgrade to the PM_{10} TEOM and also the installation of a $PM_{2.5}$ FDMS TEOM.

NO_2 is measured using an API chemiluminescent NO_x analyser which is housed in an air conditioned cabin. Data is collected remotely using a GSM modem link. The analyser is serviced every six months by We Care 4 Air and is visited every two weeks by a council officer who calibrates it using bottled gas of a known concentration and the results are logged. Since the affiliation of the Sandy site with Defra's national network, an audit is to be undertaken every 6 months.

The data from the AQMS site at Sandy roadside is ratified by ERG to the AURN standard and QA/QC visits are carried out by AEA-Ricardo on a regular basis.

During 2014 data capture for the Sandy site for NO_2 was 84%, PM_{10} was 30% and $PM_{2.5}$ was 74%.

Figure 2.1 below, shows a map of the location of the realtime analyser.

Figure 2.1 Map(s) of Automatic Monitoring Sites (if applicable)

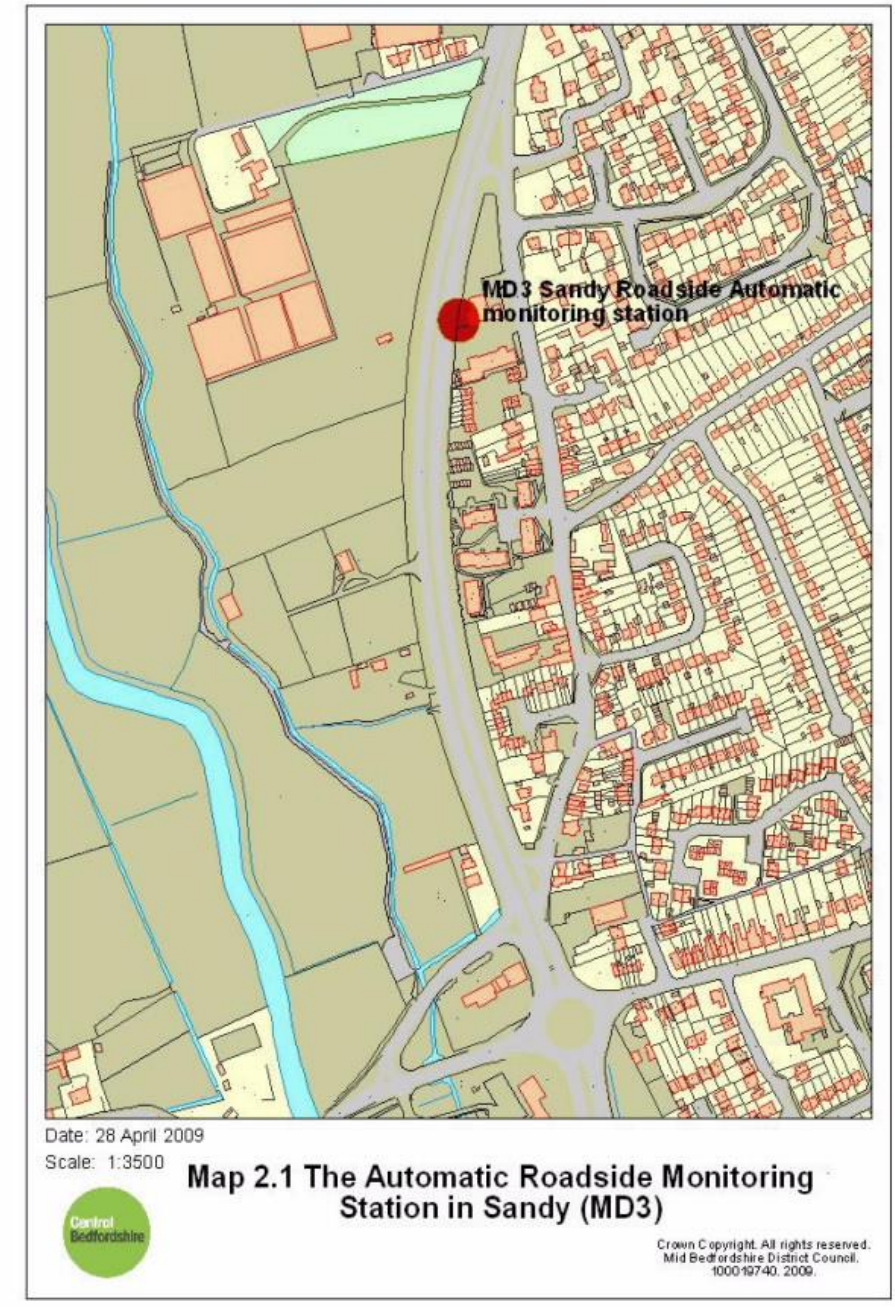


Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
MD3	Road side	516436	249600	NO_2 / PM_{10} / $PM_{2.5}$	Y	Chemiluminescence / FDMS TEOM	N	2m	N

2.1.2 Non-Automatic Monitoring Sites

In addition to the continuous monitor, Central Bedfordshire Council measures nitrogen dioxide using 45 passive diffusion tubes at sites throughout the district. The locations of the non-automatic monitoring sites can be seen in Appendix B.

The tubes are supplied and analysed by Gradko International Ltd and prepared using 20% TEA in water methodology. Gradko International is a UKAS accredited laboratory and the latest results from the laboratory precision and WASP scheme are in Appendix A.

Table 2.2 shows the details of Non-Automatic Monitoring Sites (NO_2) measured at sites in 2012. Three tubes have been co-located with the air quality monitoring station on the A1 Sandy since January 2003 to enable a local bias adjustment factor to be calculated.

The national bias adjustment factor for 2014 is 0.91

The national bias adjustment factor is available for Gradko 20% TEA in water tubes from http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html and was obtained in March 2014.

The local bias adjustment factor is 0.86

The local bias adjustment was calculated using http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html

The National Bias Adjustment factor has been used, as this gives a more conservative outcome and additionally best represented most of the NO_2 sites locations within the district.

Table 2.2 Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
N1	A1 Sandy	Kerbside	516485	249202	NO_2	Y	N	Y (3m)	1m	N
N2	Rose Lane B'wade	Kerbside	519163	244654	NO_2	N	N	Y(4)	1	N
N3	High St B'wade	Kerbside	518995	244594	NO_2	N	N	N	1	N
N4	A1 Beeston	Kerbside	517160	248190	NO_2	N	N	Y(2)	1	Y
N6	Bedford Rd Sandy	Kerbside	516621	249100	NO_2	Y	N	Y(4)	1	N
N7	Highfield Cres Brogborough	Kerbside	496334	238297	NO_2	N	N	Y(10)	3	N
N20	A1 Carter Lane Sandy	Kerbside	516534	249974	NO_2	Y	N	Y	1	Y
N9	A1 Hunts Car Co 1Sandy	Kerbside	516451	249692	NO_2	Y	N	N	I	N
N10	A1 Hunts Car Co 2Sandy	Kerbside	516480	249695	NO_2		N	Y(4)	2	N
N24	Market Sq Sandy	Kerbside	517310	249228	NO_2	N	N	Y(3)	1	N
N12	NOx Co loc 1	Kerbside	516434	249603	NO_2	Y	Y	N	3	N
N13	NOx Co loc 2	Kerbside	516434	249603	NO_2	Y	Y	N	3	N
N14	NOx Co loc 3	Kerbside	516434	249603	NO_2	Y	Y	N	3	N
N15	Battlesden	RB	495944	229191	NO_2	N	N	N	1	N
N16	Bedford Rd Sandy	Kerbside	516593	249083	NO_2	Y	N	Y	3	N
N17	Bedford Rd Sandy	Kerbside	516569	249074	NO_2	Y	N	Y(3)	1	Y
N18	Eddies Cott	Kerbside	516579	249070		Y	N	Y	5	Y
N19	McMurdo Ct	Kerbside	516524	249139	NO_2		N	Y	11	N

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
N21	Ampthill 1	Kerbside	503444	238197	NO_2	Y	N	Y	2	N
N22	Ampthill 2	Kerbside	503466	238141	NO_2	Y	N	Y(2)	1	Y
N23	Ampthill 3	Kerbside	503458	283039	NO_2	Y	N	Y(2)	1	Y
N25	A1 Akbar Sandy	Kerbside	516568	250174	NO_2	Y	N	N	1	Y
N26	Woburn	Kerbside	494900	233230	NO_2	N	N	Y(2)	1	Y
1	High St South D'ble	Kerbside	501936	221833	NO_2	Y	N	N	1	Y
3	Mardale D'ble	Kerbside	502029	220688	NO_2	N	N	Y(3)	1	N
5	Rowley Linslade	Kerbside	491000	225788	NO_2	N	N	Y(3)	1	N
6	Barton	Kerbside	508062	230874	NO_2	N	N	Y(5)	1	N
7	Slip End	Kerbside	507698	218376	NO_2	N	N	Y(3)	1	N
10	Houghton Regis	Kerbside	501991	223965	NO_2	N	N	N	1	N
13	Tebworth	RB	499542	226940	NO_2	N	N	N	8	N
14	Sallowsprings	Rural background	500525	218840	NO_2	N	N	N	8	N
17	London/Mayfield D'ble	Kerbside	502848	220829	NO_2	N	N	Y(5)	2	Y
18	Argos D'ble	Kerbside	501705	222089	NO_2	Y	N	N	1	Y
21	Frenchs Ave D'ble	Kerbside	500790	223047	NO_2	N	N	Y(4)	2	Y
26	West St D'ble	Kerbside	501571	221742	NO_2	N	N	Y(5)	1	N
27	Luton Rd D'ble	Kerbside	503214	222123	NO_2	Y	N	Y(2)	1	Y
28	Chalton	Kerbside	503763	226103	NO_2	N	N	N	1	N
33	Church St D'ble	Kerbside	501962	221884	NO_2	Y	N	Y	3	Y
34	High St South D'ble	Kerbside	501911	221853	NO_2	Y	N	Y(5)	1	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
35	Flint Ct D'ble	Kerbside	501504	222278	NO_2	N	N	Y	3	Y
36	Luton Rd D'ble	Kerbside	503849	222326	NO_2	Y	N	Y(2)	1	Y
37	Luton Rd D'ble	Kerbside	502838	222071	NO_2	Y	N	Y(3)	1	Y
39	Houghton Rd D'ble	Kerbside	501151	222821	NO_2	N	N	Y(3)	1	Y
41	Chalton X	Kerbside	503925	225855	NO_2	N	N	Y	6	Y
48	Poytners Rd D'ble	Kerbside	503745	222914	NO_2	N	N	Y(4)	1	Y
49	Poynters Rd D'ble	Kerbside	503569	223034	NO_2	N	N	Y(6)	1	Y
50	Luton Road D'ble	Kerbside	502813	222065	NO_2	Y	N	Y(6)	2	Y
51	Busway D'ble	Kerbside	503481	221866	NO_2	N	N	Y(8)	2	Y
52	Hockliffe St Leighton Buzzard	Kerbside	492512	225235	NO_2	N	N	Y(2)	1	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

As can be seen from Table 2.3 (Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective), the Sandy site recorded an annual mean concentration of NO_2 over the air quality objective level (44µg/m^3) in 2009. However there have been no exceedance's at this location in the years since.

Table 2.4 (Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean objective) also shows that concentrations were within the objective level.

Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2014 % [b]	Annual Mean Concentration μg/m^3				
					2010* [c]	2011* [c]	2012* [c]	2013* [c]	2014 [c]
MD3	Roadside	Y	84	84	38	35	35	31	27.94c

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.
*Annual mean concentrations for previous years are optional.

Due to the data capture of the site being below 90% the 2014 annual mean figure has been annualised. Calculations can be seen in Appendix A

Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2014 % [b]	Number of Exceedences of Hourly Mean (200 μg/m^3)				
					2010* [c]	2011* [c]	2012* [c]	2013* [c]	2014 [c]
MD3	Roadside	Y	84	84	1(216)	0	0	0	0 (113)

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] If the period of valid data is less than 90%, include the 99.8th percentile of hourly means in brackets
*Number of exceedences for previous years are optional.

As data capture was below 90% the 99.8th percentile of hourly means is shown in brackets for the 2014 data.

Diffusion Tube Monitoring Data

In addition to the continuous monitors, Central Bedfordshire Council measures nitrogen dioxide using passive diffusion tubes at sites throughout the district. The locations of the monitoring sites can be seen in Appendix B. Monthly results are in Appendix C.

The tubes are supplied and analysed by Gradko International Ltd and prepared using 20% TEA in water methodology. Gradko International is a UKAS accredited laboratory and was considered 'Good' in the latest results from the laboratory precision and WASP scheme. See Appendix A

Table 2.5 shows the details of Non-Automatic Monitoring Sites (NO_2) measured at sites in 2014. Three tubes have been co-located with the air quality monitoring station on the A1 Sandy since January 2003 to enable a local bias adjustment factor to be calculated. Several sites had low data capture rates and so have been annualised. In addition sites have had a distance correction factor applied where appropriate to calculate the drop off in pollution from the source to the receptor. This has been done in accordance with the methodology in Defra's Local Air Quality Management Technical Guidance (LAQM TG.09) published in February 2009. Calculations can be seen in Appendix A

Table 2.6 shows monitoring results from 2010 to 2014 .

Hourly objective

As a result of a review of nitrogen dioxide diffusion tube sites in 2010 – a new site was set up on the façade of a row of terraced houses alongside the A1 in Sandy approximately 1 metre from the carriageway. The annual mean result concentration of the tube was 74.15µg/m^3 (with national bias adjustment factor 0.91 applied). This indicates that there is a breach of the hourly objective at this location which falls within the AQMA for Sandy. A map of this site can be seen in Appendix B.

A new diffusion tube monitoring site has been introduced to the network following discussions with Highways England. The new tube is in Carter Street, Sandy, this is outside of the boundary of the Air Quality Management Area and will be used to indicate if the high levels NO_2 at the facades of the cottages affect the wider area. Unfortunately the new site is some distance away from the A1 (due to restrictions in suitable receptacles).

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2014

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.91) 2014 (µg/m^3)
N1	A1 Sandy	K	Y	N	10	-	Y	33.7
N2	Rose Lane Biggleswade	K	N	N	10	-	N	27.31
N3	High St Biggleswade	K	N	N	10	-	N	34.98
N4	Beeston	K	N	N	10	-	N	35.47
N6	Bedford Rd Sandy	K	Y	Y	10	-	N	35.38
N7	Brogborough	K	N	N	10	-	N	26.15
N20	A1 Carters Sandy	K	Y	N	10	-	No drop off	**74.15**
N9	Hunts Car Co 1 Sandy	K	Y	N	10	-	N	39.46
N10	Hunts Car Co 2 Sandy	K	Y	N	10	-	N	24.59
N24	Market Sq Sandy	K	N	N	6	Y	N	34.87
N12	NOx co location 1	K	Y	Triplicate & Co-located	10	-	N	31.41
N13	NOx co location 2	K	Y	Triplicate & Co-located	10	-	N	32.92
N14	NOx co location 3	K	Y	Triplicate & Co-located	10	-	N	33.30
N15	Battlesden	RB	N	N	10	-	N	13.08

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.91) 2014 (µg/m^3)
N16	Bedford Rd Sandy	K	Y	N	10	-	Y	31.5
N17	Bedford Rd Sandy	K	Y	N	10	-	Y	37.8
N18	Eddies Cott Sandy	K	Y	N	9	Y	N	29.92
N19	McMurdo Sandy	K	Y	N	10	-	N	27.43
N21	Ampthill 1	K	Y	N	9	Y	N	26.97
N22	Ampthill 2	K	Y	N	10	-	No drop off	**42.25**
N23	Ampthill 3	K	Y	N	10	-	No drop off	**47.71**
1	HSS D'ble	K	Y	N	7	Y	N	38.75
3	Mardale D'ble	K	N	N	10	-	N	14.50
5	Rowley Linslade	K	N	N	10	-	N	14.65
6	Barton	K	N	N	8	Y	N	20.42
7	Slip End	K	N	N	10	-	N	17.72
10	Houghton Regis	K	N	N	7	Y	Y	33.9
13	Tebworth	RB	N	N	9	Y	N	19.36
14	Sallowsprings	RB	N	N	10	-	N	11.99
17	London/Mayfield	K	N	N	10	-	N	32.31
18	Argos	K	Y	N	6	Y	No exposure	**55.18**
21	Frenchs D'ble	K	N	N	8	Y	N	27.11
26	West St D'ble	K	N	N	6	Y	N	27.47
27	Luton Rd	K	Y	N	9	Y	N	32.16
28	Chalton	K	N	N	10	-	No exposure	**48.39**
33	Church St D'ble	K	Y	N	10	-	N	39.03

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.91) 2014 (µg/m^3)
34	HSS D'ble	K	Y	N	6	Y	Y	30.4
35	Flint Ct D'ble	K	N	N	9	Y	N	33.22
36	Luton Rd D'ble	K	Y	N	7	Y	Y	**41.2**
37	Luton Rd D'ble	K	Y	N	9	Y	Y	35.2
39	Houghton Rd	K	N	N	9	Y	N	32.91
41	Chalton X	K	N	N	8	Y	N	37.20
48	Poynters Rd	K	N	N	9	Y	N	34.45
49	Poynters Rd	K	N	N	10	-	N	36.56
50	Luton Rd	K	Y	N	8	Y	Y	37.2
51	Busway	K	N	N	4	Y	N	24.89

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2014)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias & distance corrected where appropriate) μg/m^3				
			2010* (Bias Adjustment Factor = 0.92)	2011* (Bias Adjustment Factor = 0.89)	2012* (Bias Adjustment Factor = 0.97)	2013* (Bias Adjustment Factor = 0.95)	2014 (Bias Adjustment Factor = 0.91)
N1	A1 Sandy	Y	39.3	37.1	35.5	32.4	33.7
N2	Rose Lane Biggleswade	N	27	27.09	29.78	25.60	27.31
N3	High St Biggleswade	N	42	37.50	38.45	37.10	34.98
N4	Beeston	N	37.8	35.28	38.27	31.5	35.47
N6	Bedford Rd Sandy	Y	33.6	38.13	36.56	35.54	35.38
N7	Brogborough	N	35	25.65	26.76	26.93	26.15
N20	A1 Carters Sandy	Y	-	74.62	80.45	80.39	**74.15**
N9	Hunts Car Co 1 Sandy	Y	46	39.7	33.8	31.1	39.46
N10	Hunts Car Co 2 Sandy	Y	30	26.9	27.10	27.78	24.59
N24	Market Sq Sandy	N	35.42	28.4	35.08	31.36	34.87
N12	NOx co location 1	Y	37	33.22	35.18	32.6	31.41
N13	NOx co location 2	Y	39	32.91	33.44	33	32.92
N14	NOx co location 3	Y	37	33.36	33.15	32.9	33.30
N15	Battlesden	N	15	12.75	13.47	13.31	13.08
N16	Bedford Rd Sandy	Y	30.7	33.73	34.40	35.49	31.5

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias & distance corrected where appropriate) μg/m^3				
			2010* (Bias Adjustment Factor = 0.92)	**2011*** (Bias Adjustment Factor = 0.89)	**2012*** (Bias Adjustment Factor = 0.97)	**2013*** (Bias Adjustment Factor = 0.95)	**2014** (Bias Adjustment Factor = 0.91)
N17	Bedford Rd Sandy	Y	33.7	41.65	35.6	36.1	37.8
N18	Eddies Cott Sandy	Y	36	33.48	35.61	28.58	29.92
N19	McMurdo Sandy	Y	38.9	43.14	39.7	24.67	27.43
N21	Ampthill 1	Y	30.73	24.45	26.57	27.14	26.97
N22	Ampthill 2	Y	50.99	39.84	40.69	41.03	**42.25**
N23	Ampthill 3	Y	53.32	47.35	47.07	43.34	**47.71**
1	HSS D'ble	Y	49.58	45	43.32	44.80	38.75
3	Mardale D'ble	N	20.53	13.70	14.87	15.14	14.50
5	Rowley Linslade	N	14.90	12.78	12.82	13.87	14.65
6	Barton	N	26.11	22.86	22.56	24.28	20.42
7	Slip End	N	22.29	17.84	16.38	18.62	17.72
10	Houghton Regis	N	32.01	31.66	33.38	33.25	33.9
13	Tebworth	N	13.74	12.92	16.66	12.76	19.36
14	Sallowsprings	N	15.06	10.41	11.17	10.79	11.99
17	London/Mayfield	N	38.70	31.80	33.20	32.13	32.31
18	Argos	Y	46.19	40.58	38.91	43.73	**55.18**
21	Frenchs D'ble	N	35.55	33.22	30.94	27.68	27.11
26	West St D'ble	N	33.37	29.94	26.29	28.25	27.47
27	Luton Rd	Y	39.29	31.98	32.84	33.5	32.16
28	Chalton	N	48.89	45.84	53.72	49.31	**48.39**
33	Church St D'ble	Y	41.9	39.4	39.2	35.01	39.03
34	HSS D'ble	Y	38.1	32	36.7	36.1	30.4
35	Flint Ct D'ble	N	31.1	35.24	34.97	32.81	33.22
36	Luton Rd D'ble	Y	37.4	37.41	35.52	36.4	**41.2**
37	Luton Rd D'ble	Y	41.6	36.7	38.3	41.4	35.2

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias & distance corrected where appropriate) μg/m^3				
			2010* (Bias Adjustment Factor = 0.92)	**2011*** (Bias Adjustment Factor = 0.89)	**2012*** (Bias Adjustment Factor = 0.97)	**2013*** (Bias Adjustment Factor = 0.95)	**2014** (Bias Adjustment Factor = 0.91)
39	Houghton Rd	N	35.1	35.76	38.33	31.3	32.91
41	Chalton X	N	43.46	40.51	40.80	37.32	37.20
48	Poynters Rd	N	-	-	-	32.43	34.45
49	Poynters Rd	N	-	-	-	32.48	36.56
50	Luton Rd	Y	-	-	-	35.8a	37.2
51	Busway	N	-	-	-	-	24.89

*Optional

2.2.2 PM_{10}

As illustrated in the tables below, the monitoring results for the annual mean and 24hour mean objectives indicate that neither is in danger of being exceeded. The Sandy site is affiliated to the AURN network and therefore the data from the TEOM does not require adjustment in line with the VCM[1].

As with the NO_2 analyser the location is representative of public exposure at certain locations along the A1, however, some residential properties are closer to the road (although standing traffic doesn't occur as much at these locations) and some properties are more distant from the road. This section of the A1 was the subject of a Detailed Assessment in 2008 which included PM_{10}. It found that PM_{10} levels did not threaten either objective, a conclusion that has been confirmed by subsequent monitoring data.

[1] King's College ERG have developed a model to correct TEOM concentrations to "gravimetric equivalent" values, based on the purge concentrations measured by FDMS analysers. To assist local authorities with the Volatile Correction Model, ERG has developed a web portal that will allow the correction algorithms to be automatically applied.

Table 2.7 Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2014 %[b]	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m^3				
						2010*[c]	2011*[c]	2012*[c]	2013*[c]	2014[c]
MD3	Roadside	Y		30	Y	21	17	19	20	17.21c

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.
* Optional

2014 result has been annualised – see Appendix A

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2014 %[b]	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 μg/m^3)				
						2010*[c]	2011*[c]	2012*[c]	2013*[c]	2014[c]
A1	Roadside	Y	95	92	Y	3	4	8	6	1 (27)

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%).
[c] if data capture is less than 90%, include the 90th percentile of 24-hour means in brackets
* Optional

Results have been annualised and show the 90th percentile in brackets for 2014

2.2.3 Sulphur Dioxide

A Detailed Assessment conducted in 2004, along with monitoring results, indicated that sulphur dioxide levels were exceeding the 15minute mean objective. As a result an Air Quality Management Area was declared with regard to sulphur dioxide emissions from Stewartby Brickworks.

Production stopped at the brickworks from the 28th February 2008; although the process did continue for a few weeks after that date, due to the inherent nature of the production method (fires in the kilns continued after the input of the final batch of the green bricks until the process was complete and the fires went out).

Monitoring continued for a period of time after the closure of the brickworks and showed that SO_2 concentrations met the air quality objectives. The realtime analyser ceased monitoring for SO_2 in April 2009. Additionally the realtime monitor operated by Bedford Borough Council decommissioned their monitoring station in February 2009.

Subsequently the AQMAs relating to the emissions from the brickworks have been revoked.

Central Bedfordshire Council is currently carrying out no sulphur dioxide monitoring within the district.

2.2.4 Benzene

There are no continuous benzene analysers in Hertfordshire or Bedfordshire as previous rounds of review and assessment showed that the objective is likely to have been met in all locations.

2.2.5 Other pollutants monitored

2.2.5i Ozone (O^3)

The Government has set an air quality objective for ground level ozone but, as it is a national and international problem rather than a local one, it is not included in environmental legislation. This means that local authorities are not required to take action to specifically decrease ground level ozone levels.

The sun shining on polluted air, which contains nitrogen dioxide and volatile organic compounds, produces ozone. Given that strong sunshine is essential in the formation of ozone, the pollutant is, in the main, a summertime problem.

Ozone concentrations tend to be highest in rural locations. This is due to ozone being used by other pollutants in photochemical reactions and as such ozone levels will be decreased in urban situations where traffic or industrial pollutants tend to be higher.

Table 2.2.5 The National Air Quality Standards and Objectives for ground level ozone

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Ozone (O3)	100 µg/m3 (50 ppb)	Running 8 hour mean daily maximum of running 8hr mean not to be exceeded more than 10 times per year	31/12/2005

Monitoring results indicate that all parts of Hertfordshire and Bedfordshire will have failed to achieve this objective.

Unlike all of the other pollutants, ozone (O_3) concentrations across the network have seen a steady increase over the last 10 years and this helps to indicate why the reduction in NO_x is not being directly translated into a similar reduction in NO_2. Ozone levels are highly dependent on the weather and a series of warm sunny summer periods can cause a sharp increase in mean levels. Furthermore, a large proportion of the ozone experienced in Hertfordshire and Bedfordshire is transported from continental Europe during easterly and southerly winds.

The realtime analyser in Marston Moretaine showed the number of days where the running 8hour mean of 100 µg/m^3 exceeded the objective level in both 2011 (36 days) and 2012 (23 days). In 2013 the monitor showed that there were 43 days which exceeded the objective, before it was decommissioned in August (2013). Central Bedfordshire Council now no longer monitors Ozone.

The pattern of rising ozone levels is common across the UK. There are a number of possible reasons why, despite falling NO_x concentrations. Climate change may be causing more hours of sunlight and higher temperatures helping to drive the reaction that forms ozone.

Ozone 'precursors', such as hydrocarbons and secondary particulate compounds emitted by both vehicles and industrial processer, may be increasing. It is even possible that emission control technologies such as particle traps fitted to diesel vehicles are upsetting the balance between NO and NO_x. As ozone is a transboundary pollutant, which can travel hundreds or even thousands of miles, the reasons and possible solutions, have to be sought within and outside the borders of the UK.

2.2.5ii $PM_{2.5}$

Currently PM2.5 objectives are not included in regulations.

However as part of the AURN site in Sandy $PM_{2.5}$ is monitored – during 2014 a 74% data capture was achieved and an annual mean of 12µg/m^3 calculated.

Summary of Compliance with AQS Objectives

Central Bedfordshire Council has examined the results from monitoring in the district. Concentrations outside of the AQMAs are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3 Road Traffic Sources

Within Central Bedfordshire there have been no changes to:

- Busy streets where people may spend one hour or more close to traffic
- Roads with a high flow of buses and/or HGVs
- Junctions
- New roads constructed or proposed since the last round of Review and Assessment
- Roads with significantly changed traffic flows
- Bus or coach stations

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Central Bedfordshire Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

Central Bedfordshire Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

Central Bedfordshire Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Central Bedfordshire Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

Central Bedfordshire Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Central Bedfordshire Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Central Bedfordshire Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

London Luton Airport is situated in a neighbouring authority's district.

Luton Borough Council's 2014 Progress Report (published April 2014) stated "that air quality is monitored within and around the airport site. Currently the airport has 14 NO_2 diffusion tube sites. None of the sites measured an Annual Mean concentration at or above the 40µg/m^3 objective level".

Data from 2009 to 2013 data for Luton Airport can be seen in Appendix D

Central Bedfordshire confirms that there are no airports in the Local Authority area and the one in a neighbouring authority does not impact on air quality in the district.

4.2 Railways (Diesel and Steam Trains)

Railways were considered during previous rounds of review and assessment and found they were unlikely to be an issue (not enough periods of idling or relevant exposure). There have been no significant changes to train services or exposures.

The narrow gauge railway at Leighton Buzzard continues to run during school holidays and weekends) using engines which are coal powered. However there have been no changes to the route or scheduled stops, which means that it is highly unlikely that the trains will be stationary for 15 minutes or more and the public would have access to within 15metres (unless they are on the train).

4.2.1 Stationary Trains

Central Bedfordshire Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Central Bedfordshire Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

Central Bedfordshire Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Central Bedfordshire Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Central Bedfordshire Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Central Bedfordshire Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

Central Bedfordshire Council confirms there are no major fuel (petrol) storage depots within its district.

5.3 Petrol Stations

Central Bedfordshire Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Central Bedfordshire Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Central Bedfordshire Council confirms that there are no biomass combustion plant in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

Central Bedfordshire Council confirms that there are no biomass combustion plant in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

Central Bedfordshire Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

As reported in the Progress Report 2014, Central Bedfordshire Council received a proposal for a waste incinerator to be erected and operated within the district. Comments have been made with regards to issues surrounding air quality. The decision for approval of the project is pending.

However there are no new landfill sites, quarries, unmade haulage roads on industrial sites, waste transfer stations or other potential sources of fugitive particulate emissions since the last review and assessment.

Central Bedfordshire Council has identified the following potential local developments which may impact on air quality in the Local Authority area.

Proposed waste incinerator at Marston Vale, which is currently being reviewed.

If necessary this will be taken into consideration in future Review and Assessments.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

The 2015 Updating and Screening Assessment has not identified a need to progress to a Detailed Assessment for any pollutant.

NO_2 diffusion tube monitoring showed sites that were exceeding the annual/hourly objectives were within one of the three AQMAs. The exception to this was the Chalton (28) site which is near a bridge over the M1 and on a busy B road, relevant exposure

The automatic monitoring showed compliance with the annual and hourly NO_2 objectives and the annual and 24hour PM_{10} objectives.

Some changes have been made to monitoring locations – some sites have closed and others introduced: These are

- N7 – Brogborough has been closed as the new A421 has taken much of the traffic of the old road through the village and NO2 has been shown to be under the objective level.

- 41 – Chalton Cross Cottages this site has been closed as these properties are no longer occupied and demolition is imminent as part of the A5-M1 link road (Dunstable bypass) as reported in previous reports.

- N25 – A1 Sandy has been introduced to ascertain the extent of the exceedance of the hourly NO2 objective and annual mean.

- N26 – Woburn High Street has been introduced to monitor pollution concentrations outside a school sited on a busy road.

- N27 (Ampthill 4) – Church Street, Ampthill has been introduced to monitor pollution levels, as public consultation requested the AQMA boundary be extended along this road

- N28 – Carter Street has been introduced to the network to try to ascertain the extent of the exceedance of the hourly NO2 objective and annual mean.

- 51- Busway (Jeans Way, Dunstable) was introduced as a result of a request from a member of the public living near to the line who was concerned regarding potential pollution.

- 52 – Hockliffe Street, Leighton Buzzard was introduced to monitor levels of pollution alongside a busy and narrow street (but not over 5,000 vehicles per day).

8.2 Conclusions from Assessment of Sources

Potential sources of pollution have been considered during previous rounds of review and assessment and as there have been no changes in circumstances, continue to not to require further assessment.

8.3 Proposed Actions

The AQMAs at Ampthill and Sandy have now been declared (copies of the Orders have been sent to Defra for information). Work will commence to produce a Further Assessment report and an Action Plan to work towards achieving the relevant objectives. Additionally a Progress Report will be submitted to Defra in 2016.

The 2015 Updating and Screening Assessment has not identified a need to progress to a Detailed Assessment for any pollutant.

9 References

- Central Bedfordshire Council USA 2012 report
- Central Bedfordshire Council Progress Report 2014
- Central Bedfordshire Council Local Transport Plan 3
- Defra – Local Air Quality Management Technical Guidance (LAQM.TG(09))
- Defra website NO_2 fall off with distance calculator accessed at http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
- Defra website National bias adjustment factor spreadsheet (version 3/15) accessed at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html
- Defra website Background maps accessed at
- http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html
- Hertfordshire and Bedfordshire Air Quality Monitoring Network accessed at www.HertsBedsAir.net

Appendices

Appendix A: QA/QC Data

Appendix B: Diffusion tube (non-automatic) sites – location plans

Appendix C: Diffusion tube (non-automatic) sites – monthly results

Appendix D: Luton Airport air quality data

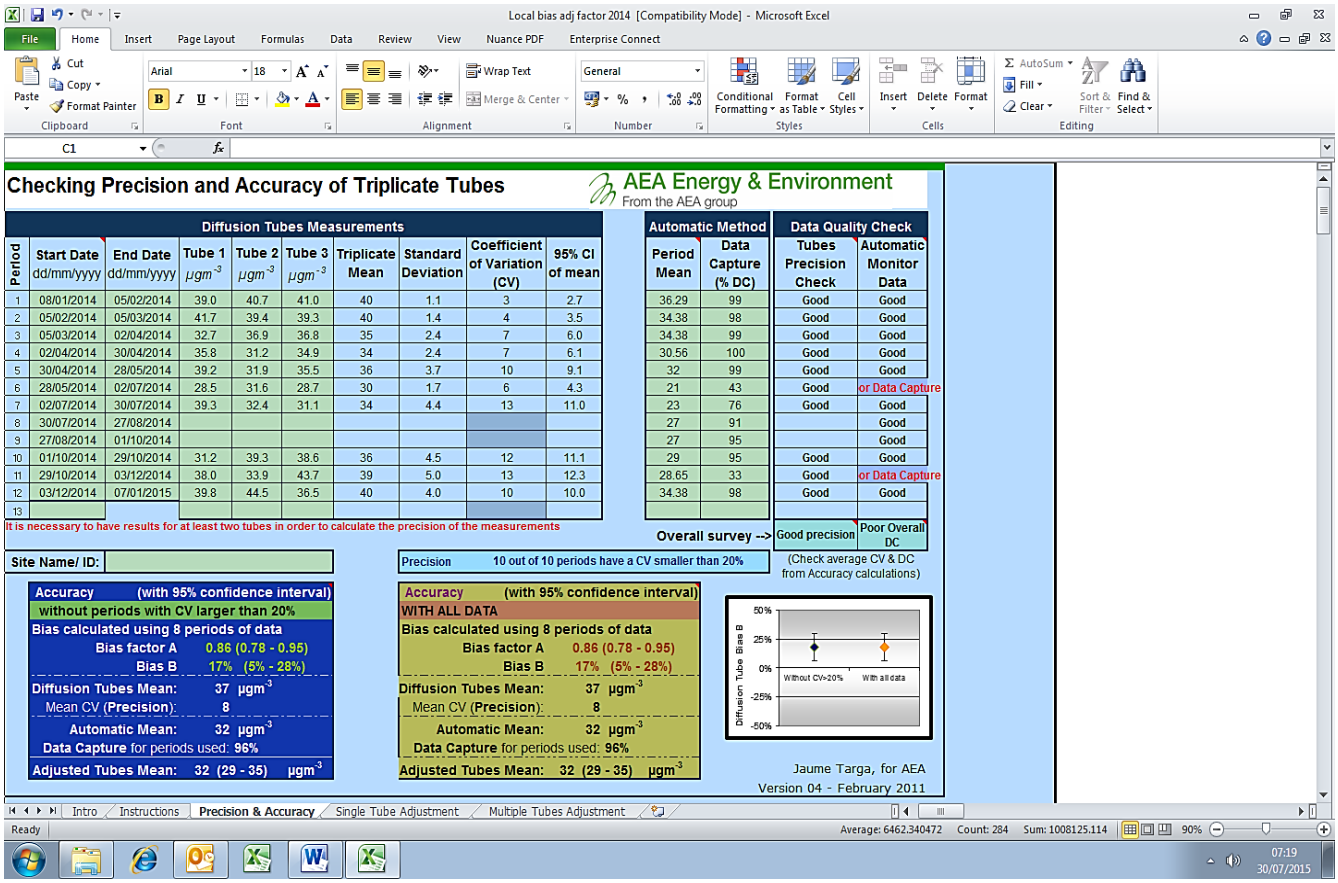
Appendix A: QA/QC Data

Factor from Local Co-location Studies (if available)

The table below shows the precision and accuracy of the three NO_2 diffusion tubes which were co-located with the Sandy AURN automatic monitor.

The local bias adjustment factor is 0.86

The local bias adjustment was calculated using http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html

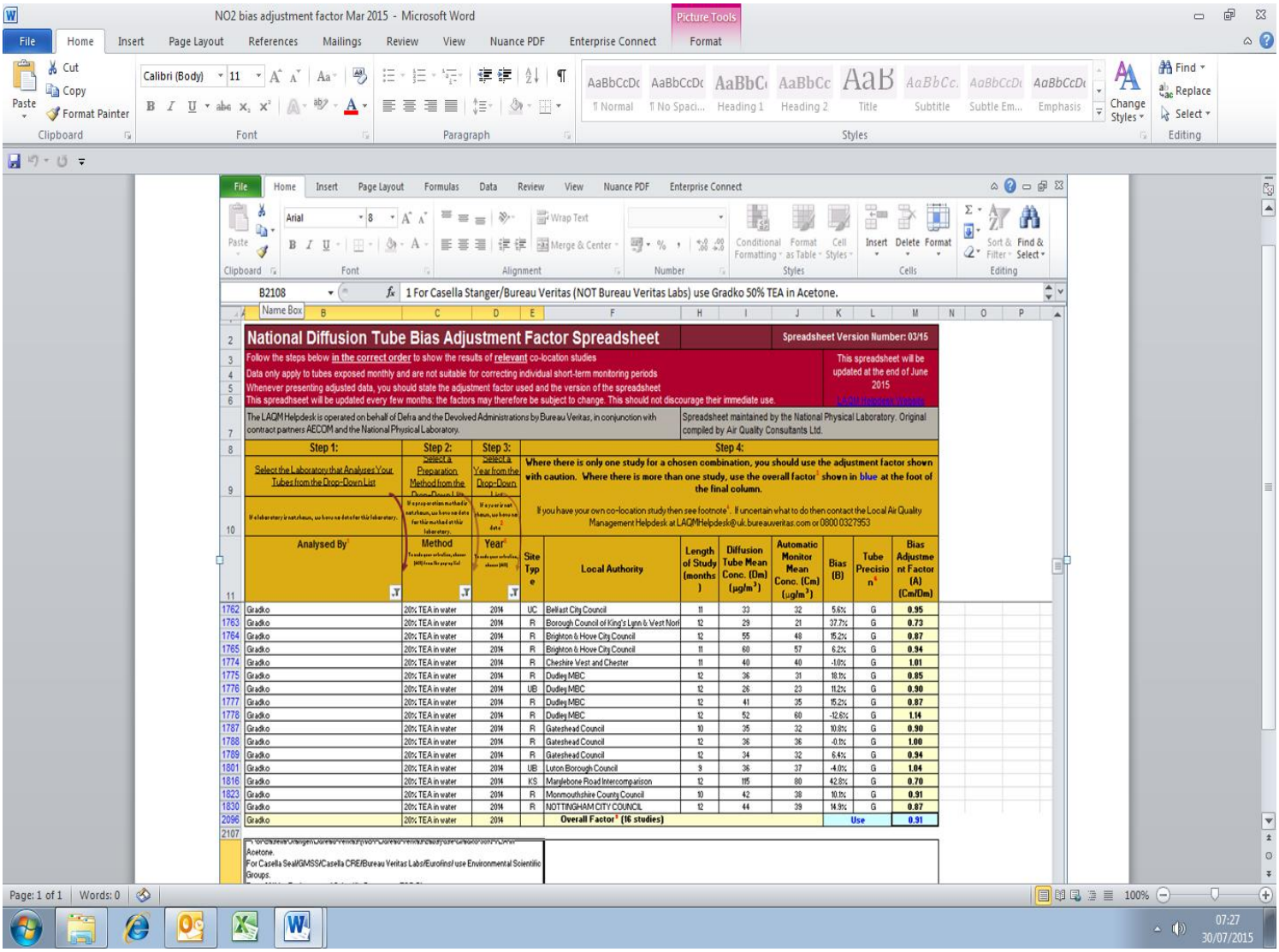


Diffusion Tube Bias Adjustment Factors

The tubes are supplied and analysed by Gradko International Ltd and prepared using 20% TEA in water methodology.

The national bias adjustment factor for 2014 is 0.91

The national bias adjustment factor is available for Gradko 20% TEA in water tubes from http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html and was obtained in March 2014 (version 3/15). See below.



NO2 bias adjustment factor Mar 2015 - Microsoft Word

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/15

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 spreadsheet 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 June 2015

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

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

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

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 shown in blue at the foot of the final column.

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

Analysed By	Method	Year	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	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2014	UC	Belfast City Council	11	33	32	5.6%	G	0.95
Gradko	20% TEA in water	2014	R	Borough Council of King's Lynn & West Norf	12	29	21	37.7%	G	0.73
Gradko	20% TEA in water	2014	R	Brighton & Hove City Council	12	55	48	15.2%	G	0.87
Gradko	20% TEA in water	2014	R	Brighton & Hove City Council	11	60	57	6.2%	G	0.94
Gradko	20% TEA in water	2014	R	Cheshire West and Chester	11	40	40	-1.0%	G	1.01
Gradko	20% TEA in water	2014	R	Dudley MBC	12	36	31	18.1%	G	0.85
Gradko	20% TEA in water	2014	UB	Dudley MBC	12	26	23	11.2%	G	0.90
Gradko	20% TEA in water	2014	R	Dudley MBC	12	41	35	15.2%	G	0.87
Gradko	20% TEA in water	2014	R	Dudley MBC	12	52	60	-12.6%	G	1.14
Gradko	20% TEA in water	2014	R	Gateshead Council	10	35	32	10.8%	G	0.90
Gradko	20% TEA in water	2014	R	Gateshead Council	12	36	36	-0.1%	G	1.00
Gradko	20% TEA in water	2014	R	Gateshead Council	12	34	32	6.4%	G	0.94
Gradko	20% TEA in water	2014	UB	Luton Borough Council	9	36	37	-4.0%	G	1.04
Gradko	20% TEA in water	2014	KS	Marylebone Road Intercomparison	12	115	80	42.8%	G	0.70
Gradko	20% TEA in water	2014	R	Monmouthshire County Council	10	42	38	10.1%	G	0.91
Gradko	20% TEA in water	2014	R	NOTTINGHAM CITY COUNCIL	12	44	39	14.9%	G	0.87
Gradko	20% TEA in water	2014		**Overall Factor (16 studies)**				**Use**		**0.91**

For Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofins/ use Environmental Scientific Groups.

Discussion of Choice of Factor to Use

The National Bias Adjustment factor has been used, as this gives a more conservative outcome and additionally best represented most of the NO_2 sites locations within the district.

PM Monitoring Adjustment

The Sandy site has been affiliated to the AURN network and so data does not require to be adjusted by the VCM method. As with the NO_2 analyser, the location is representative of public exposure at certain locations along the A1, however, some residential properties are closer to the road (although standing traffic doesn't occur as much at these locations) and some are more distant. This section of the A1 was the subject of a Detailed Assessment in 2008 which included PM_{10}. It was found that PM_{10} levels did not threaten either of the objectives, which were backed up by 2008 monitoring data.

Short-term to Long-term Data Adjustment

Several NO_2 diffusion sites had less than 75% data capture during 2014 – resulting in the need to "annualise" the data sets.

Two long term automatic monitoring sites from the Hertfordshire and Bedfordshire Monitoring Network were selected to provide data for this calculation. They were East Herts Sawbridgeworth and Luton Challney.

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan & Feb		Apr-Jun		Nov & Dec									
East Herts Sawbridgeworth background	21		14		24									
Hertsmere Borehamwood background	30		21		30									
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.841		1.26		0.74									
Hertsmere Borehamwood background	0.823		1.16		0.823									
Ave	**0.832**		**1.21**		**0.78**							**0.94**		
	AM	Ra												
	45.3	0.94												
High St South, Dunstable (1) annualised tube ave	**AM*Ra**		**42.58**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan - Jul		Oct & Nov											
East Herts Sawbridgeworth background	17		23											
Hertsmere Borehamwood background	24		31											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	1.061		0.77											
Hertsmere Borehamwood background	1.014		0.8											
Ave	**1.038**		**0.78**									**0.91**		
	AM	Ra												
	23.37	0.91												
Tebworth (13) annualised tube ave AM*Ra			**21.27**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan - Jul		Oct											
East Herts Sawbridgeworth background	17		21											
Hertsmere Borehamwood background	24		27											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	1.061		0.84											
Hertsmere Borehamwood background	1.014		0.91											
Ave	**1.038**		**0.88**									**0.96**		
	AM	Ra												
	23.37	0.96												
Barton (6) annualised tube ave AM*Ra			**22.44**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan - Mar		Jun & Jul		Nov & Dec									
East Herts Sawbridgeworth background	22		11		24									
Hertsmere Borehamwood background	31		15		30									
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.816		1.68		0.74									
Hertsmere Borehamwood background	0.797		1.59		0.823									
Ave	**0.807**		**1.64**		**0.78**							**1.08**		
	AM	Ra												
	39.79	1.08												
Houghton (10) annualised tube ave AM*Ra			**42.97**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan & Feb		Apr		Jun & Jul		Dec							
East Herts Sawbridgeworth background	21		17		11		23							
Hertsmere Borehamwood background	30		25		15		25							
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.841		1.04		1.682		0.77							
Hertsmere Borehamwood background	0.823		0.98		1.594		0.98							
Ave	**0.832**		**1.01**		**1.64**		**1.74**					**1.31**		
	AM	Ra												
	46.29	1.31												
Argos, High St North, Dunstable annualised tube ave AM*Ra			**60.64**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan - Jun		Nov & Dec											
East Herts Sawbridgeworth background	18		24											
Hertsmere Borehamwood background	26		30											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.991		0.74											
Hertsmere Borehamwood background	0.944		0.82											
Ave	**0.968**		**0.78**									**0.87**		
	AM	Ra												
	34.24	0.87												
Frenchs Ave/High St North, Dunstable annualised tube ave AM*Ra			**29.79**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan & Feb		Apr - Jun		Dec									
East Herts Sawbridgeworth background	21		14		23									
Hertsmere Borehamwood background	30		21		25									
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.841		1.26		0.769									
Hertsmere Borehamwood background	0.823		1.16		0.976									
Ave	**0.832**		**1.21**		**0.87**							**0.97**		
	AM	Ra												
	31.12	0.97												
West St, Dunstable (26) annualised tube ave AM*Ra			**30.19**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan - Apr		Jun		Nov									
East Herts Sawbridgeworth background	21		11		25									
Hertsmere Borehamwood background	29		17		34									
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.86		1.61		0.708									
Hertsmere Borehamwood background	0.836		1.43		0.717									
Ave	**0.848**		**1.52**		**0.71**							**1.03**		
	AM	Ra												
	52.27	1.03												
5 High St South, Dunstable (34) annualised tube ave AM*Ra			**53.84**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Mar & Apr		Jun & Jul		Oct - Dec									
East Herts Sawbridgeworth background	20		11		23									
Hertsmere Borehamwood background	29		15		29									
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.881		1.68		0.771									
Hertsmere Borehamwood background	0.85		1.59		0.85									
Ave	**0.865**		**1.64**		**0.81**							**1.1**		
	AM	Ra												
	45.91	1.10												
247 Luton Rd, Dunstable (36) annualised tube ave AM*Ra			**50.50**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan		Mar - Jul		Oct		Dec							
East Herts Sawbridgeworth background	23		15		21		23							
Hertsmere Borehamwood background	34		22		27		25							
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.769		1.19		0.843		0.77							
Hertsmere Borehamwood background	0.717		1.12		0.903		0.98							
Ave	**0.743**		**1.15**		**0.87**		**1.74**					**1.13**		
	AM	Ra												
	47.08	1.13												
24 Luton Road, Dunstable annualised tube ave AM*Ra			**53.20**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jul		Oct - Dec											
East Herts Sawbridgeworth background	10		23											
Hertsmere Borehamwood background	13		29											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	1.77		0.77											
Hertsmere Borehamwood background	1.876		0.85											
Ave	**1.823**		**0.81**									**1.32**		
	AM	Ra												
	20.72	1.32												
Jeans Way (Busway (51)) annualised tube ave AM*Ra			**27.35**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan & Feb		Apr-Jul		Oct-Dec									
East Herts Sawbridgeworth background	21		13		23									
Hertsmere Borehamwood background	30		19		29									
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.841		1.37		0.771									
Hertsmere Borehamwood background	0.823		1.28		0.85									
Ave	**0.832**		**1.32**		**0.81**							**0.99**		
	AM	Ra												
	36.87	0.99												
Flint Court (35)			**36.50**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan-Jul		Oct		Dec									
East Herts Sawbridgeworth background	17		21		23									
Hertsmere Borehamwood background	24		27		25									
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	1.061		0.84		0.769									
Hertsmere Borehamwood background	1.014		0.9		0.976									
Ave	**1.038**		**0.87**		**0.87**							**0.93**		
	AM	Ra												
	38	0.93												
89 Luton Rd (27)			**35.34**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan - Jul		Nov											
East Herts Sawbridgeworth background	17		25											
Hertsmere Borehamwood background	24		34											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	1.061		0.71											
Hertsmere Borehamwood background	1.014		0.72											
Ave	**1.038**		**0.71**									**0.88**		
	AM	Ra												
	46.46	0.88												
Chalton Cross Cottages (41) annualised tube ave AM*Ra			**40.88**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan - Jul		Nov & Dec											
East Herts Sawbridgeworth background	17		24											
Hertsmere Borehamwood background	24		30											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	1.061		0.74											
Hertsmere Borehamwood background	1.014		0.82											
Ave	**1.038**		**0.78**									**0.91**		
	AM	Ra												
	39.75	0.91												
Houghton Rd (39)			**36.17**											

2014 ppb data source H&B network														data capture%
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan - Jul		Oct											
East Herts Sawbridgeworth background	17		21											
Hertsmere Borehamwood background	24		27											
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	1.061		0.84											
Hertsmere Borehamwood background	1.014		0.91											
Ave	**1.038**		**0.88**									**0.96**		
	AM	Ra												
	46.84	0.96												
32 Luton Rd (37)			**44.97**											

2014 ppb data source H&B network														data ca
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave	
East Herts Sawbridgeworth background	12	10	12	9	7	6	5	6	8	11	13	12	9	99
Hertsmere Borehamwood background	18	13	17	13	11	9	7	8	12	14	18	13	13	97
2014 converted to ug/m3 (ppb*1.913)														
East Herts Sawbridgeworth background	23	19	23	17	13	11	10	11	15	21	25	23	18	99
Hertsmere Borehamwood background	34	25	33	25	21	17	13	15	23	27	34	25	24	97
Period Mean	Jan		Mar		May & Jun		Oct & Nov							
East Herts Sawbridgeworth background	23		23		12		23							
Hertsmere Borehamwood background	34		33		19		31							
Ann mean : period mean (ratio)														
East Herts Sawbridgeworth background	0.769		0.769		1.423		0.77							
Hertsmere Borehamwood background	0.717		0.739		1.275		0.8							
Ave	**0.743**		**0.754**		**1.35**		**1.57**					**1.104**		
	AM	Ra												
	34.71	1.10												
Market Sq Sandy (24) annualised tube ave AM*Ra			**38.32**											
Hertsmere Borehamwood background		1.014		0.9		0.976								
Ave		**1.038**		**0.87**		**0.87**						**0.93**		
		AM	Ra											
		40.71	0.93											
Poynters Rd/Katherine Dr (48)				**37.86**										

The Sandy AURN automatic monitoring station data capture of NO_2 was 84% and so the 2014 NO_2 data set has been annualised.

Two long term automatic monitoring sites from Hertfordshire and Bedfordshire Monitoring Network were selected to provide data for this calculation. They were Est Herts Sawbridgeworth background and Hertsmere Borehamwood background.

2014 Ug/m3 NO2 data						data capture%									
	Ann ave														
East Herts Sawbrigeworth background	17					99									
Hertsmere Borehamwood background	11					100									
Period Mean	1/1/14 -28/5/14		12/06/14 -25/6/14		3/7/14 - 24/7/14		1/8/14 - 28/9/14		1/10/14 - 29-10-14		8/11/14 - 15/11/14		1/12/14 - 31/12/14		
East Herts Sawbrigeworth background	19		8		9.5		13		21		23		23		
Hertsmere Borehamwood background	27		13		13		15		25		36		25		
Ann mean : period mean (ratio)															
East Herts Sawbrigeworth background	0.894737		2.23684211		1.789474		1.307692		0.809524		0.73913		0.73913		
Hertsmere Borehamwood background	0.411985		0.84615385		0.846154		0.733333		0.68		0.305556		0.44		
Ave	**0.653361**		**1.54149798**		**1.317814**		**1.020513**		**0.744762**		**0.522343**		**0.589565**		**0.912837**
	AM	Ra													
	30.61	0.91													
Sandy annualised NO2 ave AM*Ra			**27.94**												

Finally the Sandy AURN automatic monitoring station data capture was below 75% and so the 2014 PM_{10} data set has also been annualised.

Two long term automatic monitoring sites from the Hertfordshire and Bedfordshire Monitoring Network were selected to provide data for this calculation. They were Hertsmere Borehamwood background and Watford Town Hall.

2014 Ug/m3 PM10 data (grav equivalent)						data capture%	
	Ann ave						
Hertsmere Borehamwood background	15					94	
Watford Town Hall	20					92	
Period Mean	5/1/14 - 4/3/14		1/4/14 - 28/5/14		27/12/14 - 31/12/14		
Hertsmere Borehamwood background	12		16		18		
Watford Town Hall	16		23		26		
Ann mean : period mean (ratio)							
Hertsmere Borehamwood background	1.25		0.9375		0.833333		
Watford Town Hall	1.25		0.869565		0.769231		
Ave	**1.25**		**0.903533**		**0.801282**		**1.076766**
	AM	Ra					
	16	1.08					
Sandy annualised PM10 ave AM*Ra			**17.21**				

QA/QC of Automatic Monitoring

The Sandy site became an affiliated site in the AURN National Network in January 2009, which resulted in an FDMS upgrade to the PM_{10} TEOM and also the installation of a $PM_{2.5}$ FDMS TEOM.

NO_2 is measured using an API chemiluminescent NO_x analyser which is housed in an air conditioned cabin. Data is collected remotely using a GSM modem link. The analyser is serviced every six months by We Care 4 Air and is visited every two weeks by a council officer who calibrates it using bottled gas of a known concentration and the results are logged. Since the affiliation of the Sandy site with Defra's national network, an audit is to be undertaken every 6 months.

The data from the AQMS site at Sandy roadside is ratified by ERG to the AURN standard and QA/QC visits are carried out by AEA Ricardo on a regular basis.

QA/QC of Diffusion Tube Monitoring

The latest diffusion tube precision studies for Gradko 20% TEA in water methodology show good precision in all 21 tests carried out during 2014. This information was obtained from http://laqm.defra.gov.uk/diffusion-tubes/precision.html

The lastest WASP results can be seen below. Gradko's results scored 100% satisfactory.

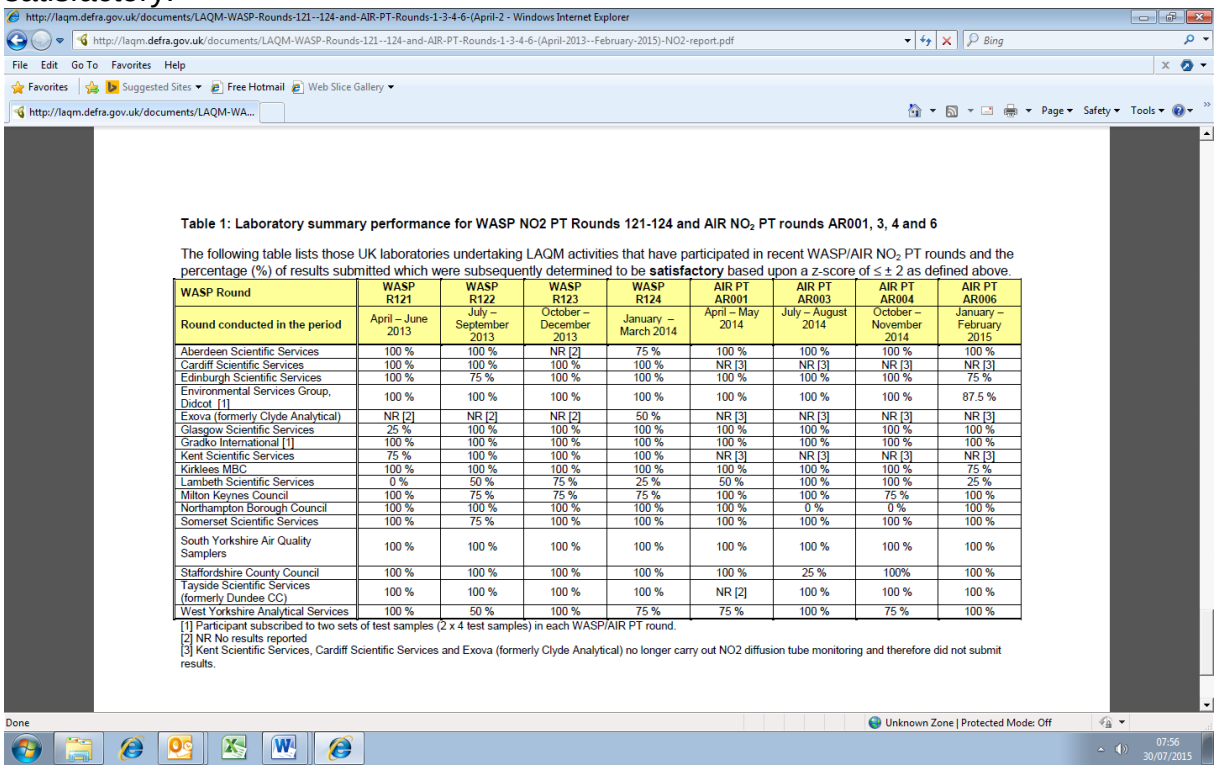


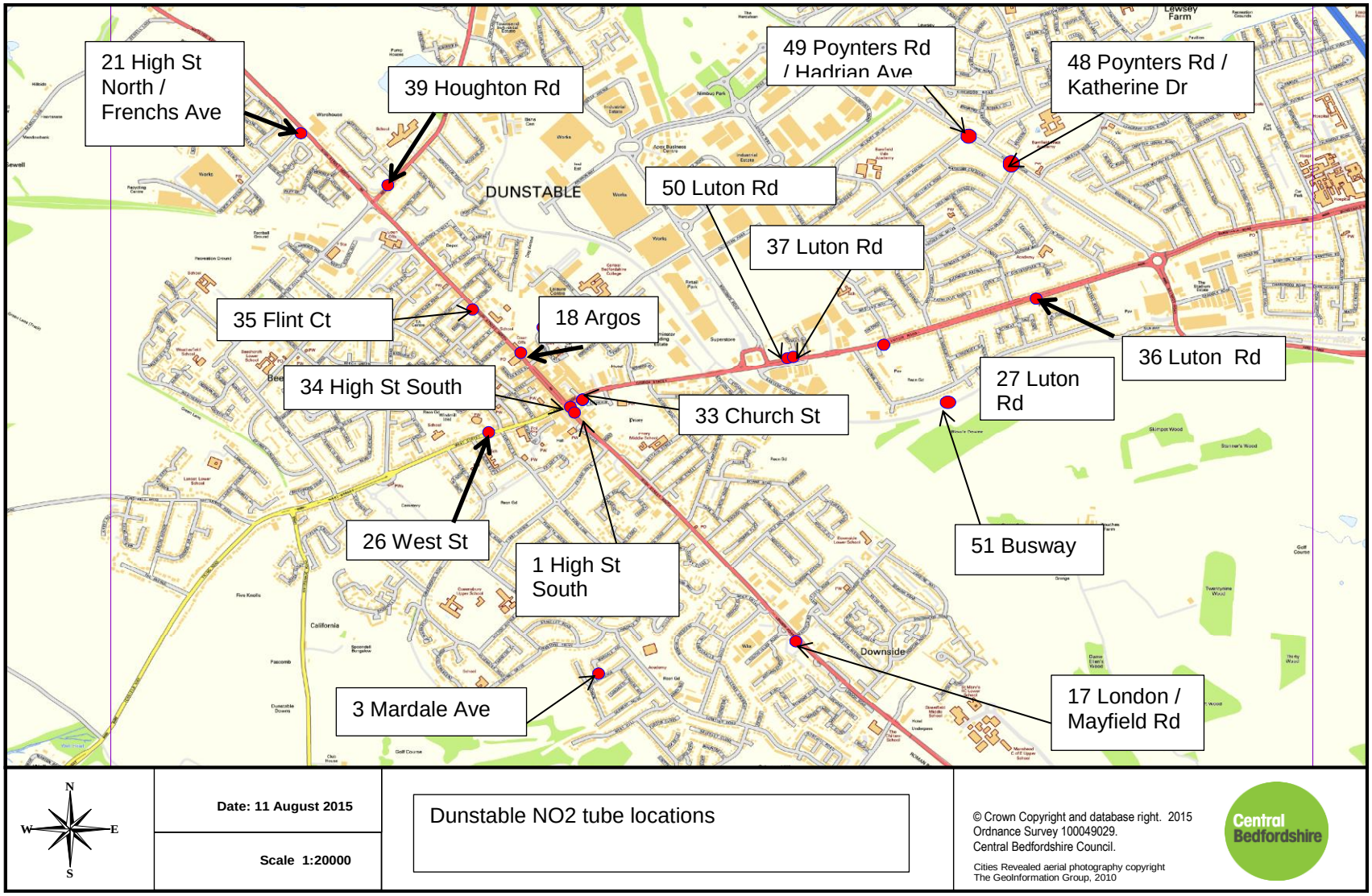
Table 1: Laboratory summary performance for WASP NO2 PT Rounds 121-124 and AIR NO_2 PT rounds AR001, 3, 4 and 6

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent WASP/AIR NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

WASP Round	WASP R121	WASP R122	WASP R123	WASP R124	AIR PT AR001	AIR PT AR003	AIR PT AR004	AIR PT AR006
Round conducted in the period	April – June 2013	July – September 2013	October – December 2013	January – March 2014	April – May 2014	July – August 2014	October – November 2014	January – February 2015
Aberdeen Scientific Services	100 %	100 %	NR [2]	75 %	100 %	100 %	100 %	100 %
Cardiff Scientific Services	100 %	100 %	100 %	100 %	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	75 %	100 %	100 %	100 %	100 %	100 %	75 %
Environmental Services Group, Didcot [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	87.5 %
Exova (formerly Clyde Analytical)	NR [2]	NR [2]	NR [2]	50 %	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	25 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Gradko International [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	75 %	100 %	100 %	100 %	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Lambeth Scientific Services	0 %	50 %	75 %	25 %	50 %	100 %	100 %	25 %
Milton Keynes Council	100 %	75 %	75 %	75 %	100 %	100 %	75 %	100 %
Northampton Borough Council	100 %	100 %	100 %	100 %	100 %	0 %	0 %	100 %
Somerset Scientific Services	100 %	75 %	100 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	100 %	100 %	100 %	25 %	100%	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	100 %	100 %	100 %	NR [2]	100 %	100 %	100 %
West Yorkshire Analytical Services	100 %	50 %	100 %	75 %	75 %	100 %	75 %	100 %

[1] Participant subscribed to two sets of test samples (2 x 4 test samples) in each WASP/AIR PT round.
[2] NR No results reported
[3] Kent Scientific Services, Cardiff Scientific Services and Exova (formerly Clyde Analytical) no longer carry out NO2 diffusion tube monitoring and therefore did not submit results.

Appendix B: Non-automatic (NO2 diffusion tube) sites – location plans


21 High St North / Frenchs Ave
39 Houghton Rd
49 Poynters Rd / Hadrian Ave
48 Poynters Rd / Katherine Dr
DUNSTABLE
50 Luton Rd
37 Luton Rd
35 Flint Ct
18 Argos
36 Luton Rd
27 Luton Rd
34 High St South
33 Church St
26 West St
1 High St South
51 Busway
3 Mardale Ave
17 London / Mayfield Rd
N
W
E
S
Date: 11 August 2015
Scale 1:20000
Dunstable NO2 tube locations
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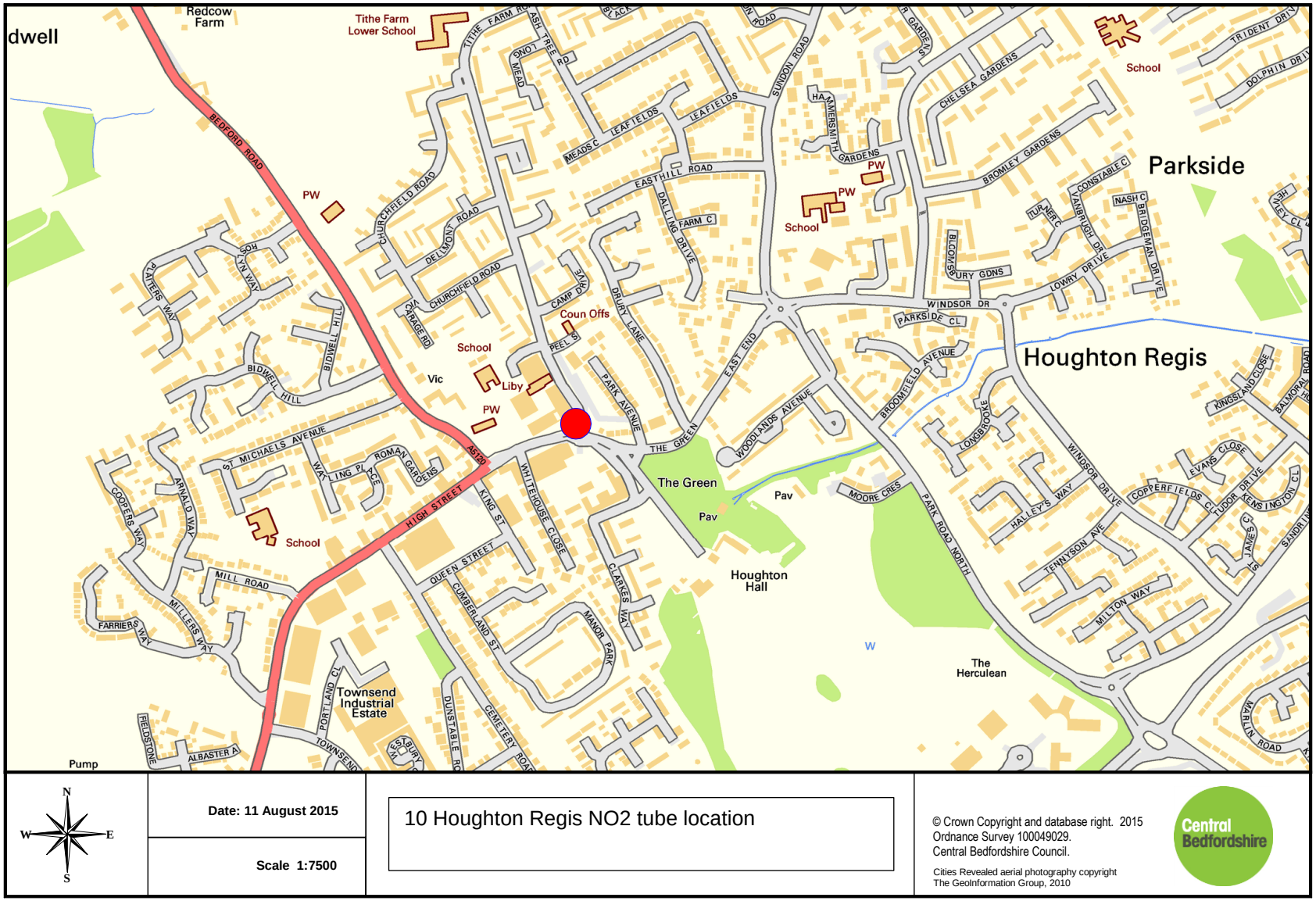
Ordnance Survey 100049029.
Central Bedfordshire Council.
Cities Revealed aerial photography copyright
The GeoInformation Group, 2010
Central Bedfordshire



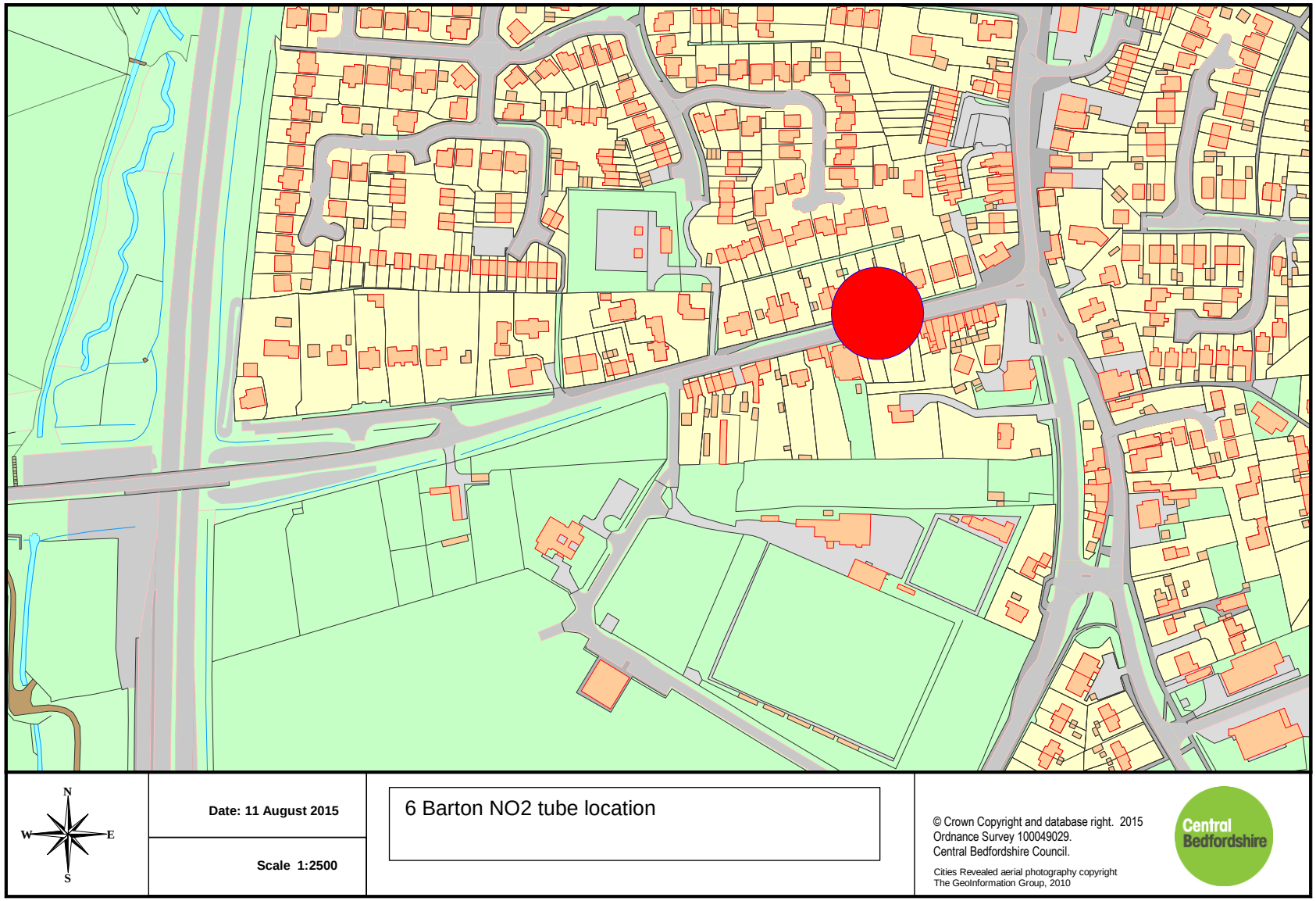
N
W E
S

Date: 11 August 2015

Scale 1:7500

10 Houghton Regis NO2 tube location

Central Bedfordshire


N
W
E
S
Date: 11 August 2015
Scale 1:2500
6 Barton NO2 tube location
© Crown Copyright and database right. 2015
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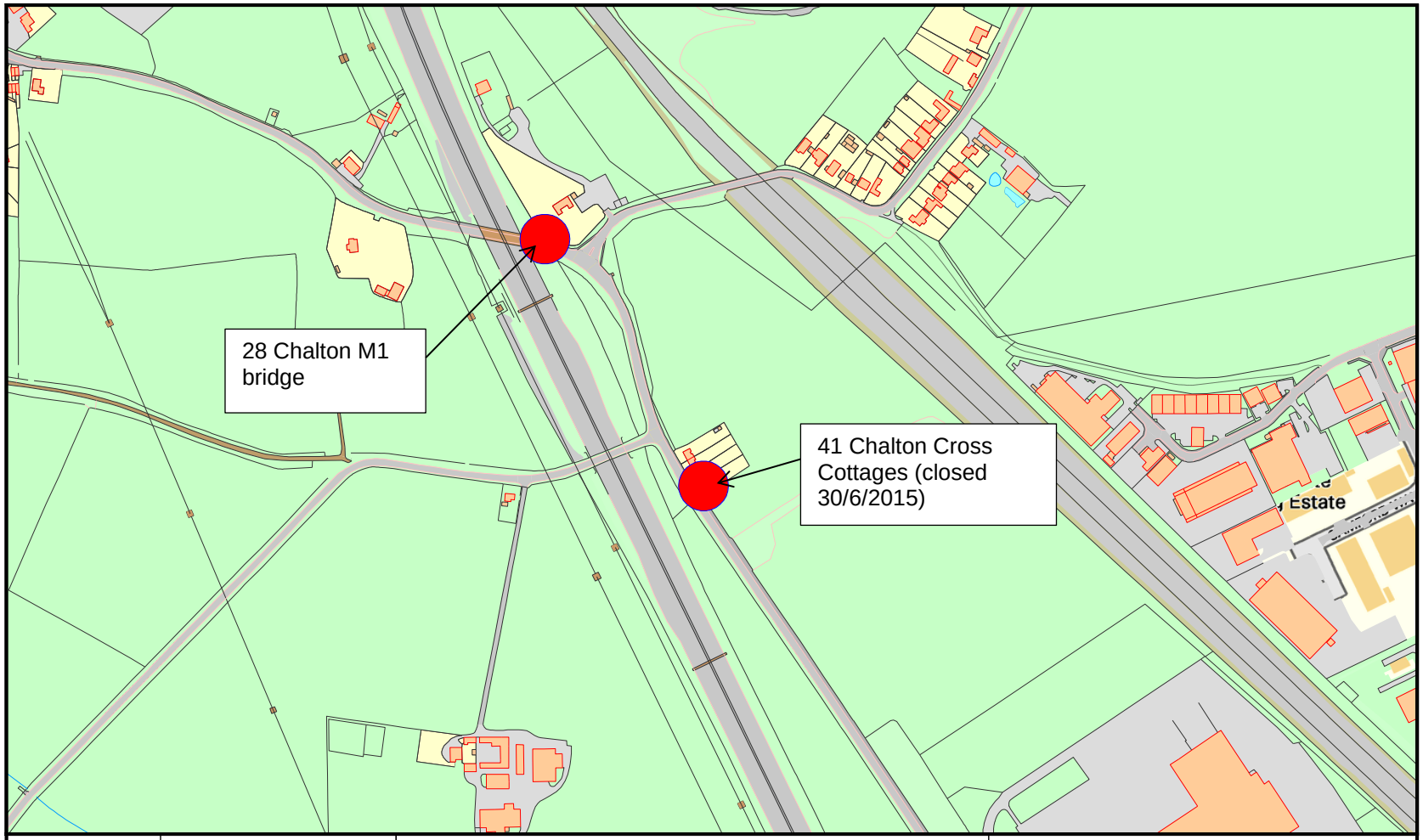
Central Bedfordshire Council.
Cities Revealed aerial photography copyright
The GeoInformation Group, 2010
Central Bedfordshire


28 Chalton M1 bridge
41 Chalton Cross Cottages (closed 30/6/2015)
Estate
N
W
E
S
Date: 11 August 2015
Scale 1:5000
Chalton NO2 tube locations
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Central Bedfordshire Council.
Cities Revealed aerial photography copyright
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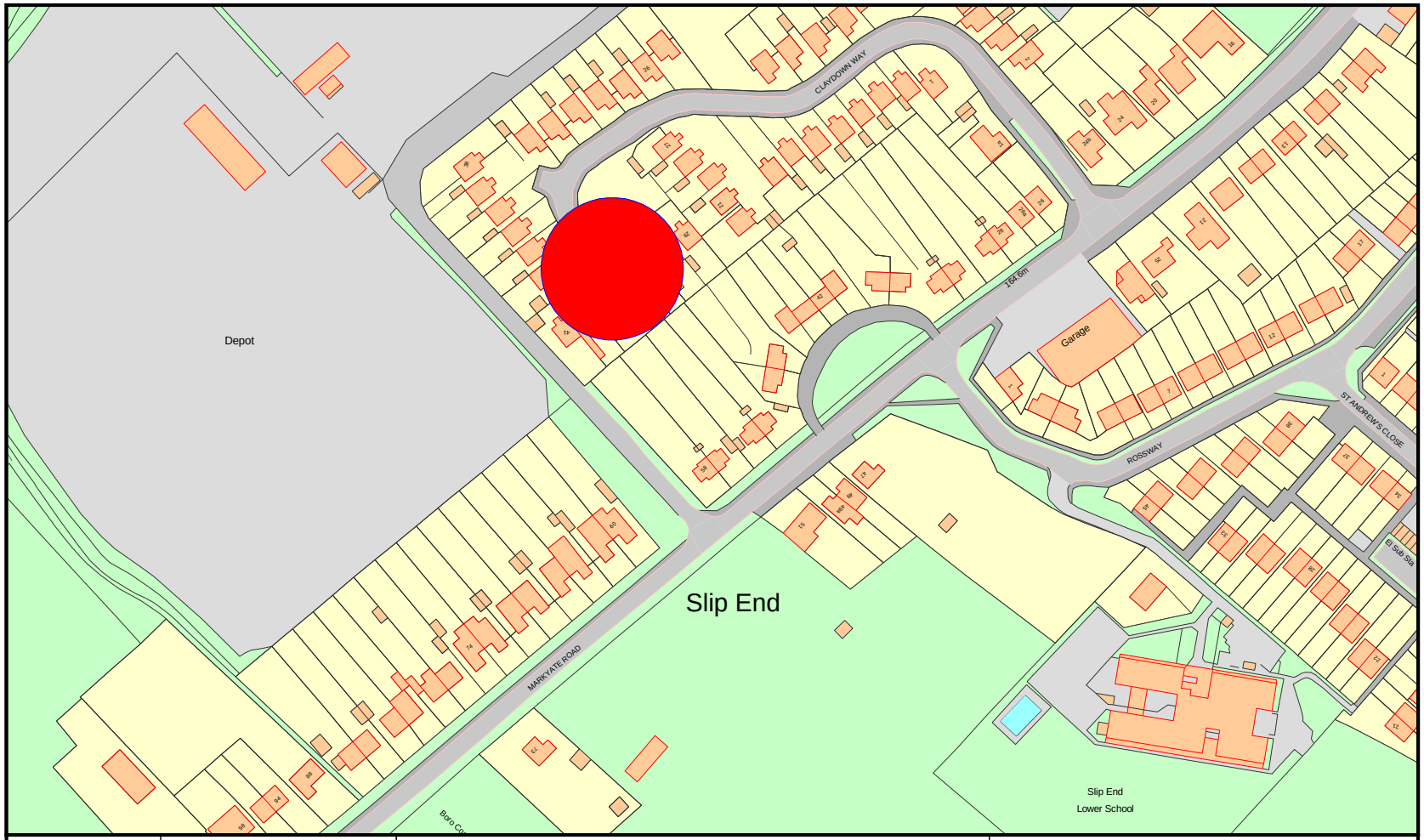
Central Bedfordshire


Depot
CLAYDOWN WAY
164.6m
Garage
ST ANDREWS CLOSE
ROSSWAY
Slip End
MARKYATE ROAD
Slip End
Lower School
N
W
E
S
Date: 11 August 2015
Scale 1:1750
7 Slip End NO2 diffusion tube site
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Cities Revealed aerial photography copyright
The GeoInformation Group, 2010
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Sallowspring Wood
Chute Farm
Whipsnade Park Homes
Bison Hill
N
W
E
S
Date: 11 August 2015
Scale 1:5000
14 Whipsnade NO2 diffusion tube site
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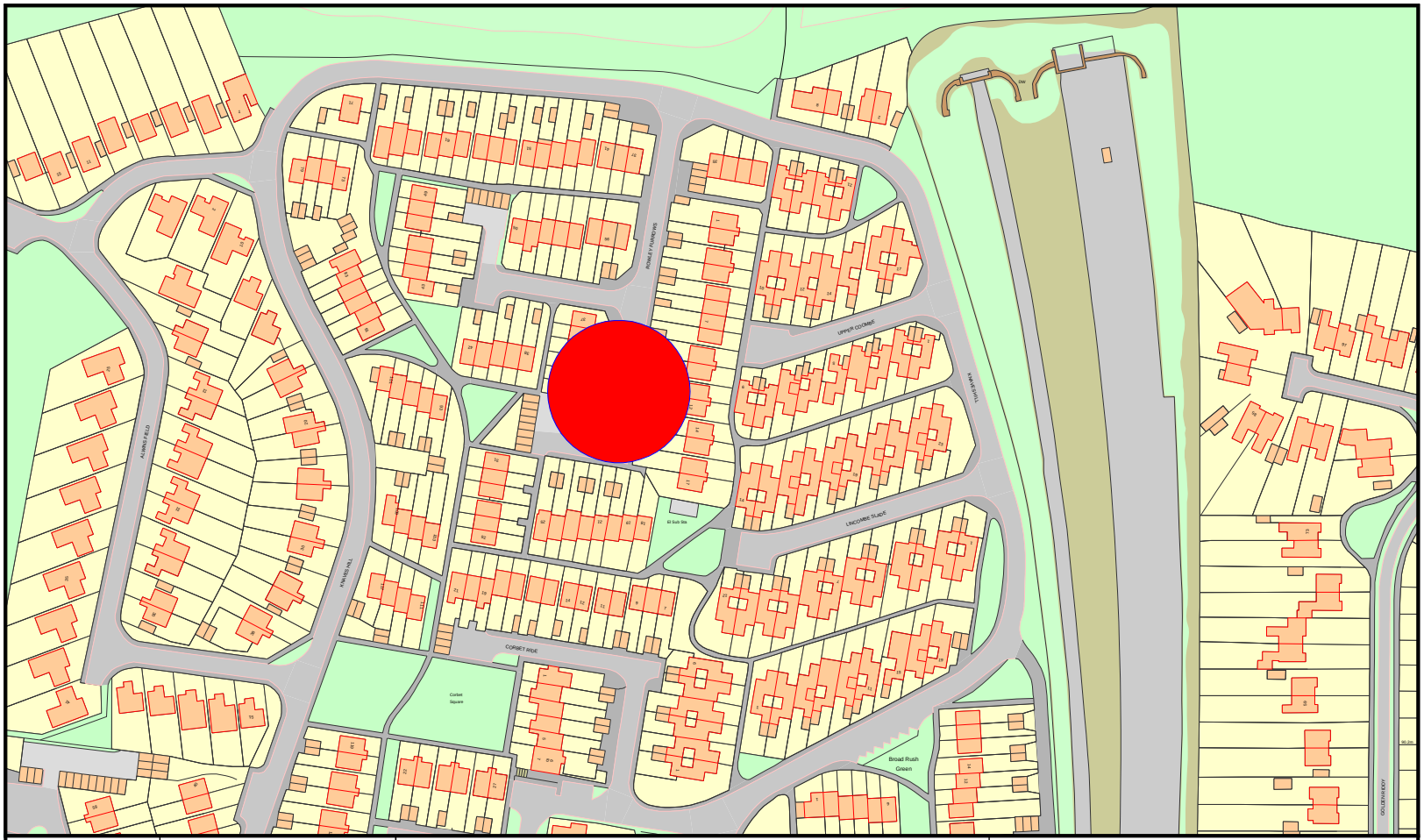
Central Bedfordshire


N
W
E
S
Date: 11 August 2015
Scale 1:1750
5 Rowley Furrows NO2 diffusion tube location
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Central Bedfordshire Council.
Cities Revealed aerial photography copyright
The GeoInformation Group, 2010
Central Bedfordshire


LAMMAS WALK
Rush Court
Presby
Church of the Sacred Heart
Wrestlell Path
Church Hall
Peel Court
Police Station
Court House
Hockliffe House
93.9m
93.3m
94.9m
94.2m
LB
TCB
WHITE HOUSE COURT
The White House
Lammas House
94.5m
Oakleaf House 1 to 15
HOCKLIFFE STREET
95.2m
The Barn
Lavells House
Surgery
HARTWELL CRESCENT
94.1m
1 to 12 Sovereign
89.0m
Date: 11 August 2015
Scale 1:1250
52 Hockliffe Street NO2 diffusion tube location
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Central Bedfordshire Council.
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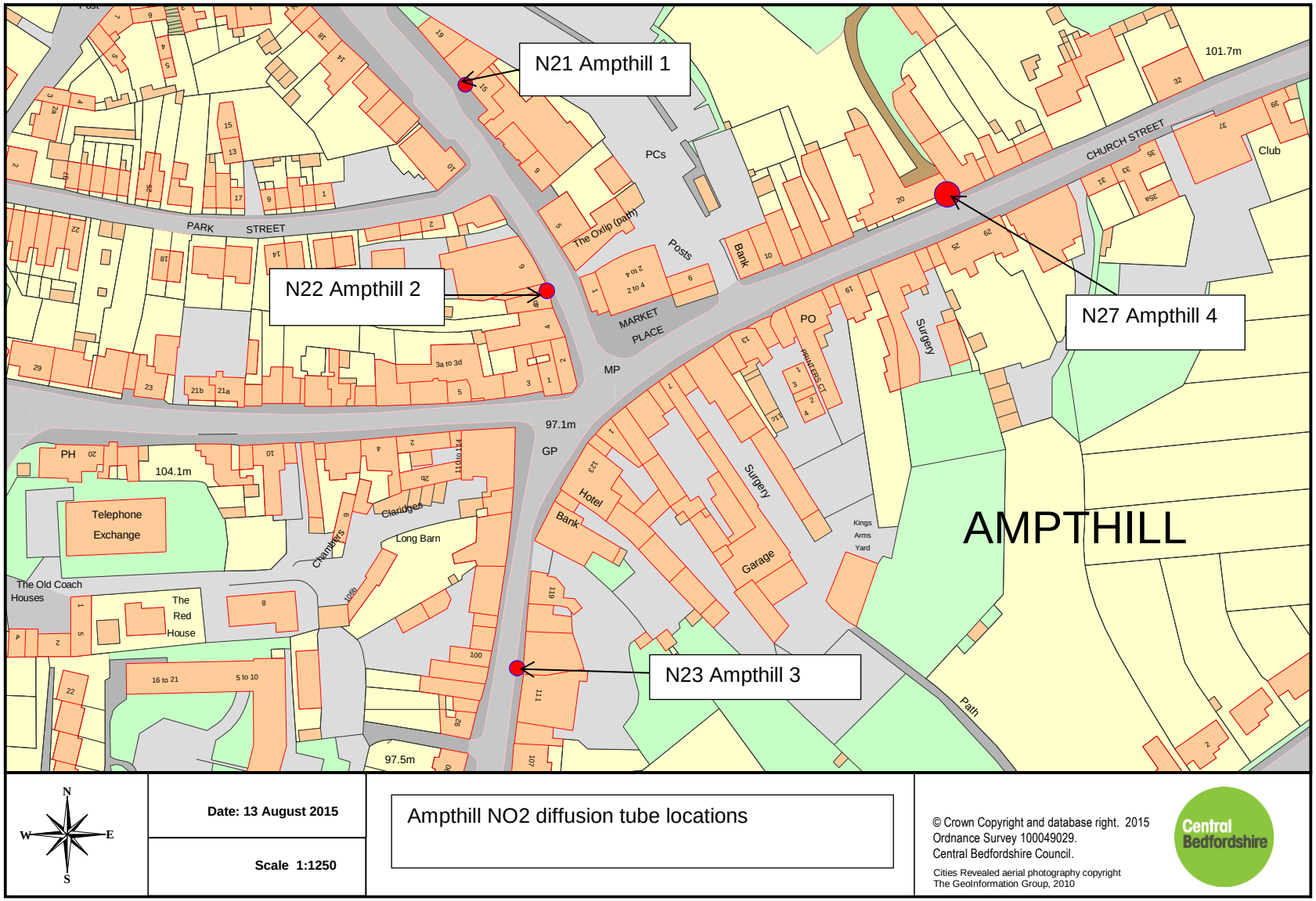
Central Bedfordshire


N21 Ampthill 1
N22 Ampthill 2
N23 Ampthill 3
N27 Ampthill 4
AMPTHILL
PARK STREET
CHURCH STREET
MARKET PLACE
The Oxlip (path)
PCs
Posts
Bank
MP
GP
PO
Surgery
Club
Hotel
Garage
Kings Arms Yard
Telephone Exchange
Claridges
Chalfhers
Long Barn
The Old Coach Houses
The Red House
PH
104.1m
97.1m
97.5m
101.7m
Path
Date: 13 August 2015
Scale 1:1250
Ampthill NO2 diffusion tube locations
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Central Bedfordshire


N2 Rose Lane
N3 High Street
CHURCH STREET
HIGH STREET
Market Square
Bank
PH
Club
Works
Regency Lodge
The White Hart (PH)
Mon
War Meml
Market House
TCB
TCBs
Station Chambers
Hall
Cambertey House
Victoria Court
Cavendish Court
SAND LANE
VICTORIA PLACE
BACK STREET
The Malting
The Old School
El Sub Sta
Posts
LB
A 6001
30.0m
30.1m
30.8m
32.6m
Date: 13 August 2015
Scale 1:1250
Biggleswade NO2 diffusion tube locations
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N4 Beeston
Beeston
Builder's Yard
Whitestones
Georgette
WEST VIEW
THE CRESCENT
THE VIEW
LB
24.1m
24.6m
El Sub Sta
24.4m
HIGH ROAD
EAST SIDE
ORCHARD ROAD
Threeway
Elm Farm
Beeston Green
Sinks
Issues
Nursery
A 1
N
S
E
W
Date: 13 August 2015
Scale 1:2000
Beeston NO2 diffusion tube location
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Cities Revealed aerial photography copyright
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Central Bedfordshire


N1 A1 Sandy
N19 Mc Murdo Ct
N6 Bedford Rd
N16 Bedford Rd 1
N18 Eddie's Cottage
N17 Bedford Rd 2
Girtford Bridge House
MCMURDO COURT
Church Path
CHURCH PATH
LABURNUM RD
B 1042
A 603
Filling Station
22.6m
23.8m
23.0m
Harvey Court
Allison House
Posts
N
S
E
W
Date: 13 August 2015
Scale 1:1250
Sandy NO2 diffusion tube locations for sites N1, N6, N16, N17, N18 & N19
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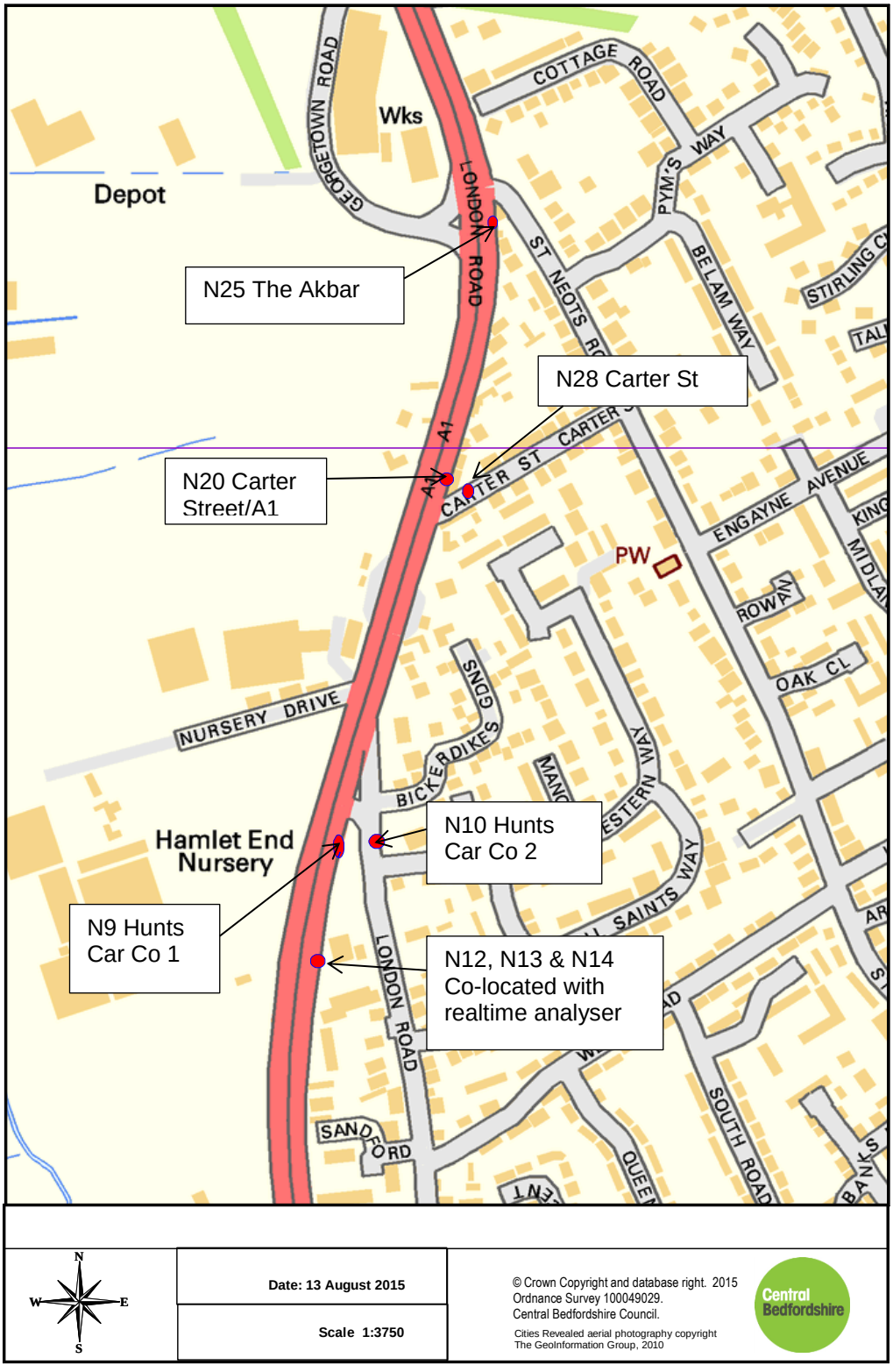
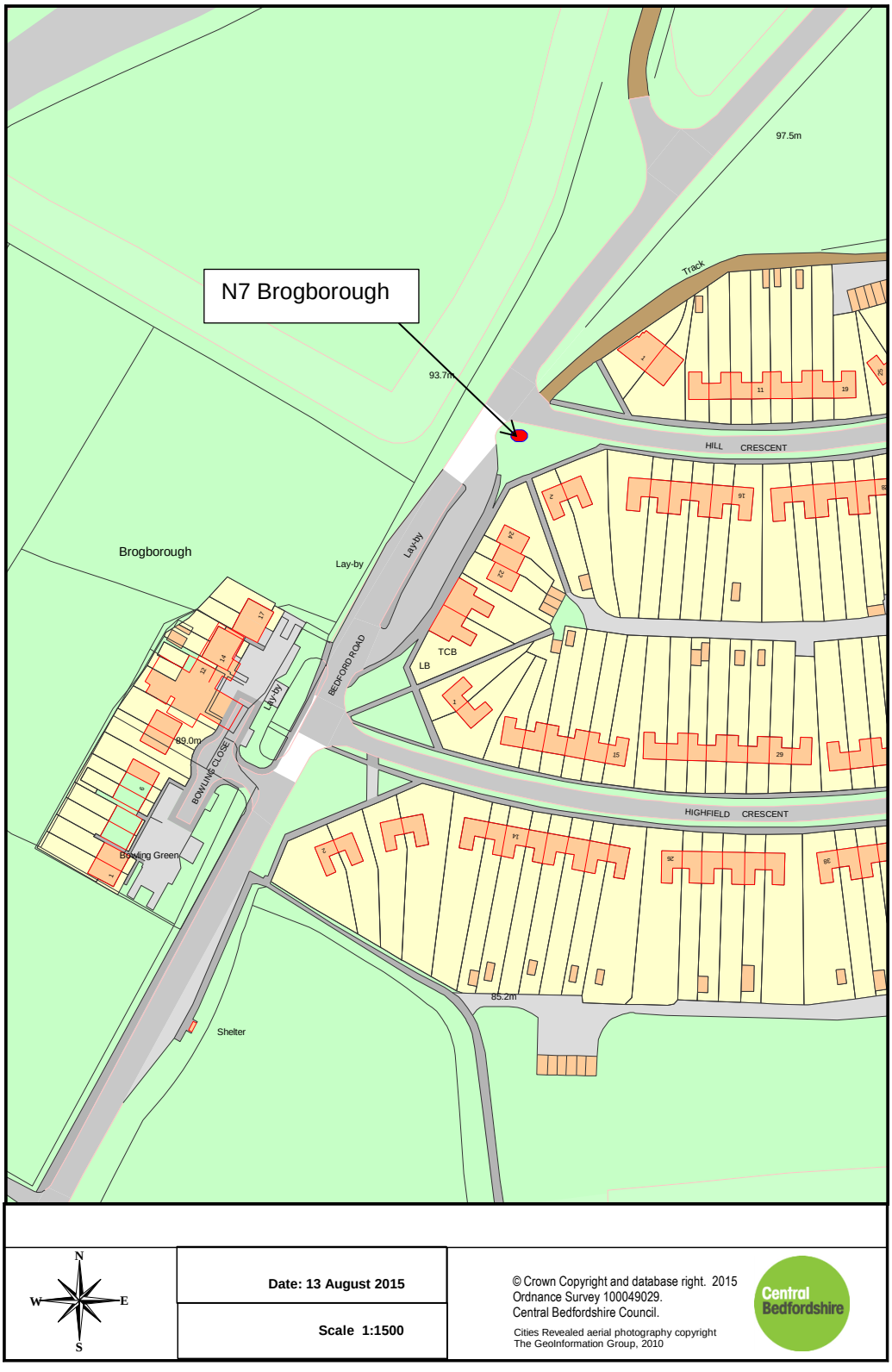


Sandy NO2 diffusion tube locations for sites N9, N10, N12, N13, N14, N20, N25 & N28



Brogborough N02 diffusion tube location (site now closed)

Appendix C – Monthly NO2 data sets for 2014

		2014 (ug/m3)														national	Local bias
		JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	AVE	Annualised	0.91	0.86
1	High St South	42.43	34.18		59.77	28.22	56.62	*				58.12	37.73	45.30	42.58	38.75	36.62
3	Mardale	18.31	15.96	19.84	15.62	14.55	10.26	10.65	11.43	13.66	12.19	26.19	15.79	15.94		14.50	13.70
5	Rowley	20.89	17.28	17.99	14.22	12.26	10.04	9.78		11.69	14.37	25.61	17.53	16.10		14.65	13.84
6	Sharpenhoe Road Barton	35.58	24.51	31.99	28.63	25.03	15.02	23.90	22.65	30.10	26.31			26.37	22.44	20.42	19.30
7	Claydown	24.32	18.50	25.00	20.00	17.85	14.81	14.21	14.34	19.68	17.43	24.89	17.68	19.47		17.72	16.74
10	Houghton	48.60	37.14	49.16			33.24	38.82	32.97			37.45	34.12	39.79	42.97	39.10	36.95
13	Tebworth	17.96	14.71	17.82	14.15	11.02	7.97	7.91			6.96	15.60		12.68	21.27	19.36	18.29
14	Sallowspring	17.95	10.32	16.92	11.94	10.66	7.55	8.49	8.36	11.76	11.58	25.03	11.35	13.18		11.99	11.33
17	London/Mayfield Rd	39.38	32.48	41.99	34.87	20.53	37.46	38.34	31.68	44.64	34.07	44.09	31.81	35.50		32.31	30.53
18	Argos (High St North)	47.38	41.48		53.36		48.76	52.33	46.86	56.34			34.42	46.29	60.64	55.18	52.15
20	Asda (Court Drive)	39.65	28.04														
21	High St North/Frenchs Ave	37.09	32.64	38.05	28.74	30.37	31.44					45.79	29.76	34.24	29.79	27.11	25.62
26	West St, Dunstable	28.61	30.63		32.83	29.77	29.94						34.93	31.12	30.19	27.47	25.96
27	Luton Rd o/s 89, D'ble	36.60	31.28	49.37	45.35	34.41	40.23	39.81	34.74		31.64		33.35	38.00	35.34	32.16	30.39
28	Luton Rd, Chalton	63.92	66.10	59.45	46.32	27.19	44.86	58.87	48.26	58.77	64.74	57.06	45.36	53.39		48.58	45.91
33	16 Church Street, Dunstable	45.61	40.47	47.40	41.70	44.14	42.56	43.19	43.24	47.21	36.90	45.05	41.93	42.90		39.03	36.89
34	5 High St South	41.06	43.09	45.32	55.98		65.89		55.23			62.27		52.27	53.84	48.99	46.30
35	6 Flint Court, High St North	40.45	35.84		32.01	35.21	34.91	34.43	31.35	40.04	35.78	45.84	37.35	36.87	36.5	33.22	31.39
36	247 Luton Road, Dunstable			73.76	41.58		36.57	39.01	38.14	57.50	29.10	55.83	45.55	45.91	50.5	45.96	43.43
37	32 Luton Road, Dunstable	44.87	34.06	54.19	45.78	50.63	51.14	57.00	46.11	63.19	38.81		45.10	46.84	44.97	40.92	38.67
39	15 Houghton Road	44.33	38.73	42.45	30.46	39.05	38.91	41.65	41.65	44.46		45.60	36.58	39.75	36.17	32.91	31.11
41	1 Chalton Cross Cottages	49.80	47.93	50.85	42.43	45.46	45.30	45.88	43.64	49.83		44.04		46.46	40.88	37.20	35.16
48	185 Poynters Road (Katherine Drive)	49.43	37.77	47.84	37.33	41.82	40.39	38.48	32.10	44.71	34.84		38.47	40.71	37.86	34.45	32.56
49	Poynters Road - o/s 241 (Hadrian Ave)	43.31	37.60	46.30	38.78	37.24	40.42	30.90	36.69	47.52	37.30	56.31	33.55	40.17		36.56	34.55
50	Luton Road D'ble (o/s 24)	49.90		48.76	51.67	44.07	45.81	48.26		63.08	44.49		43.65	47.08	53.2	48.41	45.75
51	Busway, r/o 62 Jeans Way, Dunstable							13.28	13.6	19.94	16.04	32.32	21.2	20.72	27.35	24.89	23.52

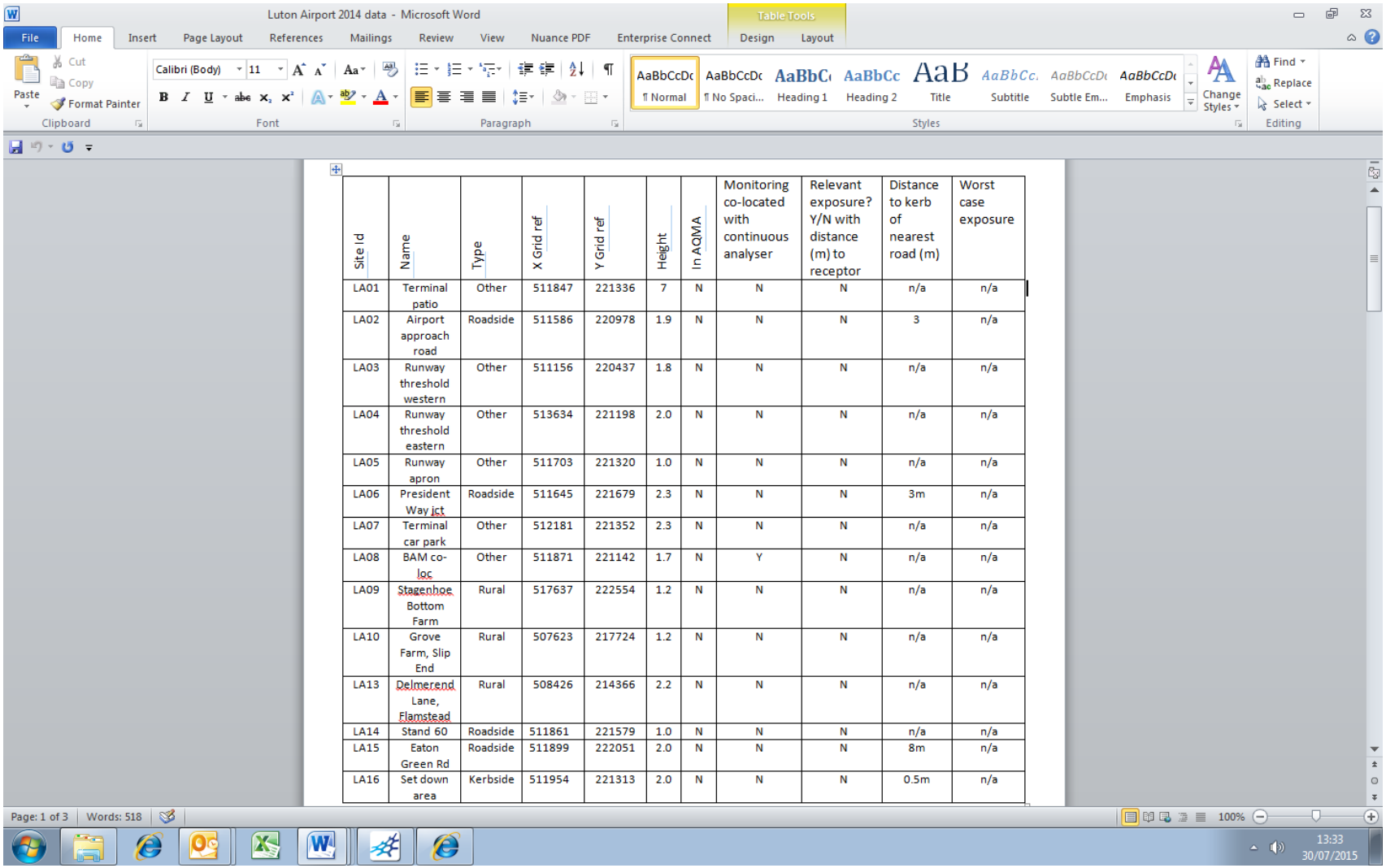
Site 20 (Asda) closed as tube frequently missing and levels below obj levels

tubes not changed in accordance with calendar dates

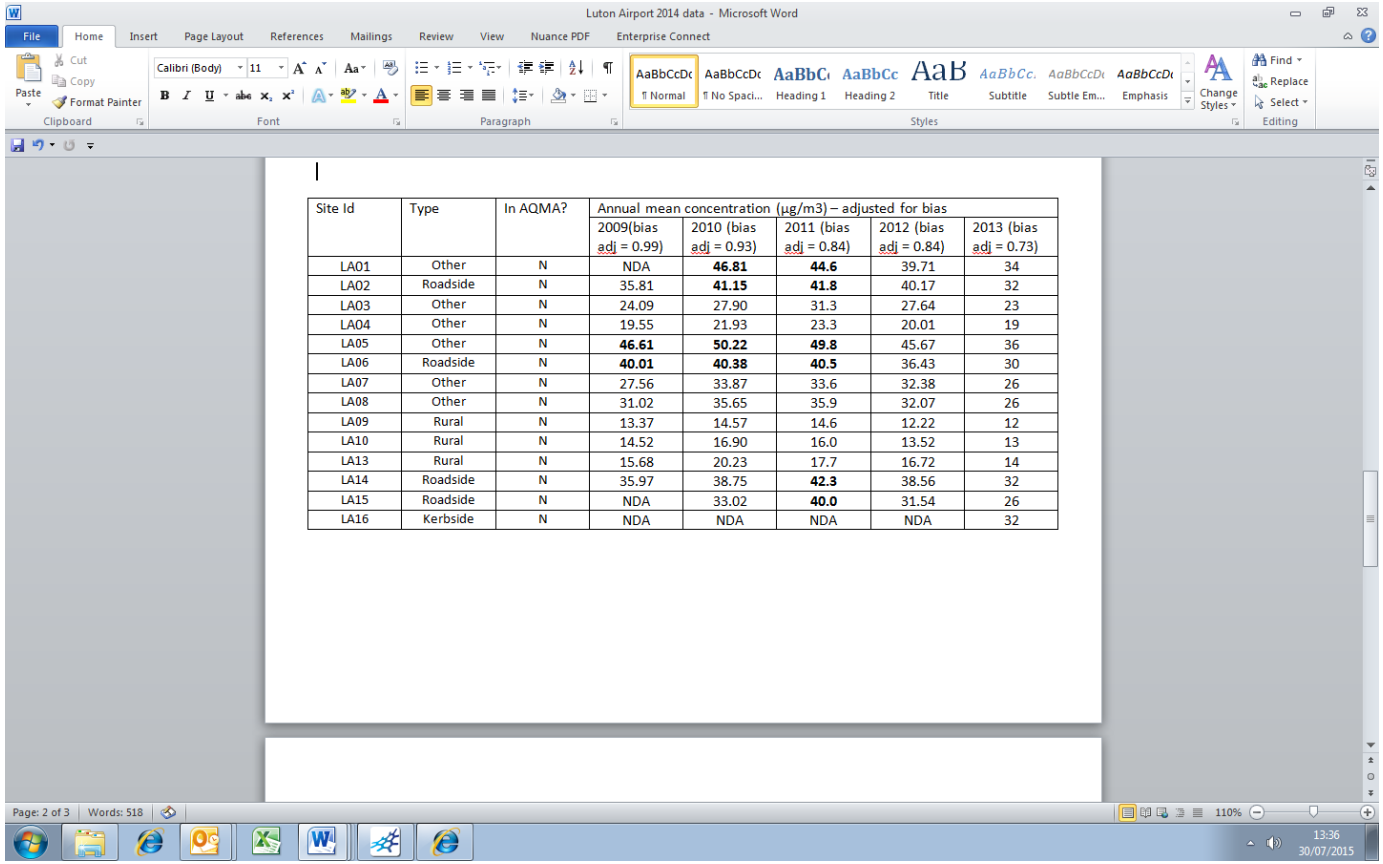
Site Name		Site ref	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Annualisa	bias 0.91	local bias 0.86
A1	Sandy	1	52.58	45.52	45.04	48.81	40.02	32.44	42.6	35.92	35.26	41.93	55.33	49.81	45.41		41.32	39.05
Rose Lane	Biggleswade	2	33.64	34.01	30.71	28.7	23.4	21.63	22.65	26.28	21.94	30.42	40.34	34.65	30.02		27.31	25.81
High St	Biggleswade	3	37.13	35.82	43.15	45.53	38.72	35.9	34.44	41.01	35.66	31.16	42.86	39.68	38.44		34.98	33.06
A1	Beeston	4	40.28	31.19	39.47	44.94	37.74	34.11	39.57	42.94	37.05	35.43	46.75	40.31	38.98		35.47	33.52
Bedford Road	Sandy	6	43.17	43.88	38.96	38.67	28.25	29.09	33.82	38.41	31.59	42.8	45.98	44.13	38.88		35.38	33.43
Highfield Crescent	Brogborough	7	32.79	29.11	31.13	31.81	25.06	22.98	26.96	27.09	27.89	24.91	33.12	29.52	28.74		26.15	24.72
A1	Sandy	20	80.77	85.63	76.25	85.64	81.26	75.38	71.26	82.45	75.84	62.92	124.68	71.06	**81.49**		74.15	**70.08**
A1	Hunts Car Company	9	45.96	43.93	39.91	48.73	35.03	35.26	37.38	40.64	35.88	41.38	60.18	45.82	43.36		39.46	37.29
A1	Hunts Car Company 2	10	34.45	30.58	29.46	24.08	22.68	20.41	21.91	25.23	19.38	26.13	29.73	30.79	27.02		24.59	23.24
Market Square	Sandy	24	35.18		37.46		32.74	30.1			30.42	29.36	43.42		34.71	38.32	34.87	32.96
NOx Box 1	Sandy	12	38.97	41.73	32.65	35.81	29.21	28.51	29.32	39.9	27.07	31.21	37.97	39.76	34.51		31.41	29.68
NOx Box 2	Sandy	13	40.69	39.35	36.93	31.2	31.89	31.58	32.43	39.47	26.51	39.3	33.85	44.5	36.17		32.92	31.11
NOx Box 3	Sandy	14	41.02	39.25	36.75	34.94	35.48	28.65	31.05	35.17	25.4	38.57	43.72	36.48	36.59		33.30	31.47
Rural Background	Battlesden	15	18.85	16.21	17.69	11.49	9.08	7.52	9.37	11.36	10.94	11.32	26.65	15.59	14.38		13.08	12.36
Bedford Road South 1	SAndy	16	50.72	42.29	40.95	40.46	34.45	29.84	36.41	44.42	32.68	39.73	38.98	46.43	40.03		36.42	34.42
Bedford Road South 2	Sandy	17	53.16	57.9	45.28	54.02	46.19	39.57	46.37	57.51	39.9	39.83	49.1	58.24	48.97		44.56	42.11
Eddies Cottage	Sandy	18	36.94	37.13	35.19	35.46		12.56	31.91	34.18	25.52	33.04	34.78	38.92	32.88		29.92	28.28
McMurdo	Sandy	19	27.63	39.25	32.05	29.25	25.01	24.3	22.57	31.54	21.93	35.01	36.61	29.78	30.15		27.43	25.93
Ampthill 1		21	35.27	29.06	33.17		29.76	26.04	26.09		29.11	23.36	36.65	27.29	29.63		26.97	25.48
Ampthill 2		22	49.14	55.19	46.57	43.7	42.57	37.37	41.26	45.55		47.58	55.71	45.25	46.43		42.25	39.93
Ampthill 3		23	50.42	56.34	51.7	52.27	55.88	44.2	47.62		47.36	45.9	70.94	49.01	52.43		47.71	45.09

Tubes not changed in accordance with schedule

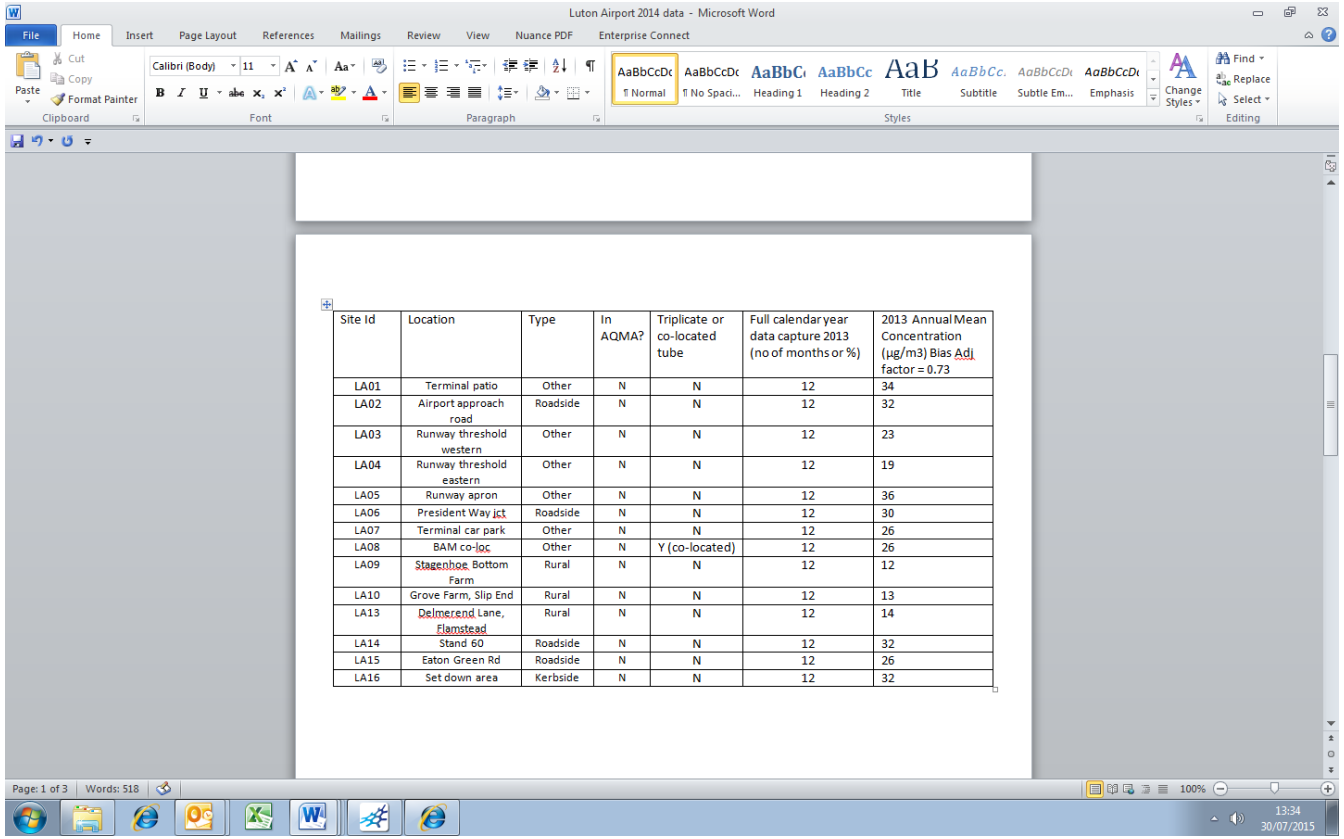
Appendix D – Luton Airport NO_2 diffusion tube data sets



Site Id	Name	Type	X Grid ref	Y Grid ref	Height	In AQMA	Monitoring co-located with continuous analyser	Relevant exposure? Y/N with distance (m) to receptor	Distance to kerb of nearest road (m)	Worst case exposure
LA01	Terminal patio	Other	511847	221336	7	N	N	N	n/a	n/a
LA02	Airport approach road	Roadside	511586	220978	1.9	N	N	N	3	n/a
LA03	Runway threshold western	Other	511156	220437	1.8	N	N	N	n/a	n/a
LA04	Runway threshold eastern	Other	513634	221198	2.0	N	N	N	n/a	n/a
LA05	Runway apron	Other	511703	221320	1.0	N	N	N	n/a	n/a
LA06	President Way jct	Roadside	511645	221679	2.3	N	N	N	3m	n/a
LA07	Terminal car park	Other	512181	221352	2.3	N	N	N	n/a	n/a
LA08	BAM co-loc	Other	511871	221142	1.7	N	Y	N	n/a	n/a
LA09	Stagenhoe Bottom Farm	Rural	517637	222554	1.2	N	N	N	n/a	n/a
LA10	Grove Farm, Slip End	Rural	507623	217724	1.2	N	N	N	n/a	n/a
LA13	Delmerend Lane, Flamstead	Rural	508426	214366	2.2	N	N	N	n/a	n/a
LA14	Stand 60	Roadside	511861	221579	1.0	N	N	N	n/a	n/a
LA15	Eaton Green Rd	Roadside	511899	222051	2.0	N	N	N	8m	n/a
LA16	Set down area	Kerbside	511954	221313	2.0	N	N	N	0.5m	n/a



Site Id	Type	In AQMA?	Annual mean concentration (µg/m3) – adjusted for bias				
			2009(bias adj = 0.99)	2010 (bias adj = 0.93)	2011 (bias adj = 0.84)	2012 (bias adj = 0.84)	2013 (bias adj = 0.73)
LA01	Other	N	NDA	**46.81**	**44.6**	39.71	34
LA02	Roadside	N	35.81	**41.15**	**41.8**	40.17	32
LA03	Other	N	24.09	27.90	31.3	27.64	23
LA04	Other	N	19.55	21.93	23.3	20.01	19
LA05	Other	N	**46.61**	**50.22**	**49.8**	45.67	36
LA06	Roadside	N	**40.01**	**40.38**	**40.5**	36.43	30
LA07	Other	N	27.56	33.87	33.6	32.38	26
LA08	Other	N	31.02	35.65	35.9	32.07	26
LA09	Rural	N	13.37	14.57	14.6	12.22	12
LA10	Rural	N	14.52	16.90	16.0	13.52	13
LA13	Rural	N	15.68	20.23	17.7	16.72	14
LA14	Roadside	N	35.97	38.75	**42.3**	38.56	32
LA15	Roadside	N	NDA	33.02	**40.0**	31.54	26
LA16	Kerbside	N	NDA	NDA	NDA	NDA	32



Site Id	Location	Type	In AQMA?	Triplicate or co-located tube	Full calendar year data capture 2013 (no of months or %)	2013 Annual Mean Concentration (µg/m3) Bias Adj factor = 0.73
LA01	Terminal patio	Other	N	N	12	34
LA02	Airport approach road	Roadside	N	N	12	32
LA03	Runway threshold western	Other	N	N	12	23
LA04	Runway threshold eastern	Other	N	N	12	19
LA05	Runway apron	Other	N	N	12	36
LA06	President Way jct	Roadside	N	N	12	30
LA07	Terminal car park	Other	N	N	12	26
LA08	BAM co-loc	Other	N	Y (co-located)	12	26
LA09	Stagenhoe Bottom Farm	Rural	N	N	12	12
LA10	Grove Farm, Slip End	Rural	N	N	12	13
LA13	Delmerend Lane, Flamstead	Rural	N	N	12	14
LA14	Stand 60	Roadside	N	N	12	32
LA15	Eaton Green Rd	Roadside	N	N	12	26
LA16	Set down area	Kerbside	N	N	12	32