EAST CAMBRIDGESHIRE
DISTRICT COUNCIL

2016 Air Quality Annual Status Report (ASR)

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

November 2016

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Executive Summary: Air Quality in Our Area

The Environment Act, 1995 introduced the Local Air Quality Management (LAQM) regime which requires local authorities to review and assess air quality in their areas from time to time. This report forms the 2016 Annual Status Report (ASR) for East Cambridgeshire District Council and sets out the findings of a review of air quality in the district in 2015.

Air Quality in East Cambridgeshire

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

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

This ASR relates to data gathered between 1st January and 31st December 2015. East Cambridgeshire is predominantly rural in character and air quality is relatively good. Statutory objectives are currently being met and the council has not designated any areas as Air Quality Management Areas. As in most other parts of the country road traffic emissions are the principal source of poor air quality. Nitrogen dioxide (NO_2) and particulates are the main contaminants of concern and the council monitors NO_2 levels across the district. NO_2 levels declined at some locations in 2015 and increased at others. Overall, there has been a gradual downward trend in NO_2 levels across the district in recent years. There is one area of poor air quality in the district in the Station Road/Angel Drove area of Ely which is subject to high volumes of traffic.

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

This ASR has not identified the need to proceed to a Detailed Assessment for any pollutants or a change in the monitoring programme. No new significant emission sources have been identified which could lead to poor air quality in the district. The council will continue to operate the current nitrogen dioxide monitoring programme to ensure that air quality objectives continue to be met. The council will compile and submit a further ASR in 2017.

Actions to Improve Air Quality

Although air quality in East Cambridgeshire is relatively good, the council will support any actions to improve air quality. The council is working with Cambridgeshire County Council (CCC) to bring about improvements in transport infrastructure and work will begin shortly on construction of the A142 Ely Southern Bypass. This will remove the traffic which is the source of poor air quality in Station Road and Angel Drove. The two councils are working together to produce a Transport Strategy for East Cambridgeshire with a view to improving transport links in the district and reducing negative impacts on air quality.

Local Priorities and Challenges

The Health and Social Care Act 2012 introduced a number of reforms to health and social care provision. Local authorities now have a stronger role in shaping health improvement services in their areas. Cambridgeshire Health and Wellbeing Board has approved a number of Joint Strategic Needs Assessments (JSNA). These help determine what actions local authorities, the local NHS and others need to take to meet local health and social care needs; and also to address the wider determinants that impact on public health and wellbeing such as traffic and air quality. The Transport and Health JSNA includes a section on Air Pollution and recommends that future actions should focus on:

- Introducing low emission passenger fleets and vehicles
- Encouraging walking and cycling rather than car use
- Further assessment of shorter term measures to reduce exposure

East Cambridgeshire District Council will work towards achieving these aims.

Rapid population growth and an increase in demand for new housing in the district may lead to an in increase in road traffic which can have a negative impact on air quality. The council's main priority is to ensure that air quality improves across the district at a time of increased development pressure.

How to Get Involved

The council encourages the public to help improve air quality by trying to reduce the number of car journeys undertaken, choosing a low emission vehicle, switching off car engines when stationary; and by walking, cycling, and using public transport wherever possible.

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1 Local Air Quality Management

This report provides an overview of air quality in East Cambridgeshire during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by East Cambridgeshire District Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives. There are no AQMAs in East Cambridgeshire.

2.2 Progress and Impact of Measures to address Air Quality in East Cambridgeshire

East Cambridgeshire District Council in collaboration with Cambridgeshire County Council (CCC) has taken forward a number of measures during the current reporting year of 2015 in pursuit of improving local air quality. Details of all measures completed, in progress, or planned are set out in Table 2.1. Key completed measures are:

- Securing of central government funding and appointment of a main contractor for construction of the Ely Southern Bypass
- Production of a draft Transport Strategy for East Cambridgeshire

Progress on the construction of the Ely Southern Bypass has been slower than expected due to delays in securing government funding. The council's priorities for the coming year are to maintain and improve are quality in the district at a time of increased development pressure.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date
1	Transport and health JSNA: Air pollution	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CCC	2014	2015	N/A	N/A	ongoing	ongoing
2	Transport Strategy for East Cambridge-shire	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CCC	2015	2016	Compliance with AQ limits	N/A	Final Draft stage	2016
3	Travel 4 Cambridge-shire	Promoting Travel Alternatives	Workplace Travel Planning	CCC	2015	2015	Compliance with AQ limits	N/A	ongoing	ongoing
4	Ely A142 Southern by-pass	Transport Planning & Infrastructure	Other	CCC	September 2015	January 2017	Compliance with AQ limits	N/A	Main contractor appointed	2018

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Under the Health and Social Care Act 2012 the government introduced a Public Health Outcomes Framework (PHOF) which sets out key indicators of the state of public health and includes an indicator relating to air pollution:

- 3.01- Fraction of mortality attributable to particulate air pollution.

This was estimated as 5.3% in 2014, one percentage point below the average for the East of England.

East Cambridgeshire District Council does not carry out monitoring or take any measures to specifically address $PM_{2.5}$ concentrations. However, measures to reduce road traffic emissions generally are likely to reduce emissions of $PM_{2.5}$. These include promoting alternatives to private vehicle use (Measures 1 and 3) and working with CCC to improve transport and road infrastructure (Measures 2 and 4).

In considering applications for planning approvals for new development under Town and Country Planning East Cambridgeshire District Council requires applicants to provide Construction Environment Management Plans to minimise the production of $PM_{2.5}$ and other particulates which might arise during construction work.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

East Cambridgeshire District Council undertook automatic (continuous) monitoring at one site in the district at Station Road, Ely during 2015. Table A.1 in Appendix A shows the site details. A map showing the location of the monitoring site is provided in Appendix D. Further details on how the monitor is calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

East Cambridgeshire District Council undertook non-automatic (passive) monitoring of NO_2 using diffusion tubes at 17 sites during 2015. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for "annualisation" and bias. Annualisation had to be applied to the results for NAS9 Station Road, Haddenham due to poor data capture. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. The full 2015 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

AS1, the automatic monitoring station in Ely near the Station Road/Angel Drove roundabout, was established to gather data to support a decision on whether an AQMA should be declared. The monitor recorded an annual mean nitrogen dioxide concentration of 32.65 µg/m^3 in 2013, 32.70 µg/m^3 in 2014, and 33.30 µg/m^3 in 2015. These concentrations are within the air quality limit of 40 µg/m^3. However, as the monitor is located more than 10m from the roadside an adjustment must be applied using the procedure specified in LAQM Technical Guidance TG16. A background NO_2 value of 13.19 µg/m^3 was obtained from the DEFRA website. This results in a predicted annual mean concentration at a human receptor of 57.5 µg/m^3. This represents an exceedance of the annual mean air quality objective. However, as the monitor is more than 10m further from the kerb than the receptor this result must be treated with caution. It should also be noted that the nearby diffusion tube site NAS3,

located 64m further south in Station Road, records NO_2 levels which are well within the 40 µg/m^3 limit. AS1 did not record any exceedances of the 1-hour mean of 200 µg/m^3.

All data from the seventeen NO_2 diffusion tube monitoring sites were within the air quality hourly mean limit of 40 µg/m^3. Reductions in NO_2 concentrations were recorded at nine sites compared with the results for 2014. Eight sites recorded increases although these increases were relatively small. Site NAS17, at West End, Haddenham recorded an increase of 5.1 µg/m^3 from 20.6 µg/m^3 in 2014 to 25.7 µg/m^3 in 2015. The site was moved 150m east to a new location in The Green due to building work at the original location in late 2014. The new location is nearer to the road junction with High Street, and this is likely to account for the apparent rise in recorded NO_2 levels at this site. Overall there appears to be a general downward trend in NO_2 levels in the district over recent years (Figure B2).

The poor air quality recorded at Station Road, Ely is due to high traffic flows and queuing traffic on the A142 in Station Road and Angel Drove. This road carries approximately 15,000 vehicles per day of which 8% are HGVs. The road passes under the Ely to Kings Lynn railway line to the north of the station via an underpass which has a height restriction. Taller vehicles must use the adjacent level crossing. Increases in passenger and freight rail traffic in recent years mean that the level crossing is now closed for around 40 minutes per hour during the day. When the gates are closed heavy traffic queues back on to the main carriageway blocking access to the underpass for smaller vehicles. Construction of the new A142 Ely Southern Bypass will begin in early 2017. The road will connect the A142 at Angel Drove to Stuntney Causeway and will largely remove the source of poor air quality in the area.

3.2.2 Particulate Matter (PM_{10})

East Cambridgeshire District Council does not carry out any monitoring for PM_{10}.

3.2.3 Particulate Matter ($PM_{2.5}$)

East Cambridgeshire District Council does not carry out any monitoring for $PM_{2.5}$.

3.2.4 Sulphur Dioxide (SO_2)

East Cambridgeshire District Council does not carry out any monitoring for SO_2.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
AS1	Station Road (Auto), Ely	Roadside	554309	279638	NO_2	N	Chemiluminescent	15	15	2.25

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
NAS1	38 Market St, Ely	Roadside	554154	280427	NO_2	N	1	1.5	N	2.25
NAS2	Abbot Thurston Av, Ely	Urban Background	554616	281320	NO_2	N	4.5	1.5	N	2.25
NAS3	Station Rd, Ely	Roadside	554322	279566	NO_2	N	15	3.5	N	3.25
NAS4	Fieldside, Ely	Urban Background	553385	280309	NO_2	N	7	3	N	2.25
NAS5	Main St, Littleport	Roadside	556845	286801	NO_2	N	2.5	2	N	2.25
NAS6	High St, Soham	Roadside	559418	273098	NO_2	N	1.5	1.5	N	2.25
NAS7	Market St, Fordham	Roadside	562682	270294	NO_2	N	1.5	1.5	N	2.25
NAS8	Sheriffs Court, B'Green	Urban Background	563721	255387	NO_2	N	2	1.5	N	2.25
NAS9	Station Road, Haddenham	Roadside	546419	275628	NO_2	N	13	1	N	2.25
NAS10	Tramar Drive, Sutton	Urban Background	545012	279286	NO_2	N	8	2	N	2.25

Appendix 1 **East Cambridgeshire District Council**

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
NAS11	Nutholt Lane, Ely	Roadside	554255	280536	NO_2	N	2.5	2.5	N	2.25
NAS12	A142, Witcham Toll	Roadside	546346	279106	NO_2	N	5	1	N	2.25
NAS13	A10 Stretham	Roadside	550811	274395	NO_2	N	12	1.5	N	2.25
NAS14	High St, Burwell	Roadside	558896	266364	NO_2	N	4	2	N	2.25
NAS15	Hop Row, Haddenham	Roadside	546466	275463	NO_2	N	2	1	N	2.25
NAS16	High St, Haddenham	Roadside	546382	275411	NO_2	N	2	1	N	2.25
NAS17	West End, Haddenham	Roadside	546185	275594	NO_2	N	3	1	N	2.25

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
AS1	Roadside	Automatic	98.6	98.6		**41.5**	32.65	32.7	33.3
NAS1	Roadside	Non-automatic	100	100	23.8	23.8	23.5	21.0	21.1
NAS2	Urban Background	Non-automatic	91.7	91.7	15.8	14.9	14.0	12.3	11.9
NAS3	Roadside	Non-automatic	91.7	91.7	24.5	20.8	23.2	21.6	20.1
NAS4	Urban Background	Non-automatic	100	100	16.6	15.4	15.6	13.8	14.5
NAS5	Roadside	Non-automatic	100	100	18.1	18.0	17.2	16.3	15.7
NAS6	Roadside	Non-automatic	100	100	23.4	24.1	22.0	20.5	18.5
NAS7	Roadside	Non-automatic	91.7	91.7	21.7	21.9	19.7	18.8	17.9
NAS8	Urban Background	Non-automatic	100	100	13.2	13.2	11.4	11.2	11.4
NAS9	Roadside	Non-automatic	58.3	58.3	24.9	24.5	26.4	25.9	21.2
NAS10	Urban Background	Non-automatic	91.7	91.7	17.5	17.9	16.3	13.1	15.1

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Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
NAS11	Roadside	Non-automatic	100	100	23.3	23.0	22.0	19.3	20.1
NAS12	Roadside	Non-automatic	91.7	91.7	26.8	29.9	30.9	29.5	26.7
NAS13	Roadside	Non-automatic	91.7	91.7	22.0	23.2	24.1	20.1	20.3
NAS14	Roadside	Non-automatic	100	100	23.0	25.6	21.6	18.4	19.4
NAS15	Roadside	Non-automatic	91.7	91.7	27.7	31.0	28.3	27.1	26.8
NAS16	Roadside	Non-automatic	100	100	21.4	23.1	20.9	18.4	17.9
NAS17	Roadside	Non-automatic	91.7	91.7	20.7	22.8	22.7	20.6	25.7

Notes: Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

NO_2 annual means exceeding $60\mu g/m^3$, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

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

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

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2011	2012	2013	2014	2015
AS1	Roadside	Automatic	98.61	98.61	N/A	N/A	0	0	0

Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
NAS1	31.8	33.5	34.3	22	22.1	19.5	23.4	23.5	24.7	29.5	30	25.6	26.7	21.1
NAS2	23.6	21.7	19.6	10.4	7.2	9.2	10.3	13.1	12.2	18.6	M	19.2	15.0	11.9
NAS3	M	30.2	32.2	M	14.7	22.2	22.1	22.6	27.7	31.3	28.6	22.7	25.4	20.1
NAS4	25.4	27.1	24.4	14.2	11.5	11.4	10.6	14.1	14.7	23	24.3	20.1	18.4	14.5
NAS5	26.7	30.6	23.7	17.5	13.1	12.4	14.4	14.4	17.8	22.4	24.6	20.6	19.8	15.7
NAS6	27.4	29.9	30.2	24.8	14.8	19.8	16.9	21.1	20.3	26.6	24.3	25.2	23.4	18.5
NAS7	28.9	30.6	M	22.4	17.2	12.4	18.7	19.6	21.3	27.3	26	25.1	22.7	17.9
NAS8	18.7	21	17.9	9.2	8.3	7.3	9.4	13.4	9.9	15.2	22.1	21.2	14.5	11.4

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Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
NAS9	31.7	36.3	28	27.8	M	M	M	M	M	39.6	32.9	32.6	26.8	21.2
NAS10	25	27.2	23.6	14.3	12.1	14	M	15.4	17.2	21.4	20.6	19.7	19.1	15.1
NAS11	32.3	34.8	27.3	22.8	17.2	19.9	15.4	22.8	23.2	31.9	29.4	27.8	24.6	20.1
NAS12	25.2	46.6	40.1	33.2	M	28.3	28.2	31.9	33.4	43.1	31.8	30	32.4	26.7
NAS13	25.8	32.2	30.6	M	15.8	19.6	20.8	27.4	27.7	33.8	24.3	25	25.0	20.3
NAS14	29.8	27.3	31.9	21.5	20.1	19.7	23.3	23	22.9	29.8	27.7	17.4	24.8	19.4
NAS15	37	43.8	43.4	28.5	25.8	25.3	M	31.6	36.1	38.6	33.7	29.5	33.4	26.8
NAS16	21.3	25.7	29.3	24.3	15.7	19.4	17.3	21.1	22.5	32	22.6	21.4	22.1	17.9
NAS17	M	41.8	41	35.9	30.1	28	27.3	25.7	31.6	40	29	28	31.3	25.7

(1) See Appendix C for details on bias adjustment

M = Missing tube

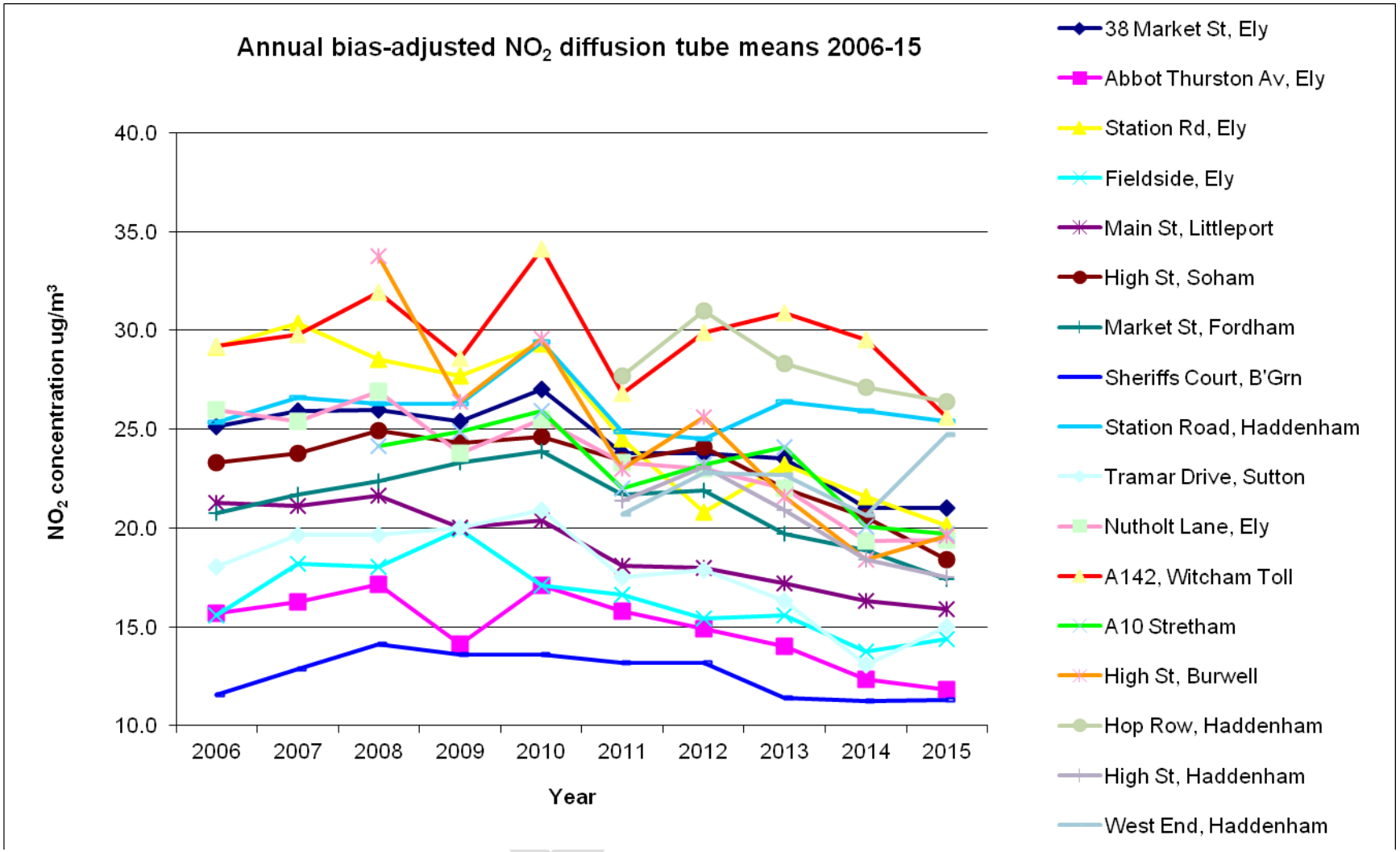


Figure B.2 – NO_2 Diffusion Tube Trend Data – 2006-2015

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

Diffusion Tube Bias Adjustment Factors

Diffusion tube values have been multiplied by a bias correction factor of 0.79 obtained from the DEFRA LAQM Helpdesk national bias adjustment database (version 03/16).

Discussion of Choice of Factor to Use

No local co-location information was available so a bias adjustment factor was obtained from the national bias adjustment database which is available at: http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html.

Adjustment factors are derived from data from diffusion tubes which were co-located with real-time analysers.

Entering the parameters for ESG Didcot, and a 50% triethanolamine (TEA) in acetone preparation method for 2015 gave an adjustment factor of 0.79 which was applied to the ECDC data.

QA/QC of Automatic Monitoring

The automatic nitrogen dioxide monitor is an Enviro Technology 200A chemiluminescent NOx anayler operated in partnership with Leicester City Council (LCC):

Leicester City Council
Air Quality
Planning Transport and Economic Development
2nd Floor, Rutland Wing
City Hall
115 Charles Street
Leicester LE1 1FZ

East Cambridgeshire District Council (ECDC) pays LCC for the hire, full quality assurance, and ratification of the instrument and dataset. The monitor is manually calibrated on a bi-monthly basis by ECDC. The output from the calibrations is forwarded to LCC. LCC sub-contracted data validation and ratification to the Environmental Research Group (ERG), Kings College, London.

The instrument is serviced by:

Enviro Technology Services plc
Kingfisher Business Park
Stroud
Gloucestershire GL5 2BY

The servicing contract resides with LCC. Servicing is carried out biannually.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes were supplied and analysed by:

Environmental Scientifics Group (ESG)
Unit 12, Moorbrook
Southmead Industrial Estate
Didcot
Oxfordshire OX11 7HP

The tubes were prepared by spiking acetone: triethanolamine (50:50) onto the grids prior to being assembled.

The DEFRA Local Air Quality Management Helpdesk publishes information on laboratory performance in the precision of diffusion tube analysis. This can be found at: http://laqm.defra.gov.uk/diffusion-tubes/precision.html

For the purpose of LAQM tube precision is classed as Good or Poor. For the purposes of Local Air Quality Management, tube precision is separated into two categories, "Good" or "Poor", as follows: tubes are considered to have "good" precision where the coefficient of variation (CV) of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%. Tubes are considered to have "poor" precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%.

The distinction between "good" and "poor" precision is an indicator of how well the same measurement can be reproduced. This precision will reflect the laboratory's performance/consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Any laboratory can show "poor" precision for a particular period/co-location study, if this is due to poor handling of the tubes in the field. In 2015 ESG Didcot received a rating of Good in 21 studies and Poor in 7 studies.

The AIR/WASP (Workplace Analysis scheme for Proficiency) NO_2 proficiency testing scheme is an independent analytical testing scheme operated on behalf of DEFRA and the Devolved Administrations to test laboratory proficiency. Details of laboratory performance can be found at: http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html. ESG Didcot achieved a score of 87% Satisfactory in January-February 2015 with a score of 100% for the remainder of 2015.

Annualisation of Monitoring Results - NAS9 Station Road, Haddenham

Due to the loss of diffusion tube data over five months at monitoring site NAS9 Station Road, Haddenham it was necessary to annualise the remaining data using the procedure specified in Technical Guidance LAQM.TG16.

http://laqm.defra.gov.uk/technical-guidance/

The mean concentration of the available data was 32.7 µg/m^3. Data was used from four nearby long term monitoring sites and the annual means (Am) and period means (Pm) were calculated. The ratio R Am/Pm was calculated for each site and an average Ra obtained which is the adjustment factor.

Long term site	Annual mean 2015 (Am)	Period Mean (Pm)	Ratio (Am/Pm)
NAS2	15.0	18.8	0.80
NAS4	18.4	22.6	0.81
NAS8	14.5	17.9	0.81
NAS10	19.1	21.7	0.88
		Average (Ra)	**0.82**

The best estimate for the site will be M x Ra = 32.7 x 0.82 = 26.8.

Applying the bias value of 0.79 gives a final value of **21.2 µg/m^3**

NO2 Fall-off with distance calculator – AS1 Station Road, Ely

This Excel tool has been developed by DEFRA to help local authorities derive the NO_2 concentration at locations relevant for exposure as it is not always possible to measure concentrations at precisely the desired location. The calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site. The monitoring can either be closer to the kerb[2] than the receptor, or further from the kerb than the receptor.

The closer the monitor and the receptor are to each other, the more reliable the prediction will be. The methodology consists of comparing the monitored annual mean NO_2 concentrations at a given point against known relationships between NO_2 concentrations and the distance from a road source.

For information about the restrictions on the application of this tool, please see the "Limitations" tab. Any further information with regards to the use of this tool is provided within LAQM.TG(16).

http://laqm.defra.gov.uk/technical-guidance/index.html

For AS1 Station Road, Ely a background value of 13.19 µg/m^3 was obtained from the DEFRA website. https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013

The calculator predicts an annual mean concentration at a human receptor of 57.5 µg/m^3. This represents an exceedance of the annual mean air quality objective. However, as the monitor is more than 10m further from the kerb than the receptor the calculator recommends that this result must be treated with caution.

Appendix D: Maps of Monitoring Locations

Figure D.1 - Map of Air Quality Monitoring Sites in East Cambridgeshire

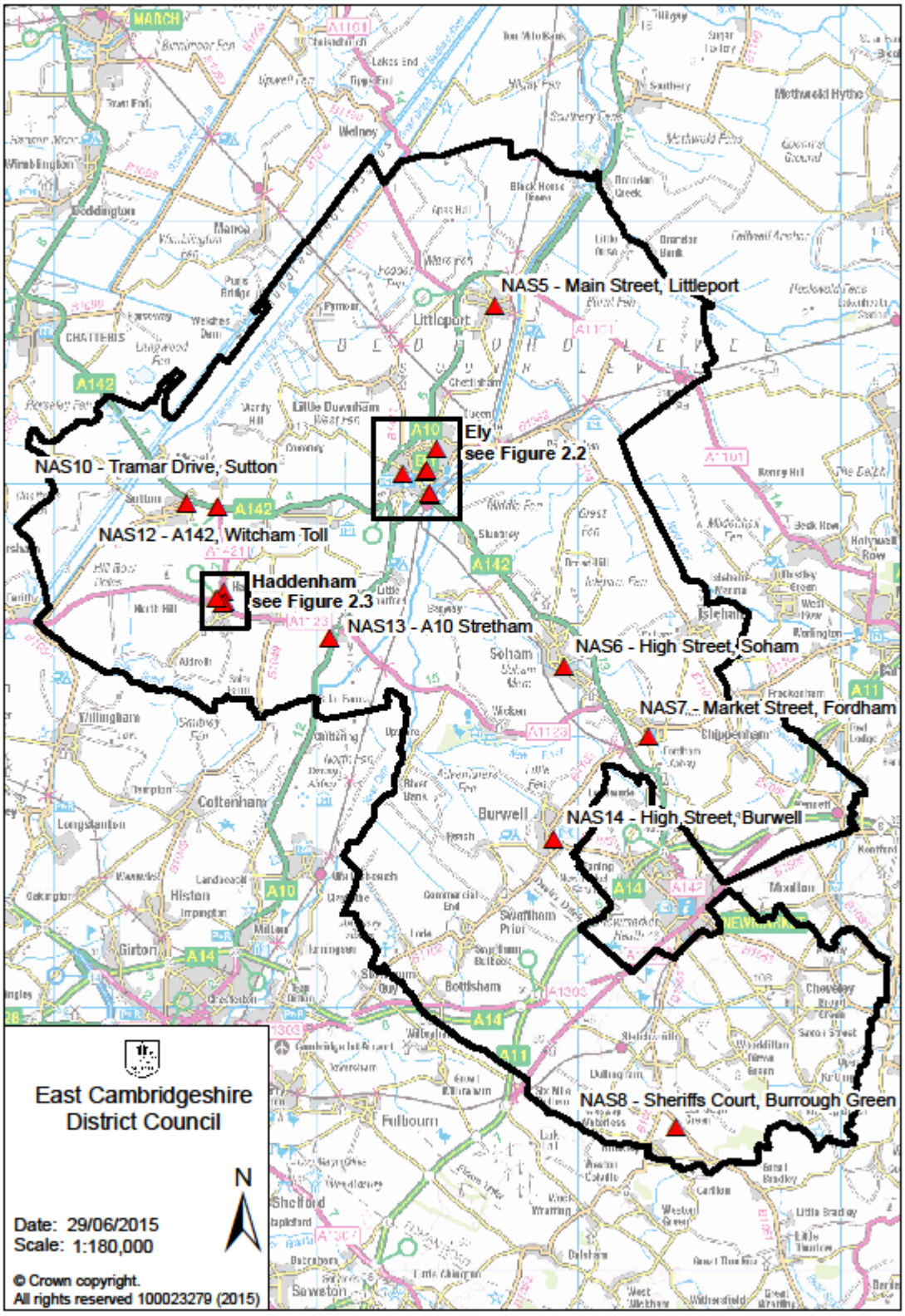


Figure D.2 - Map of Air Quality Monitoring Sites in Ely

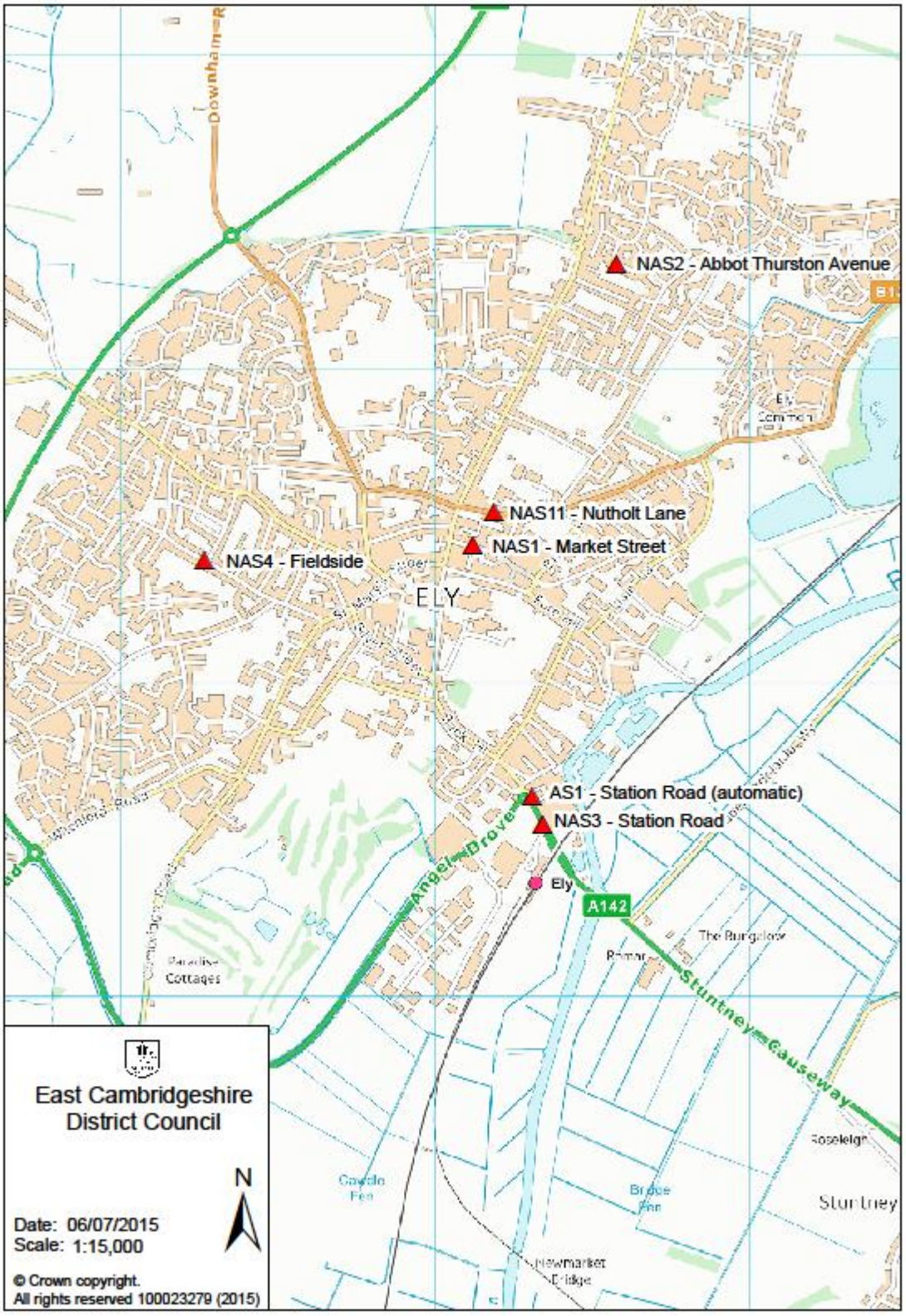
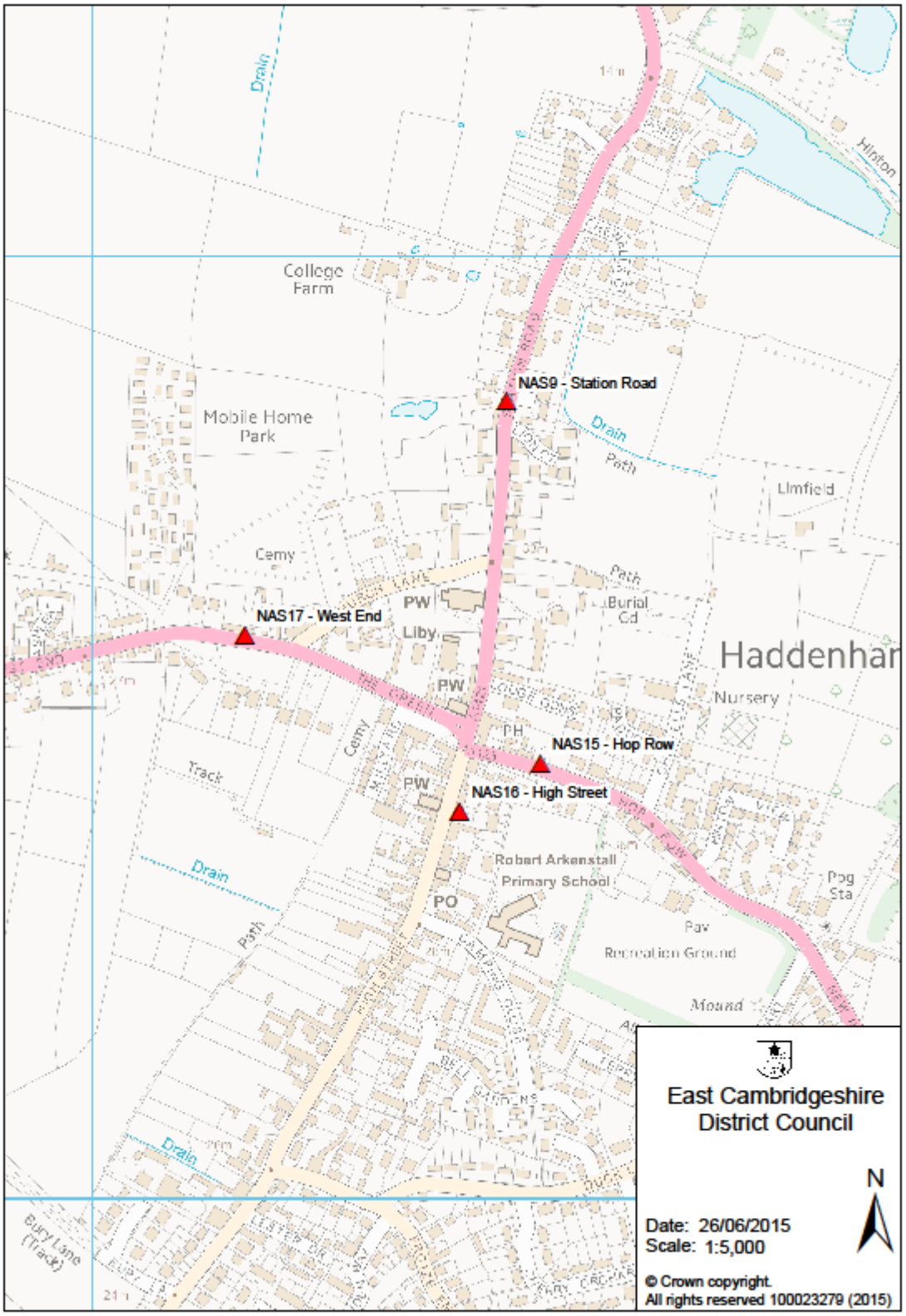


Figure D.3 - Map of Air Quality Monitoring Sites in Haddenham



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

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

[4] The units are in micrograms of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
CCC	Cambridgeshire County Council
DEFRA	Department for Environment, Food and Rural Affairs
ECDC	East Cambridgeshire District Council
EU	European Union
JSNA	Joint Strategic Needs Assessment
LAQM	Local Air Quality Management
LCC	Leicester City Council
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

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