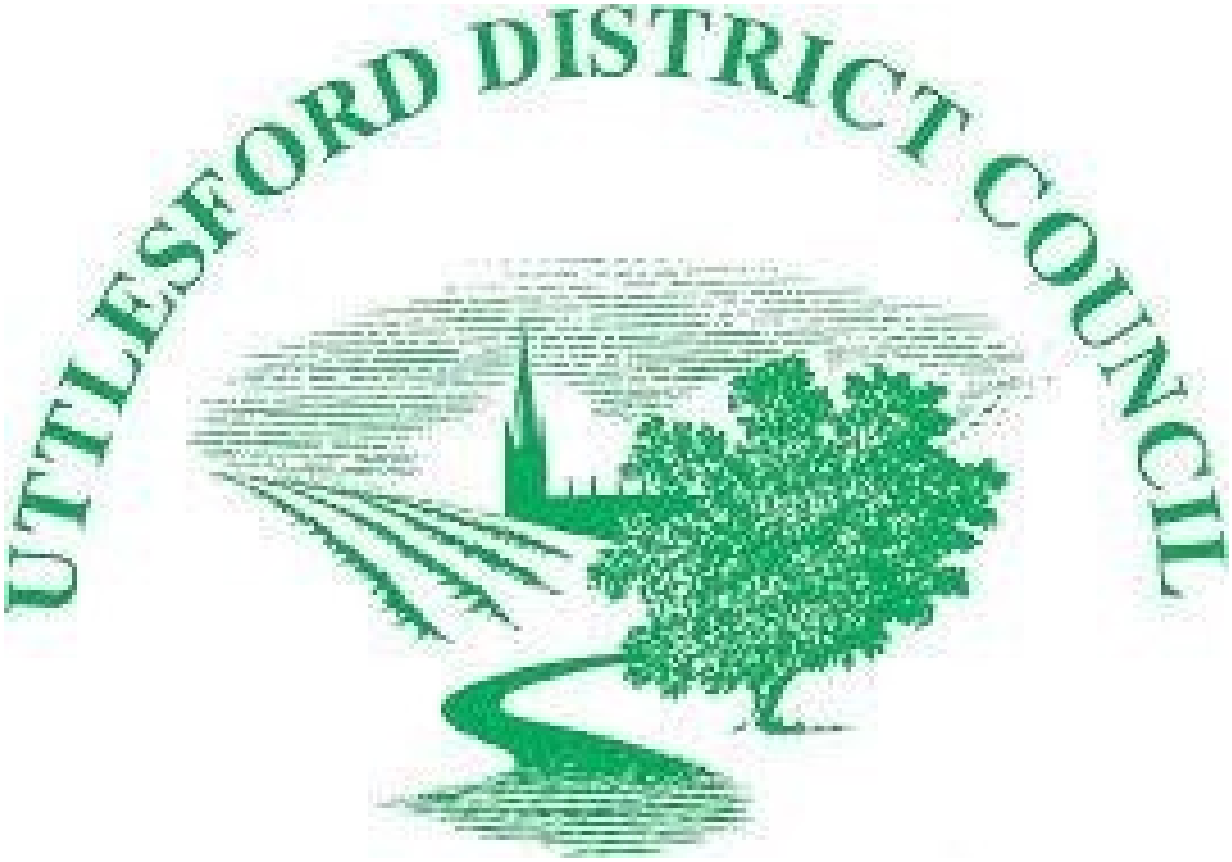


# 2016 Air Quality Annual Status Report (ASR)

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

June 2016

| | |
|---|---|
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# Executive Summary: Air Quality in Our Area

The 2016 Annual Status Report is designed to provide the public with information relating to local air quality in Uttlesford, to fulfil Uttlesford District Council's statutory duty to review and assess air quality within its area, and to determine whether or not the air quality objectives are likely to be achieved.

## Air Quality in Uttlesford

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.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[1].

Uttlesford is considered to be rural in nature and has the principal town of Saffron Walden as its administrative centre. Uttlesford is dissected by the M11 motorway and A120 trunk road which support Stansted International Airport in the south of the district.

Traffic emissions are the most significant source of air pollution within the district and within Saffron Walden, the historic layout of the town results in problems with traffic flow and congestion particularly at peak times.

Uttlesford has one Air Quality Management Area (AQMA) within the Saffron Walden town centre, declared for Nitrogen Dioxide ($NO_2$) exceedances. The Council has an Air Quality Action Plan (AQAP) but is developing a new Action Plan due to be presented in 2016.

[1] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Monitoring of local Air Quality has measured two exceedances of the Nitrogen Dioxide Air Quality Objective within the Air Quality Management area however there have been no exceedances at relevant exposure. The trend of results across all monitored sites indicates that Air Quality is at comparable levels with 2011 and that is neither improving nor worsening. Graphs can be found in Appendix C that show monitoring results from 2011 to 2015.

## Actions to Improve Air Quality

Uttlesford District Council has continued to facilitate non-car travel by requiring the incorporation of infrastructure into new residential development through the planning regime. Contributions from developers have been secured towards junction improvements and non-car travel infrastructure beyond the boundary of their development through use of section 106 agreements.

The Council has provided a rapid charging point at a leisure centre in Saffron Walden which allows cars to be re-charged in 20-30 minutes.

**Figure i.1 – Rapid Charging Point in Saffron Walden**


Electric vehicle charging points have been secured for new residential properties with garages and within commercial car parking areas.

The Council has worked with the Essex County Council Local Highways Panel (LHP) to deliver a new cycle route from Saffron Walden to Audley End Station which opened in 2015. UDC has supported a cycle path provided by ECC which opened in 2015 from Saffron Walden to Wendens Ambo and Audley End Station, with public involvement on the design of the path. Further cycle parking has been provided on Council owned publicly accessible land.

## Local Priorities and Challenges

The main challenge remains reduction of congestion at junctions in the main town, Saffron Walden, a market town with narrow streets which currently accommodate local and through traffic in the absence of alternative routes. The scope for highway improvements is limited and evaluation of schemes is dependent on the outcome of the strategic housing allocation under the emerging Local Plan.

The Council is working with Essex County Council to assess whether minor junction improvements can be made ahead of adoption of the new Local Plan, to assist with easing current congestion levels. Funding has been secured from committed development towards measures to mitigate against additional vehicle movements as a result of the development.

The Council continues to monitor air quality near to the M11 motorway and Stansted International airport as these locations have the potential to impact on local air quality.

## How to Get Involved

Uttlesford District Council is a member of the Essex Air Quality consortium. The purpose of the Essex Air is to promote improvements in air quality related issues. The Essex Air web site provides a daily forecast of air pollution. Also the @EssexAir twitter feed provides localised weekly air pollution forecasts.

**Figure i.2 Essex Air Twitter Air Quality Notifications**


Links to Defra recommended actions and health advice are provided when air pollution is likely to be moderate or higher. This will enable those with heart or lung conditions, or other breathing problems to make informed judgements about their levels of activity or exposure.

Essex County Council has worked closely with Liftshare to develop the Essex Car Share scheme. This operates across Uttlesford and provides commuters with a car sharing service which could cut congestion and air pollution whilst saving money.

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# 1 Local Air Quality Management

This report provides an overview of air quality in Uttlesford 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 Uttlesford 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 G.1 in Appendix G.

# 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.

A summary of the current AQMA declared by Uttlesford District Council can be found in Table 2.1. A map of the current AQMA can be found in Appendix F.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online.

**Table 2.1 – Declared Air Quality Management Areas**

| AQMA Name | Pollutants and Air Quality Objectives | City / Town | One Line Description | Action Plan |
|---|---|---|---|---|
| Saffron Walden AQMA | $NO_2$ annual mean | Saffron Walden | Circle of radius 1400m radius centred on Elm Grove in Saffron Walden Town Centre. Revokes and replaces 3 previous Uttlesford AQMAs | Draft Air Quality Action Plan 2015 |

## 2.2 Progress and Impact of Measures to address Air Quality in Uttlesford

Uttlesford District Council 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 2.2. More detail on these measures can be found in the Draft Action Plan 2015.

Uttlesford District Council's priorities for the coming year are:

- Adoption of the new AQAP
- Work towards delivering measures set out within the new AQAP

## Table 2.2 – Progress on Measures to Improve Air Quality

| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Essex Liftshare | Alternatives to private vehicle use | Car & lift sharing schemes | Essex County Council | N/A | 2014 | Number of Users | Unknown | Ongoing | N/A | |
| 2 | Developing Air Quality Action Plan | Policy Guidance and Development | Air Quality and Policy Guidance | Uttlesford District Council | 2015 | 2016 | Adoption of Air Quality Action Plan | In development | In Progress | 2016 | |
| 3 | Member of Essex Air | Policy Guidance and Development Control | Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality | Essex Air | N/A | N/A | N/A | N/A | Ongoing | N/A | |
| 4 | Saffron Walden Cycling Improvements | Transport Planning and Infrastructure | Cycle Network | Essex County Council | 2014 | 2015 | Number of Users | Unknown | Complete | N/A | |
| 5 | Rapid Charging Point Installation | Promoting Low Emission Transport | EV recharging | Uttlesford District Council | 2014 | 2015 | Number of Users | Unknown | Complete | N/A | |

## 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.

Uttlesford District Council monitors $PM_{2.5}$ concentrations within Saffron Walden. Monitored levels (annual mean) are below 20µg/$m^3$.

The Council notes the Public Health Outcomes Framework indicator 3.01 – Fraction of mortality attributable to particulate ($PM_{2.5}$) air pollution which for 2013 gave a value of 5.5% broadly similar to other authorities within the region.

Uttlesford District Council is taking the following measures to address $PM_{2.5}$:

- Regular inspections of industrial processes permitted by Uttlesford District Council where combustion and non-combustion processes could lead to anthropogenic emissions of $PM_{2.5}$
- Working with Essex County Council (highway authority) to deliver Major improvement schemes. In addition to reduced exhaust emissions, these schemes will reduce non-exhaust emissions from brake and tyre wear by making traffic flows smoother.
- An Action Plan has been prepared in respect of the Saffron Walden AQMA. Whilst the action plan measures are primarily aimed at reducing the exposure of residents within the AQMA to $NO_2$, the initiatives within it will have a positive effect on the reduction of $PM_{2.5}$.

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

## 3.1 Summary of Monitoring Undertaken

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

### 3.1.1 Automatic Monitoring Sites

Uttlesford District Council undertook automatic (continuous) monitoring at 3 sites during 2015 Table A.1 in Appendix A provides details of these sites.

Maps showing the location of monitoring sites can be found in Appendix E.

Detail of the Quality Assurance/Quality Control (QA/QC) process can be found in Appendix D.

Automatic monitoring has not identified any exceedances of the air quality objectives.

### 3.1.2 Non-Automatic Monitoring Sites

Uttlesford District Council undertook non-automatic (passive) monitoring of $NO_2$ at 26 sites during 2015. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix E.

Details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix D.

Diffusion tubes identified two exceedances at sites UT004 & UT005. However pollutant concentrations are not expected to exceed the Air Quality Objectives at relevant exposure.

## 3.2 Individual Pollutants

### 3.2.1 Nitrogen Dioxide ($NO_2$)

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

Exceedances of the Air Quality Objectives occurred at the diffusion tube monitoring sites of UT004 and UT005 in 2015. These sites are within the AQMA. Estimating the concentration at the receptor by making a $NO_2$ fall off calculation shows that there were no exceedances found at the receptor.

The following table 3.1 identifies the exceedances;

**Table 3.1 – Monitored Exceedances**

| Site | Annual Mean (Bias Adjusted & Annualised where appropriate) | Estimation of Concentration at the Receptor. |
|---|---|---|
| UT004 YHA Saffron Walden | **42.17µg/m$^3$** | 36.7µg/m$^3$ |
| UT005 Thaxted Road Saffron Walden | **41.17 µg/m$^3$** | 32.9µg/m$^3$ |

Details of the $NO_2$ fall off calculations can be found in Appendix D.

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$^3$.

For diffusion tubes, 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. There have been no exceedances of the 1-hr mean objective or annual mean objective in excess of 60µg/m3, which is an indication that an exceedance of the 1-hour mean objective could have occurred.

### 3.2.2 Particulate Matter ($PM_{10}$)

Uttlesford District Council monitors for $PM_{10}$ at two locations.

Table A.1 in Appendix A provides details of these sites. These sites are outside of the AQMA.

Table A.5 in Appendix A compares the ratified and adjusted monitored $PM_{10}$ annual mean concentrations for the past 5 years with the air quality objective of 40µg/$m^3$.

Table A.6 in Appendix A compares the ratified continuous monitored $PM_{10}$ daily mean concentrations for the past 5 years with the air quality objective of 50µg/$m^3$, not to be exceeded more than 35 times per year.

No exceedances of the $PM_{10}$ annual or daily objective have been identified.

### 3.2.3 Particulate Matter ($PM_{2.5}$)

Uttlesford District Council monitors for $PM_{2.5}$ within the Saffron Walden AQMA.

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 2 years.

Monitored levels (annual mean) are routinely below 20µg/$m^3$.

# 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| UTT1 | Saffron Walden | Roadside | 553894 | 238414 | NOx, NO, $NO_2$; $PM_{2.5}$ | Y | Chemiluminescent; BAM (with Smart Heater) | 25 | 4.1 | 2.0 |
| UTT2 | Takeley | Roadside | 556234 | 221496 | NOx, NO, $NO_2$; $PM_{10}$ | N | Chemiluminescent, BAM | 15 | 50 | 2.0 |
| UTT3 | Birchanger | Roadside | 551496 | 222208 | NOx, NO, $NO_2$; $PM_{10}$ | N | Chemiluminescent, BAM | 12 | 35 | 2.8 |

(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) |
|---|---|---|---|---|---|---|---|---|---|---|
| UT001 | High Street | Roadside | 553710 | 238415 | $NO_2$ | Yes | 15 | 1.5 | No | 2.0 |
| UT002 | Airport 1 Thatched Cottage | Roadside | 552706 | 221403 | $NO_2$ | No | 1 | 10 | No | 2.0 |
| UT003 | Gibson Gardens | Urban Background | 553552 | 238219 | $NO_2$ | Yes | 5.1 | 1.5 | No | 2.0 |
| UT004 | YHA | Kerbside | 553595 | 238589 | $NO_2$ | Yes | 0.8 | 0.4 | No | 2.0 |
| UT005 | Thaxted Road | Kerbside | 554342 | 238459 | $NO_2$ | Yes | 2.4 | 0.5 | No | 2.0 |
| UT006 | Stansted, Norman Ct | Urban Background | 551358 | 225452 | $NO_2$ | No | 0 | 3.9 | No | 2.0 |
| UT007 | Airport 2 Rose Cottage | Roadside | 556186 | 223724 | $NO_2$ | No | 0 | 7.5 | No | 2.0 |
| UT008 | Hallingbury | Roadside | 551189 | 217438 | $NO_2$ | No | 95 | 29.1 | No | 2.0 |
| UT009 | Burton End | Roadside | 552403 | 223965 | $NO_2$ | No | 142 | 9.3 | No | 2.0 |
| UT010 | Newport | Kerbside | 551255 | 233649 | $NO_2$ | No | 34.2 | 0 | No | 2.0 |
| UT011 | 33 High Street | Roadside | 553697 | 238452 | $NO_2$ | Yes | 0 | 2.7 | No | 2.0 |
| UT012 | Town Hall | Urban Background | 553894 | 238472 | $NO_2$ | Yes | 20 | 0.2 | No | 2.0 |
| UT013/ 014 / 027 | Fire Station Co-located | Roadside | 553845 | 238414 | $NO_2$ | Yes | 25 | 4.1 | Yes | 2.0 |
| UT024 | Takeley Hill | Rural | 554671 | 221010 | $NO_2$ | No | 196 | 117.5 | No | 2.0 |
| UT025 | Elman's Green | Rural | 553271 | 221072 | $NO_2$ | No | 265 | 183.1 | No | 2.0 |
| UT026 | South Gate | Rural | 553141 | 218694 | $NO_2$ | No | 76.3 | 138 | No | 2.0 |
| UT028 | London Rd | Roadside | 553751 | 238086 | $NO_2$ | Yes | 0.8 | 2 | No | 2.0 |
| UT029 | Debden | Roadside | 553779 | 238052 | $NO_2$ | Yes | 0.8 | 2 | No | 2.0 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Road | | | | | | | | | |
| UT030 | Friends School | Kerbside | 553875 | 237763 | $NO_2$ | Yes | 15 | 0.5 | No | 2.0 |
| UT031 | Peaslands Rd | Roadside | 554164 | 237767 | $NO_2$ | Yes | 2 | 1.5 | No | 2.0 |
| UT032 | Borough Lane | Roadside | 553619 | 237869 | $NO_2$ | Yes | 0 | 7 | No | 2.0 |
| UT033 | Chapel Hill | Roadside | 551402 | 224913 | $NO_2$ | No | 0 | 1.5 | No | 2.0 |
| UT034 | Four Ashes | Roadside | 556101 | 221243 | $NO_2$ | No | 10 | 1.5 | No | 2.0 |
| UT036 | Church Street | Kerbside | 553710 | 238524 | $NO_2$ | Yes | 0 | 1 | No | 2.0 |
| UT037 | Castle Street | Kerbside | 553936 | 238774 | $NO_2$ | Yes | 1 | 1 | No | 2.0 |
| UT038 | 2 High Street Hatfield Broad Oak | Kerbside | 554691 | 216558 | $NO_2$ | No | 0 | 1 | No | 2.0 |

(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 Address | 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 |
| UTT1 | Saffron Walden Fire Station | Roadside | Automatic | 80.27 | 80.27 | 22.30 | 22.90 | 23.70 | 22.90 | 22.13 |
| UTT2 | Takeley | Roadside | Automatic | 82.49 | 82.49 | 19.60 | 19.00 | 18.80 | 17.80 | 15.93 |
| UTT3 | Birchanger | Roadside | Automatic | 70.43 | 70.43 | N/A | N/A | N/A | 15.30 | 21.35 |
| UT001 | High Street | Roadside | Diffusion Tube | 91.67 | 91.67 | 36.65 | 36.13 | 38.94 | 33.06 | 36.35 |
| UT002 | Airport 1 Thatched Cottage | Roadside | Diffusion Tube | 91.67 | 91.67 | | 24.63 | 23.82 | 20.69 | 21.41 |
| UT003 | Gibson Gardens | Urban Background | Diffusion Tube | 83.33 | 83.33 | 14.08 | 13.51 | 16.04 | 13.66 | 12.26 |
| UT004 | YHA | Kerbside | Diffusion Tube | 100.00 | 100.00 | 38.36 | **42.57** | **42.74** | 37.34 | **42.17** |
| UT005 | Thaxted Road | Kerbside | Diffusion Tube | 100.00 | 100.00 | **43.08** | **41.12** | 36.24 | 38.59 | **41.17** |
| UT006 | Stansted, Norman Ct | Urban Background | Diffusion Tube | 100.00 | 100.00 | 15.28 | 14.57 | 15.94 | 15.06 | 14.13 |
| UT007 | Airport 2 Rose Cottage | Roadside | Diffusion Tube | 100.00 | 100.00 | 21.23 | 21.34 | 24.84 | 19.99 | 22.69 |
| UT008 | Hallingbury | Roadside | Diffusion Tube | 91.67 | 91.67 | 26.89 | 25.52 | 29.71 | 26.22 | 25.15 |
| UT009 | Burton End | Roadside | Diffusion Tube | 100.00 | 100.00 | 36.85 | 36.05 | 38.73 | 33.61 | 35.51 |
| UT010 | Newport | Kerbside | Diffusion Tube | 100.00 | 100.00 | 25.37 | 25.06 | 25.96 | 23.80 | 25.10 |
| UT011 | 33 High Street | Roadside | Diffusion Tube | 100.00 | 100.00 | 30.71 | 31.00 | 34.35 | 30.63 | 32.90 |
| UT012 | Town Hall | Urban Background | Diffusion Tube | 83.33 | 83.33 | 18.23 | 19.46 | 20.99 | 19.01 | 18.52 |
| UT013/014/027 | Fire Station Co-located | Roadside | Diffusion Tube | 100.00 | 100.00 | 21.26 | 20.41 | 23.77 | 22.1 | 21.44 |
| UT024 | Takeley Hill | Rural | Diffusion Tube | 75.00 | 75.00 | 13.61 | 20.63 | 15.73 | 13.49 | 14.73 |
| UT025 | Elman's Green | Rural | Diffusion Tube | 100.00 | 100.00 | 13.85 | 13.39 | 15.80 | 13.62 | 13.55 |
| UT026 | South Gate | Rural | Diffusion Tube | 100.00 | 100.00 | 12.62 | 12.16 | 13.28 | 11.86 | 12.29 |
| UT028 | London Rd | Roadside | Diffusion Tube | 100.00 | 100.00 | **40.73** | **41.42** | **41.33** | **35.01** | 37.96 |
| UT029 | Debden Road | Roadside | Diffusion Tube | 91.67 | 91.67 | 23.04 | 27.11 | 26.51 | 25.04 | 21.58 |
| UT030 | Friends School | Kerbside | Diffusion Tube | 91.67 | 91.67 | 25.28 | 24.36 | 29.75 | 27.16 | 29.01 |
| UT031 | Peaslands Rd | Roadside | Diffusion Tube | 91.67 | 91.67 | N/A | 19.78 | 23.79 | 22.03 | 22.00 |
| UT032 | Borough Lane | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | 18.42 | 19.51 | 16.92 | 16.79 |
| UT033 | Chapel Hill | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | 25.72 | 29.79 | 26.91 | 27.61 |
| UT034 | Four Ashes | Roadside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | 26.41 | 26.08 |
| UT036 | Church Street | Kerbside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | 22.24 | 21.63 |
| UT037 | Castle Street | Kerbside | Diffusion Tube | 100.00 | 100.00 | N/A | N/A | N/A | 25.73 | 24.19 |
| UT038 | 2 High Street Hatfield Broad Oak | Kerbside | Diffusion Tube | 91.67 | 91.67 | N/A | N/A | N/A | N/A | 21.25 |

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

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

(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 |
| UTT1 | Roadside | Automatic | 80.27 | 80.27 | 0 | 0 | 0 | 0 | 0 (78.91) |
| UTT2 | Roadside | Automatic | 82.49 | 82.49 | 0 | 0 | 0 | 0 | 0 (70.2) |
| UTT3 | Roadside | Automatic | 70.43 | 70.43 | N/A | N/A | N/A | 0 | 0 (103.2) |

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 99.8$^{th}$ percentile of 1-hour means is provided in brackets.

## Table A.5 – Annual Mean $PM_{10}$ Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2015 (%) (2) | $PM_{10}$ Annual Mean Concentration (µg/m$^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| UTT2 | Roadside | 97.26 | 97.26 | N/A | N/A | 21.00 | 26.80 | 20.63 |
| UTT3 | Roadside | 68.77 | 68.77 | N/A | N/A | N/A | 31.20 | 26.34 |

Notes: Exceedances of the $PM_{10}$ annual mean objective of 40µg/m$^3$ are shown in **bold.**

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

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

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

## Table A.6 – 24-Hour Mean $PM_{10}$ Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2015 (%) (2) | $PM_{10}$ 24-Hour Means > 50µg/m$^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| UTT2 | Roadside | 97.26 | 97.26 | N/A | N/A | 0 | 0 | 2 |
| UTT3 | Roadside | 68.77 | 68.77 | N/A | N/A | N/A | 0 | 10 (38.74) |

Notes: Exceedances of the $PM_{10}$ 24-hour mean objective (50µg/m$^3$ not to be exceeded more than 35 times/year) are shown in **bold.**

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

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

(3) If the period of valid data is less than 85%, the 90.4$^{th}$ percentile of 24-hour means is provided in brackets.

## Table A.7 – $PM_{2.5}$ Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2015 (%) (2) | $PM_{2.5}$ Annual Mean Concentration (µg/m$^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| UTT1 | Roadside | 94.25 | 94.25 | N/A | N/A | N/A | 19.6 | 19.3 |

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

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

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

# Appendix B: Full Monthly Diffusion Tube Results for 2015

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

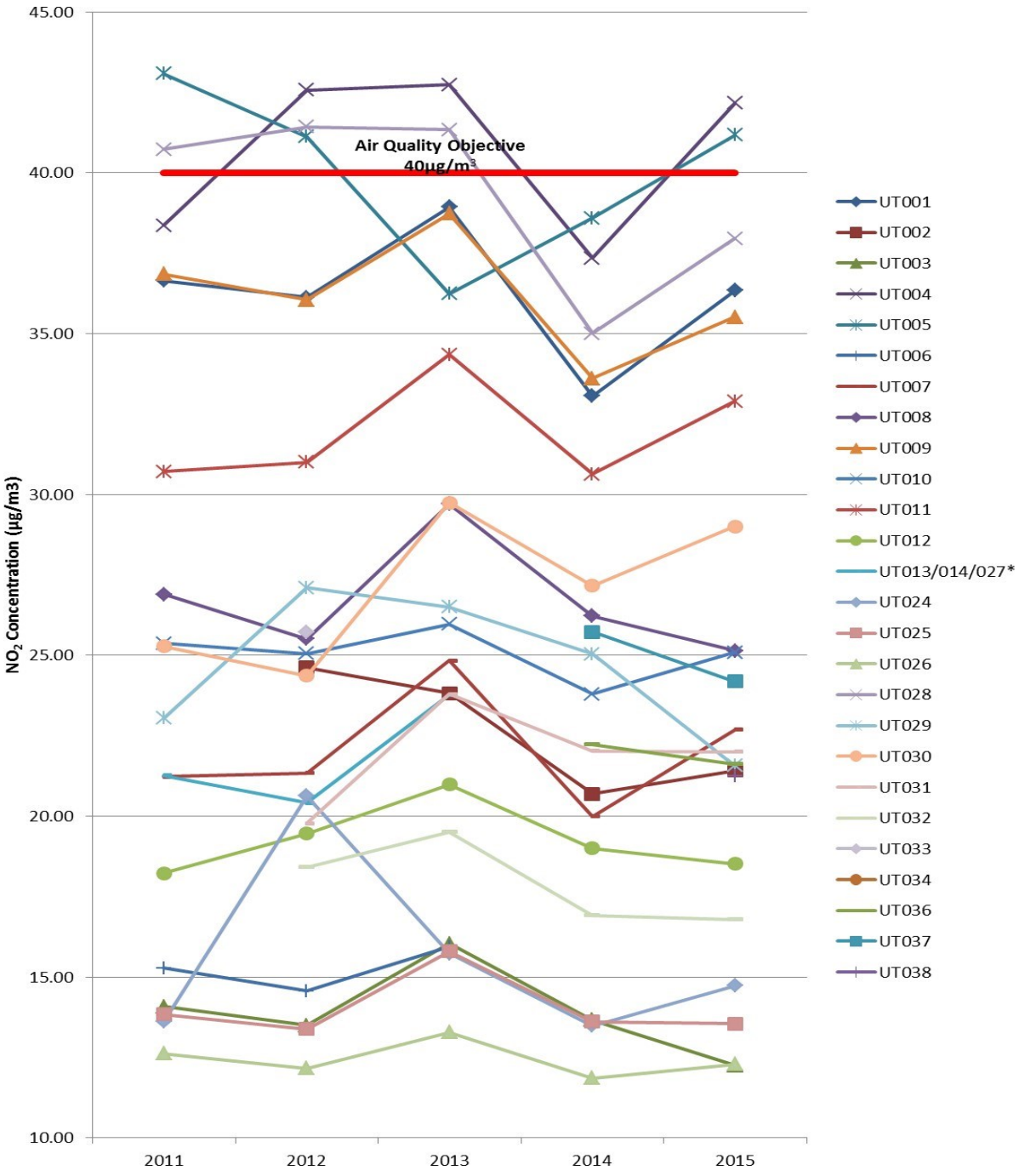
| Site ID | $NO_2$ Mean Concentrations ($\mu g/m^3$) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | |
| | | | | | | | | | | | | | Raw Data | Bias Adjusted (1) |
| UT001 | 59.40 | 56.50 | 47.00 | 41.0 | 41.30 | 37.50 | 39.10 | 39.10 | 44.10 | 44.10 | Missing | 44.50 | 44.87 | 36.35 |
| UT002 | 33.20 | 33.50 | 28.40 | 24.40 | 20.90 | 20.10 | 25.00 | 26.20 | Missing | 29.50 | 26.40 | 23.20 | 26.44 | 21.41 |
| UT003 | 23.80 | 24.30 | 15.70 | 15.20 | 10.60 | 9.40 | 9.60 | 10.70 | 13.90 | Missing | Missing | 18.10 | 15.13 | 12.26 |
| UT004 | 59.40 | 62.30 | 50.40 | 48.60 | 46.50 | 43.90 | 52.40 | 43.20 | 52.90 | 56.30 | 51.30 | 57.50 | 52.06 | **42.17** |
| UT005 | 61.30 | 56.20 | 45.10 | 47.70 | 52.00 | 54.20 | 49.50 | 43.20 | 55.10 | 57.10 | 49.10 | 39.40 | 50.83 | **41.17** |
| UT006 | 23.90 | 23.10 | 19.40 | 16.80 | 12.50 | 8.30 | 10.30 | 14.10 | 16.00 | 21.00 | 19.40 | 24.50 | 17.44 | 14.13 |
| UT007 | 40.30 | 32.70 | 32.40 | 24.00 | 25.80 | 22.50 | 24.60 | 22.30 | 26.80 | 29.70 | 31.30 | 23.70 | 28.01 | 22.69 |
| UT008 | 33.40 | 34.30 | 36.50 | 37.70 | 22.10 | 25.90 | 21.20 | 31.40 | Missing | 37.10 | 27.10 | 34.80 | 31.05 | 25.15 |
| UT009 | 63.30 | 55.40 | 48.80 | 36.70 | 43.60 | 23.00 | 41.30 | 35.00 | 45.00 | 49.80 | 50.00 | 34.20 | 43.84 | 35.51 |
| UT010 | 30.50 | 40.80 | 31.70 | 23.70 | 27.40 | 24.50 | 29.70 | 27.50 | 26.40 | 30.60 | 35.60 | 43.40 | 30.98 | 25.10 |
| UT011 | 53.40 | 47.70 | 45.54 | 33.90 | 38.70 | 30.80 | 37.80 | 37.90 | 38.40 | 40.90 | 44.30 | 38.00 | 40.61 | 32.90 |
| UT012 | 27.90 | 26.80 | 25.70 | 22.00 | 17.80 | Missing | 18.70 | 19.80 | 20.50 | 23.60 | Missing | 25.90 | 22.87 | 18.52 |
| UT013 | 34.00 | 36.10 | 29.40 | 23.00 | 20.60 | 19.40 | 20.00 | 21.30 | 25.60 | 35.10 | 36.10 | 30.90 | 27.63 | 22.38 |
| UT014 | 25.50 | 35.40 | 26.40 | 22.50 | 19.80 | 20.40 | 19.90 | 19.90 | 26.70 | 33.80 | 33.20 | 31.70 | 26.27 | 21.28 |
| UT024 | 26.70 | 21.70 | 20.50 | Missing | 11.90 | Missing | 10.40 | Missing | 15.70 | 22.20 | 18.60 | 16.00 | 18.19 | 14.73 |
| UT025 | 25.90 | 19.70 | 20.20 | 15.00 | 10.80 | 10.10 | 12.50 | 14.20 | 16.90 | 19.10 | 19.20 | 17.10 | 16.73 | 13.55 |
| UT026 | 22.60 | 19.20 | 16.30 | 12.80 | 12.20 | 11.10 | 11.00 | 12.20 | 13.10 | 15.40 | 19.70 | 16.50 | 15.18 | 12.29 |
| UT027 | 30.30 | 33.00 | 28.00 | 23.40 | 17.70 | 14.90 | 19.00 | 20.60 | 26.50 | 31.80 | 27.90 | 33.10 | 25.52 | 20.67 |
| UT028 | 50.70 | 60.00 | 48.60 | 42.50 | 38.30 | 39.70 | 39.60 | 36.50 | 47.80 | 55.20 | 57.50 | 45.90 | 46.86 | 37.96 |
| UT029 | 36.90 | 25.70 | Missing | 24.50 | 22.60 | 19.80 | 21.70 | 21.60 | 26.60 | 34.40 | 29.10 | 30.10 | 26.64 | 21.58 |
| UT030 | 37.80 | 36.60 | 43.30 | 36.00 | 31.00 | 30.30 | 28.30 | 30.60 | 35.90 | 49.60 | 34.60 | split | 35.82 | 29.01 |
| UT031 | 33.40 | 32.30 | 28.90 | 24.40 | Missing | 18.30 | 19.80 | 21.20 | 25.90 | 32.00 | 36.30 | 26.30 | 27.16 | 22.00 |
| UT032 | 23.30 | 28.10 | 24.50 | 20.40 | 15.80 | 14.30 | 10.40 | 16.50 | 19.00 | 24.50 | 27.80 | 24.10 | 20.73 | 16.79 |
| UT033 | 43.50 | 38.20 | 41.90 | 33.00 | 23.70 | 28.50 | 27.00 | 28.70 | 36.80 | 45.10 | 33.30 | 29.40 | 34.09 | 27.61 |
| UT034 | 46.90 | 41.60 | 34.30 | 32.70 | 23.30 | 29.50 | 30.10 | 30.00 | 36.10 | 41.80 | 37.80 | 28.50 | 32.20 | 26.08 |
| UT036 | 36.20 | 35.50 | 28.00 | 23.40 | 21.50 | 23.30 | 19.40 | 24.70 | 27.40 | 31.20 | 32.90 | 24.60 | 26.70 | 21.63 |

| Site ID | $NO_2$ Mean Concentrations (µg/m$^3$) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | |
| | | | | | | | | | | | | | Raw Data | Bias Adjusted (1) |
| UT037 | 39.50 | 37.10 | 34.90 | 28.20 | 23.20 | 15.60 | 22.90 | 24.30 | 25.60 | 28.40 | 35.30 | 42.70 | 29.87 | 24.19 |
| UT038 | Missing | 42.5 | 34.6 | 23.30 | 20.2 | 14.8 | 20.4 | 22.5 | 28.3 | 31.2 | 29.8 | 25.2 | 26.23 | 21.25 |

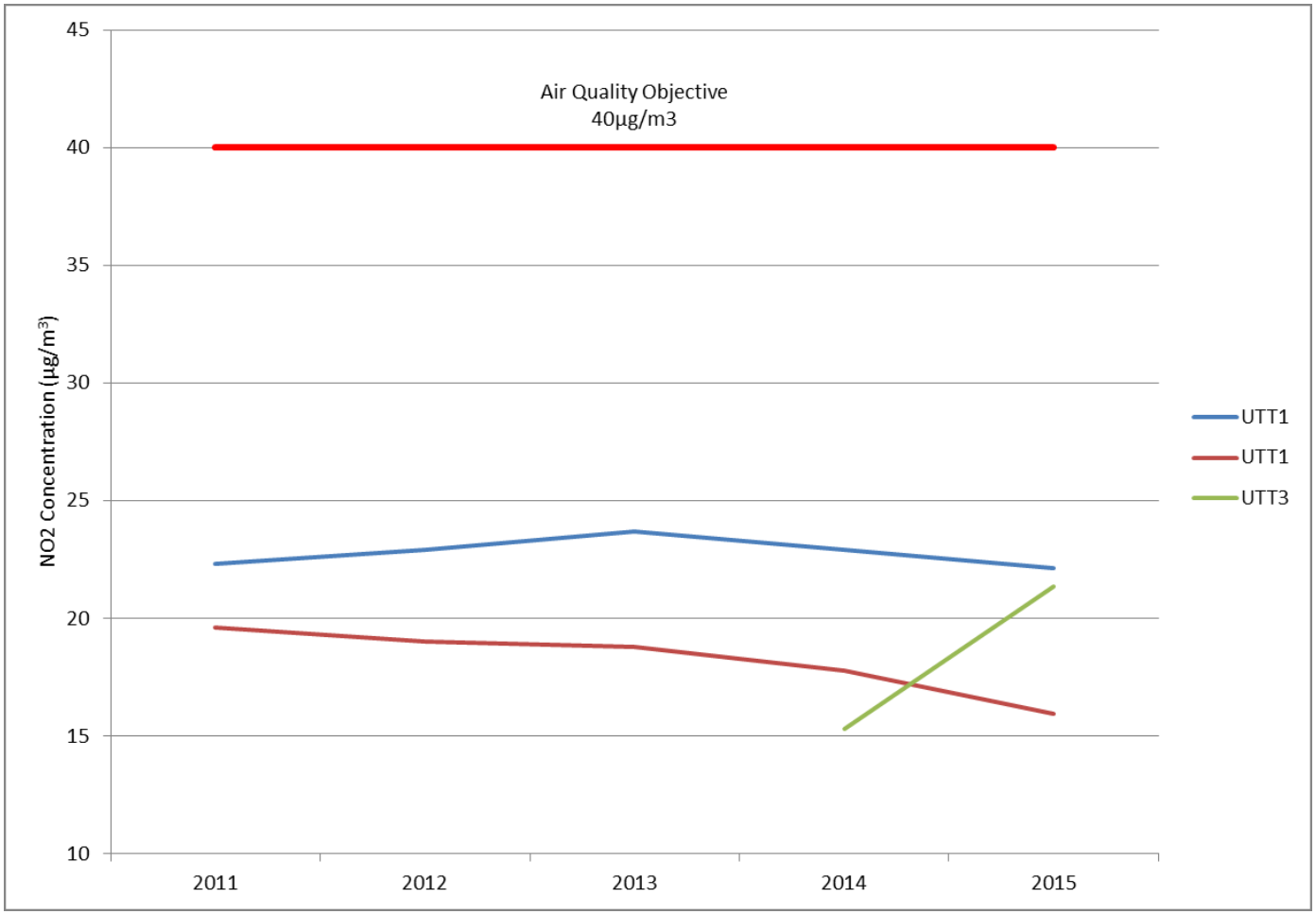
(1) See Appendix C for details on bias adjustment

# Appendix C: Nitrogen Dioxide Trend Data

## Figure C.1 – Nitrogen Dioxide (Diffusion Tube) Trend Data 2011-2015



## Figure C.2 – Nitrogen Dioxide (Automatic Monitor) Trend Data 2011-2015



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

## Automatic Monitoring QA/QC

Uttlesford District Council operates three automatic monitoring stations and monitors for $NO_2$, $PM_{10}$ and $PM_{2.5}$.

The monitoring assets consist of three chemiluminescence ($NO/NO_2/NO_x$) gas analysers, two Met One BAM $PM_{10}$ analysers and one Met One Smart Heated BAM $PM_{2.5}$ analyser.

Analysers are serviced in-line with manufacturer guidelines biannially. $NO_2$ analysers have a LSO calibration fortnightly to check against a certified calibration gas bottle.

Data has been ratified according to LAQM TG16 recommended procedures to identify erroneous data and to account for instrument drift.

For Nitrogen Dioxide, the calibration and ratification process corrected the raw dataset for any drift in the zero baseline and upper range of the instrument. This was carried out using a Enviman Reporter software based process that incorporates zero and span check information from the calibration visits.

The Met One $PM_{10}$measurements are corrected for slope by dividing the data by 1.2.

The Met One $PM_{2.5}$ measurements are not adjusted due to the presence of the smart heated.

The UTT3 mobile unit at Birchanger had poor data capture at 71% which was due in part to disconnection of the power supply which was outside the control of the Council.

## Diffusion Tubes QA/QC

Uttlesford District Council undertook monitoring at 26 nitrogen dioxide diffusion tubes sites in 2015.

The diffusion tubes were supplied by Environmental Scientifics Group (ESG Didcot) (UKAS Testing Laboratory number 1015) with a preparation method of 50% triethanolamine (TEA) in Acetone.

The AIR NO2 proficiency testing scheme found that the laboratory achieved the following percentage of results determined as satisfactory for 2015:

**Table D.1 – AIR PT Results 2015**

| AIR PT Round | AIR PT AR006 | AIR PT AR007 | AIR PT AR009 | AIR PT AR010 |
|---|---|---|---|---|
| Round conducted in the period | January – February 2015 | April – May 2015 | July – August 2015 | October – November 2015 |
| ESG Didcot | 87.5% | 100% | 100% | 100% |

## Diffusion Tube Bias Adjustment Factors

Due to poor data capture at the Saffron Walden co-location site, the national bias adjustment figure was used for calculating the diffusion tube results.

The Diffusion Tube Bias Adjustment Factors Spreadsheet for March 2016 identified that for ESG (Didcot) 50% TEA in acetone diffusion tubes in 2015, a bias adjustment factor of 0.81 should be used. This was derived from orthogonal regression analysis of 21 studies.

## Nitrogen Dioxide Fall Off with Distance Calculations

## Figure D.1 UT004 $NO_2$ Fall Off with Distance Calculations

**This calculator allows you to predict the annual mean $NO_2$ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.**

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Enter data into the yellow cells

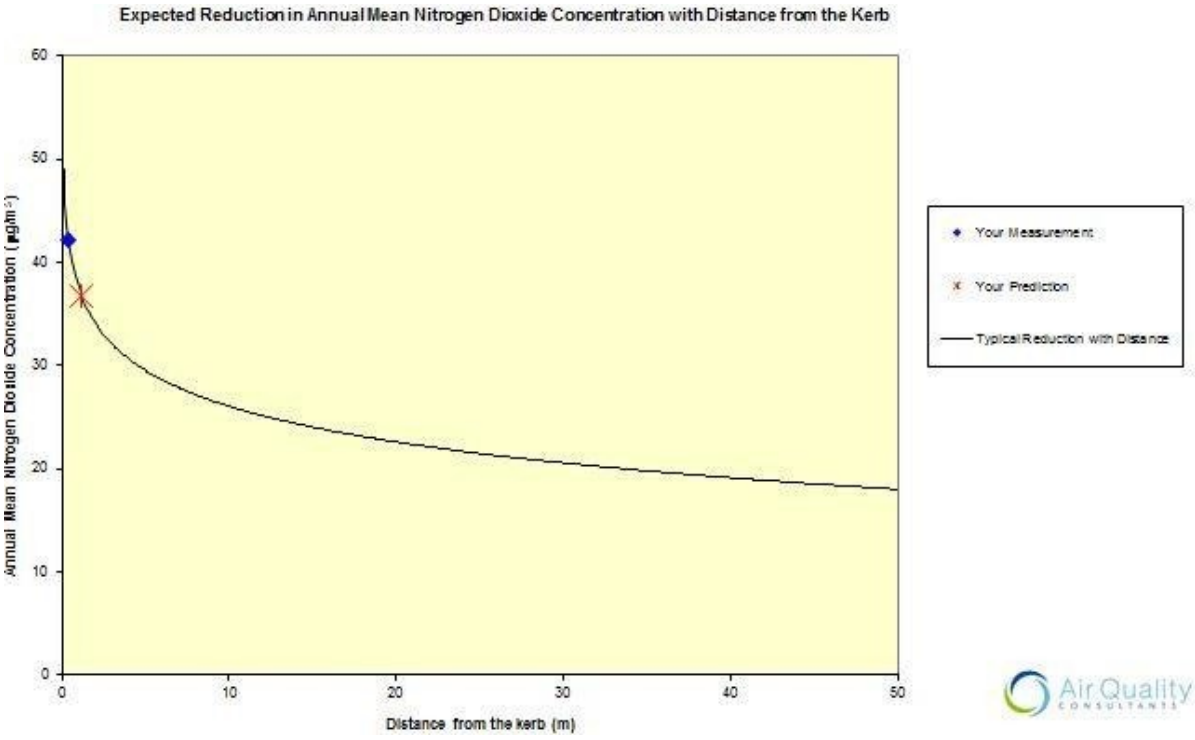
| | | | | |
|---|---|---|---|---|
| Step 1 | How far from the KERB was your measurement made (in metres)? | (Note 1) | 0.4 | metres |
| Step 2 | How far from the KERB is your receptor (in metres)? | (Note 1) | 1.2 | metres |
| Step 3 | What is the local annual mean background $NO_2$ concentration (in µg/m$^3$)? | (Note 2) | 12.74 | µg/m$^3$ |
| Step 4 | What is your measured annual mean $NO_2$ concentration (in µg/m$^3$)? | (Note 2) | 42.17 | µg/m$^3$ |
| Result | The predicted annual mean $NO_2$ concentration (in µg/m$^3$) at your receptor | (Note 3) | 36.7 | µg/m$^3$ |

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb 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. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk



## Figure D.2 UT005 $NO_2$ Fall Off with Distance Calculations

**This calculator allows you to predict the annual mean $NO_2$ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.**

Air Quality CONSULTANTS

Enter data into the yellow cells

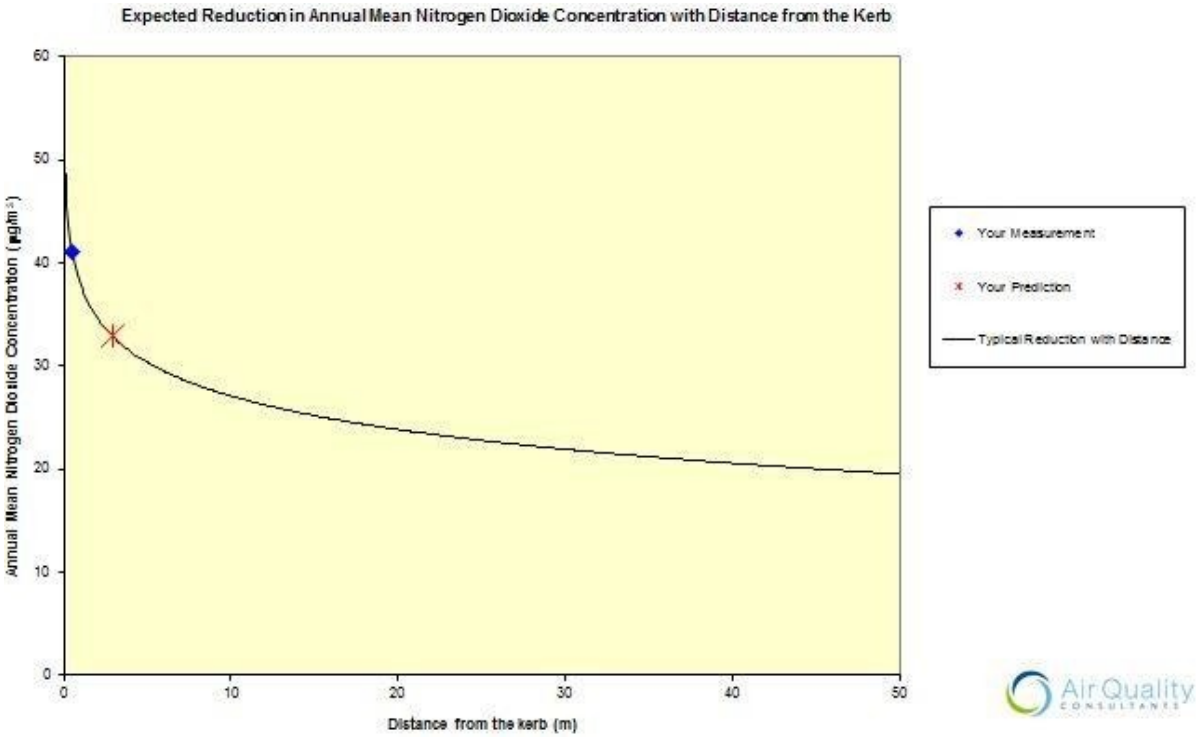
| | | | | |
|---|---|---|---|---|
| Step 1 | How far from the KERB was your measurement made (in metres)? | (Note 1) | 0.5 | metres |
| Step 2 | How far from the KERB is your receptor (in metres)? | (Note 1) | 2.9 | metres |
| Step 3 | What is the local annual mean background $NO_2$ concentration (in µg/m$^3$)? | (Note 2) | 14.58 | µg/m$^3$ |
| Step 4 | What is your measured annual mean $NO_2$ concentration (in µg/m$^3$)? | (Note 2) | 41.17 | µg/m$^3$ |
| Result | The predicted annual mean $NO_2$ concentration (in µg/m$^3$) at your receptor | (Note 3) | 32.9 | µg/m$^3$ |

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb 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. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk



## Uttlesford District Council Air Quality Action Plans

Uttlesford District Council last produced an Air Quality Action Plan in 2009 to tackle poor air quality. Subsequently a larger air quality management area was declared to cover the central area of Saffron Walden.

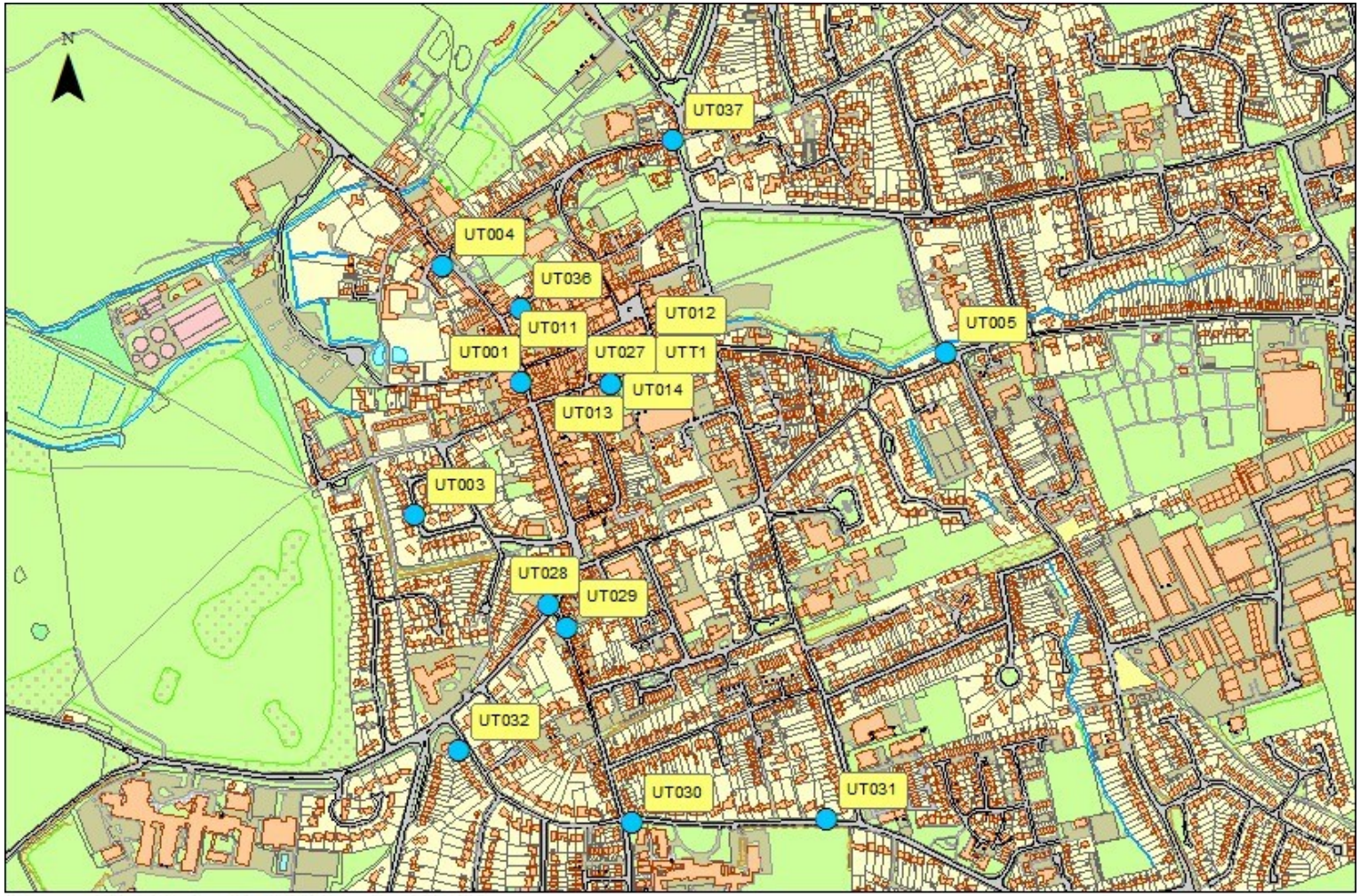
In 2015, the Council started developing a further draft Action Plan with measures aimed at improving air quality in Saffron Walden over the life of the plan. The Council will finalise an Action Plan for adoption in 2016.

The draft Air Quality Action Plan 2016 can be found at the following link:

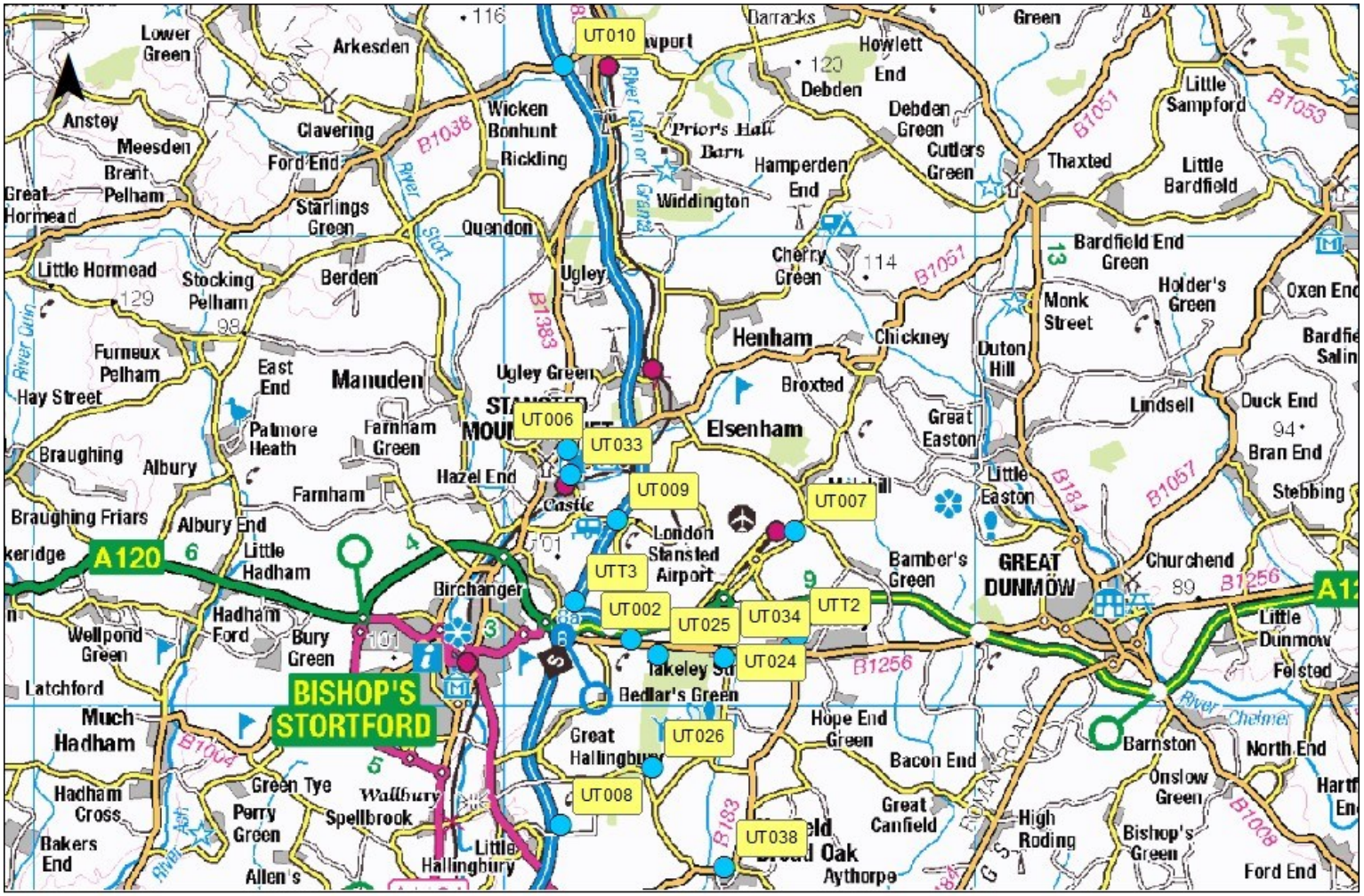
http://www.uttlesford.gov.uk/CHttpHandler.ashx?id=5553&p=0

# Appendix E: Map(s) of Monitoring Locations

## Figure E.1 - Saffron Walden Monitoring Locations

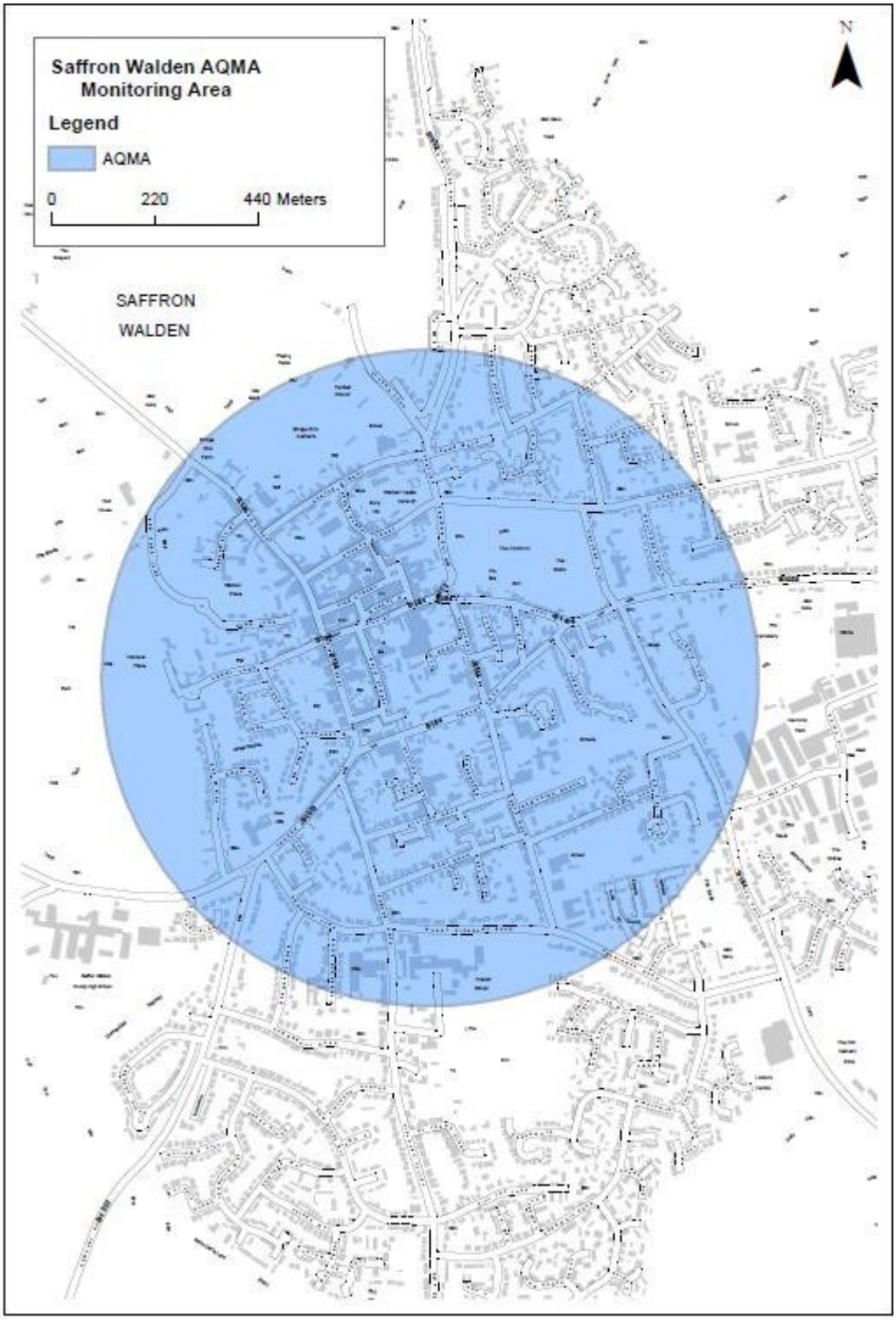


## Figure E.2 - Monitoring Locations



# Appendix F: Current AQMA Location

## Figure F.1 Current AQMA Map



# Appendix G: Summary of Air Quality Objectives in England

### Table G.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective[2] | |
|---|---|---|
| | 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 |

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

# Glossary of Terms

| Abbreviation | Description |
|---|---|
| AURN | Automatic Urban and Rural Network - The AURN is the UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives. |
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR | Air quality Annual Status Report |
| Defra | Department for Environment, Food and Rural Affairs |
| EU | European Union |
| LAQM | Local Air Quality Management |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxides |
| $PM_{10}$ | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less |
| $PM_{2.5}$ | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less |
| QA/QC | Quality Assurance and Quality Control |
| TEA | Triethanolamine – substance used in diffusion tubes for absorbing nitrogen dioxide |
| UKAS | United Kingdom Accreditation Service |

# References

AQMAs Declared by Uttlesford District Council available at; https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=289

Defra Diffusion Tube Bias Adjustment Factors Spreadsheet available at; http://laqm.defra.gov.uk/documents/Database_Diffusion_Tube_Bias_Factors_v03_16_Final_v2.xls

Defra LAQM Summary of Laboratory Performance in AIR $NO_2$ PT Scheme available at; http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-(April-2014-February-2016)-NO2-report.pdf

Defra LAQM Policy Guidance LAQM.PG16 available at; http://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf

Defra LAQM Technical Guidance LAQM.TG16 available at; http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

Defra Nitrogen Dioxide Fall-Off with Distance Calculator available at; http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

Essex Air Quality Consortium available at; http://www.essexair.org.uk/AQInEssex/LA/Chelmsford.aspx

EssexCarShare.com available at; https://essex.liftshare.com/

Essex Air Twitter Feed available at; https://twitter.com/essexair

Essex County Council Local Transport Plan available at; http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/Local-Transport-Plan.aspx

Public Health Outcomes Framework Indicator 3.01 available at; http://www.phoutcomes.info/

Uttlesford District Council AQMA in Saffron Walden available at; https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=289

Uttlesford District Council Draft Action Plan Consultation available at; http://www.uttlesford.gov.uk/aqconsultation

Uttlesford District Council Local Plan available at;

http://www.uttlesford.gov.uk/localplan