




2016 Air Quality Annual Status Report (ASR)

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

May 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 Harlow, to fulfil Harlow 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 Harlow

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 billion³.

Traffic emissions are the most significant source of air pollution in Harlow. The main roads in the District are the M11 and the A414. In addition, there a number of industrial processes. The majority of these are located in the two main industrial areas of the town: Templefields (to the North) and the Pinnacles (to the North West).

The Council recognises the importance of working with partnering Authorities such as with Essex County Council to make improvements to local transport infrastructure and also to fulfil its own regulatory responsibility towards industrial processes.

Air pollution is considered to be generally low in Harlow and monitoring of local Air Quality has measured no exceedances of air quality objective at relevant exposure. The trend of results across all monitored sites indicates that Air Quality is improving. A graph can be found in Appendix C that shows monitoring results from 2011 to 2015.

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

Actions to Improve Air Quality

The town of Harlow has a large network of cycle-paths and a number of projects have been recently completed to improve signage to these existing paths. Further provision of a new cycle-path along First Avenue, past Burnt Mill secondary and St Alban's Primary schools has been completed.

Local Priorities and Challenges

Due to committed employment and housing developments in Harlow, there is expectation that traffic will increase. There is a proposal for a new junction 7a on the M11 to reduce the anticipated strain on the local and wider road network. This junction would create a significant change to how traffic would access Harlow and a number of preliminary traffic management options have been identified to prevent HGVs using smaller residential roads moving to priority routes.

Air quality in Harlow meets the national Air Quality Objectives. As such, Harlow Council does not have an Air Quality Strategy or Action Plan. However Harlow Council has prioritised a Clean and Green Environment. As part of this commitment, the Council have adopted a new carbon management plan which will reduce its carbon footprint and improve air quality indicators.

How to Get Involved

Harlow 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.



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 Harlow 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 Harlow 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 Harlow 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 F.1 in Appendix F.

2 Actions to Improve Air Quality

2.1 Progress and Impact of Measures to address Air Quality in Harlow

Harlow Council does not have an Air Quality Management Area or associated Action Plan but has taken forward a number of measures during the current reporting year of 2015 in the pursuit of improved local air quality. Details of all measures completed, in progress or planned are set out in Table 2..

Key completed measures are:

- Implementing a requirement for all hackney carriages and private hire vehicles to be Euro 3 compliant.
- Strategic highway improvements to the A414 at Burnt Mill and at the A414 / Second Avenue intersection

Table 2.1 – Progress on Measures to Improve Air Quality

| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|---|---|---|----------------------|----------------|----------------------|---|--|--------------------------------|---------------------------|----------|
| 1 | Essex Liftshare | Alternatives to private vehicle use | Car & lift sharing schemes | Essex County Council | N/A | 2014 | Number of Users | No AQMA | Ongoing | N/A | |
| 2 | Travel Budi | Alternatives to private vehicle use | Car & lift sharing schemes | Harlow Council | N/A | 2007 | Number of Users | No AQMA | Ongoing | N/A | |
| 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 | No AQMA | Ongoing | N/A | |
| 4 | Environmental Permit Inspection & Enforcement | Environmental Permits | Measures to reduce pollution through IPPC Permits going beyond BAT | Harlow Council | N/A | N/A | Operator compliance with Environmental Permit | No AQMA | Ongoing | N/A | |
| 5 | A414 Route Improvements | Traffic Management | Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane | Essex County Council | 2010 | 2015 | Monitored Air Quality | No AQMA | Complete | N/A | |
| 6 | M11 J7a and associated Improvements | Traffic Management | Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane | Essex County Council | 2016 | 2018 | Monitored Air Quality | No AQMA | Development of Initial Options | 2020 | |

Harlow Council

| 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 |
|-------------|--|---------------------------------------|---------------------------|----------------------|----------------|----------------------|---------------------------|--|------------------|---------------------------|----------|
| 7 | Taxi Emissions | Promoting Low Emission Transport | Taxi Licensing conditions | Harlow Council | 2013 | 2015 | Monitored Air Quality | No AQMA | Completed | N/A | |
| 8 | First Avenue Cycle Infrastructure Improvements | Transport Planning and Infrastructure | Cycle network | Essex County Council | 2013 | 2015 | Number of Users | No AQMA | Completed | N/A | |

2.2 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

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

Harlow Council does not monitor PM_{2.5} concentrations however 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 5.8 broadly similar to other authorities within the region.

Harlow Council is taking the following measures to address PM_{2.5}:

- Regular inspections of permitted industry 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 Transport improvement [schemes](#) to alleviate congestion. In addition to reduced exhaust emissions, these schemes will reduce non-exhaust emissions from brake and tyre wear by making traffic flows smoother.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

Harlow Council undertook non- automatic (passive) monitoring of NO₂ at 8 sites during 2015. Table A. in Appendix A shows the details of the sites.

No exceedances have been identified and monitored concentrations have trended downwards over the past five years. Details of this can be found in Figure C.1 in Appendix C.

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

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

3.2 Individual Pollutants

3.2.1 Nitrogen Dioxide (NO₂)

The air quality monitoring results presented in this section has been adjusted for bias. Further details on adjustments are provided in Appendix D.

Monitoring commenced at two new locations in 2015 (HAR15 & HAR16). These sites opened in September 2015 and have been annualised to adjust for a low capture rate.

Figure C.1 in Appendix C compares the bias adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Appendix A: Monitoring Results

Table A.1 – 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) |
|---------|----------------|------------------|---------------|---------------|----------------------|-----------|--|---|---|------------|
| HAR 8 | East Park | Suburban | 54694 2 | 211186 | NO ₂ | No | 11.0 | 23.2 | No | 2 |
| HAR 9 | Gardiners | Urban Background | 54688 8 | 209435 | NO ₂ | No | 7.6 | 1.2 | No | 2 |
| HAR10 | Dadds Wood | Urban Background | 54443 4 | 209709 | NO ₂ | No | 12.5 | 33.4 | No | 2 |
| HAR11 | Town Centre | Kerbside | 54468 0 | 210016 | NO ₂ | No | 31.3 | 21.5 | No | 2 |
| HAR12 | Allende Avenue | Roadside | 54439 6 | 211101 | NO ₂ | No | 13.2 | 6.3 | No | 2 |
| HAR13 | Guilfords | Suburban | 54752 4 | 212479 | NO ₂ | No | 14.2 | 1.0 | No | 2 |
| HAR15 | Gilden Way | Roadside | 54866 2 | 212013 | NO ₂ | No | 14.0 | 1.5 | No | 2 |
| HAR16 | Chalk Lane | Rural | 54946 6 | 211599 | NO ₂ | No | 20.0 | 0.75 | No | 2 |

(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.2 – Annual Mean NO₂ 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 (µg/m ³) ⁽³⁾ | | | | |
|---------|------------------|-----------------|---|--|---|-------|-------|-------|-------|
| | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| HAR 8 | Suburban | Diffusion Tube | | 75% | 29.92 | 31.42 | 27.66 | 28.24 | 27.55 |
| HAR 9 | Urban Background | Diffusion Tube | | 100% | 32.42 | 33.6 | 28.28 | 29.76 | 28.68 |
| HAR10 | Urban Background | Diffusion Tube | | 100% | 32.88 | 32.68 | 29.78 | 29.09 | 24.83 |
| HAR11 | Kerbside | Diffusion Tube | | 100% | 37.43 | 38.8 | 33.02 | 33.56 | 31.04 |
| HAR12 | Roadside | Diffusion Tube | | 100% | 43.18 | 32.76 | 29.91 | 28.42 | 26.64 |
| HAR13 | Suburban | Diffusion Tube | | 91.7% | N/A | N/A | N/A | 20.79 | 17.45 |
| HAR15 | Roadside | Diffusion Tube | | N/A | N/A | N/A | N/A | N/A | 21.59 |
| HAR16 | Rural | Diffusion Tube | 100% | 33.3% | N/A | N/A | N/A | N/A | 18.09 |

Notes: Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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.

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.2 – NO₂ Monthly Diffusion Tube Results - 2015

| 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⁾ |
| HAR 8 East Park | 40.9 | 43.9 | Missing | 30.4 | Missing | Missing | 28.3 | 26.5 | 31.4 | 30.7 | 35.7 | 38.3 | 34.01 | 27.55 |
| HAR 9 Gardiners | 50.5 | 45.8 | 35 | 32 | 30.4 | 25.5 | 26.7 | 28.3 | 34.1 | 36 | 36.3 | 44.3 | 35.41 | 28.68 |
| HAR10 Dadds Wood | 43.7 | 42.9 | 34.7 | 30 | 25.2 | 18.2 | 21.9 | 26 | 34.1 | 17.4 | 38.4 | 35.3 | 30.65 | 24.83 |
| HAR11 Town Centre | 47.2 | 48.3 | 43.4 | 41.8 | 28.7 | 33.3 | 31.5 | 28.6 | 37.5 | 43.5 | 37.2 | 38.9 | 38.33 | 31.04 |
| HAR12 Allende Avenue | 38.3 | 39.4 | 35 | 35.2 | 26.7 | 23.4 | 23.3 | 24.3 | 40.2 | 40 | 34.8 | 34.1 | 32.89 | 26.64 |
| HAR13 Guilfords | 33.3 | 24.2 | 22.4 | 19.6 | 17.7 | 13 | 15.5 | Missing | 19.3 | 18.7 | 24.4 | 28.9 | 21.55 | 17.45 |
| HAR15 Gilden Way | | | | | | | | | 22 | 29.8 | 36.7 | 31 | 29.88 *26.65 | 21.59 |
| HAR16 Chalk Lane | | | | | | | | | 25.2 | 25 | Missing | 23.7 | 24.63 *22.33 | 18.09 |

HAR15 Gilden Way – New Site September 2015

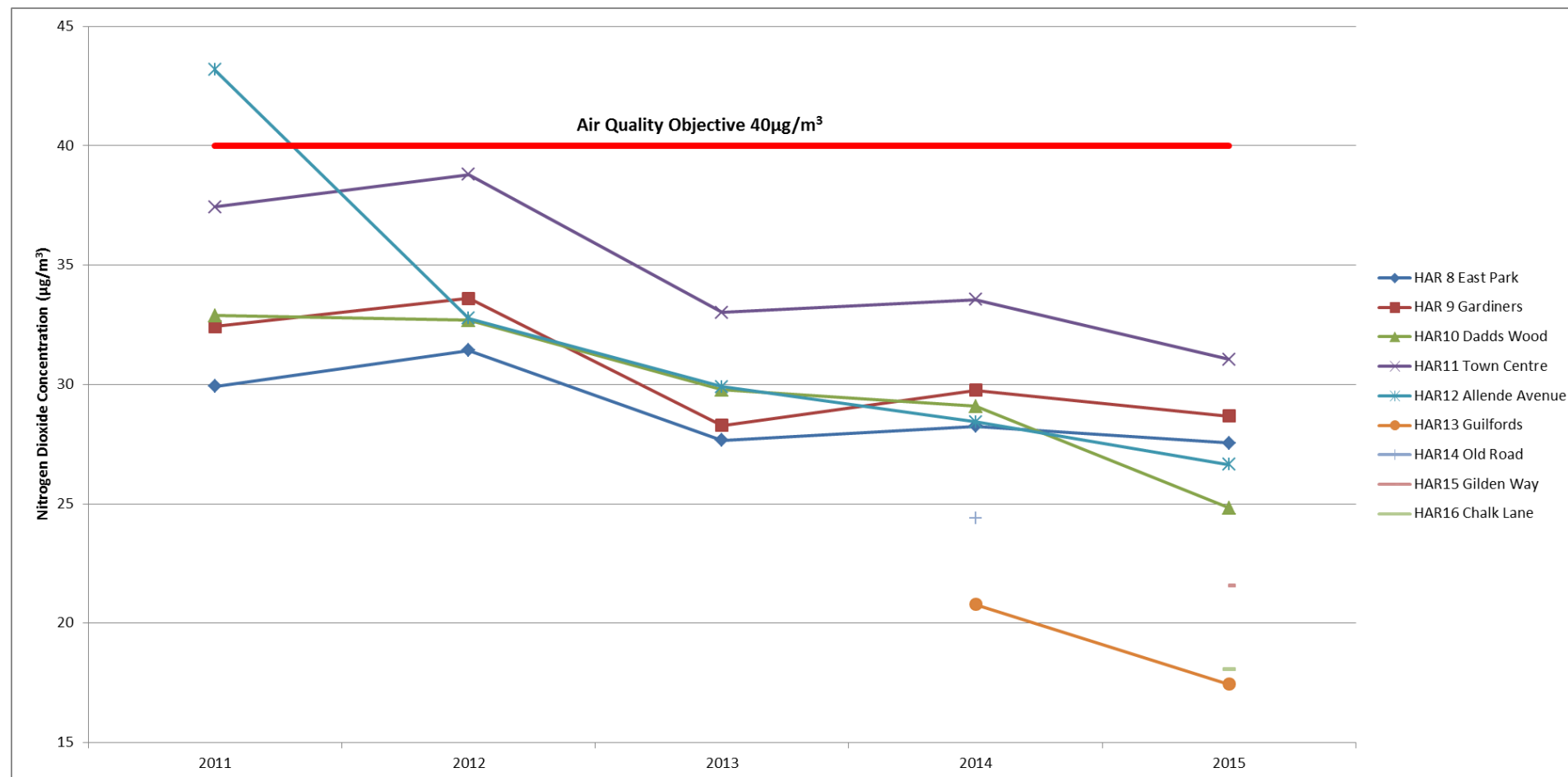
HAR16 Chalk Lane – New Site September 2015

(1) See Appendix C for details

* Annualised Data See Appendix D for details

Appendix C: Nitrogen Dioxide Trend Data

Figure C.1 – Nitrogen Dioxide Trend Data 2011-2015



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

Diffusion Tubes QA/QC

Harlow Council undertook monitoring at 8 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

Harlow Council uses the national bias adjustment figure for calculating diffusion tubes 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.

Diffusion Tube Data Annualisation

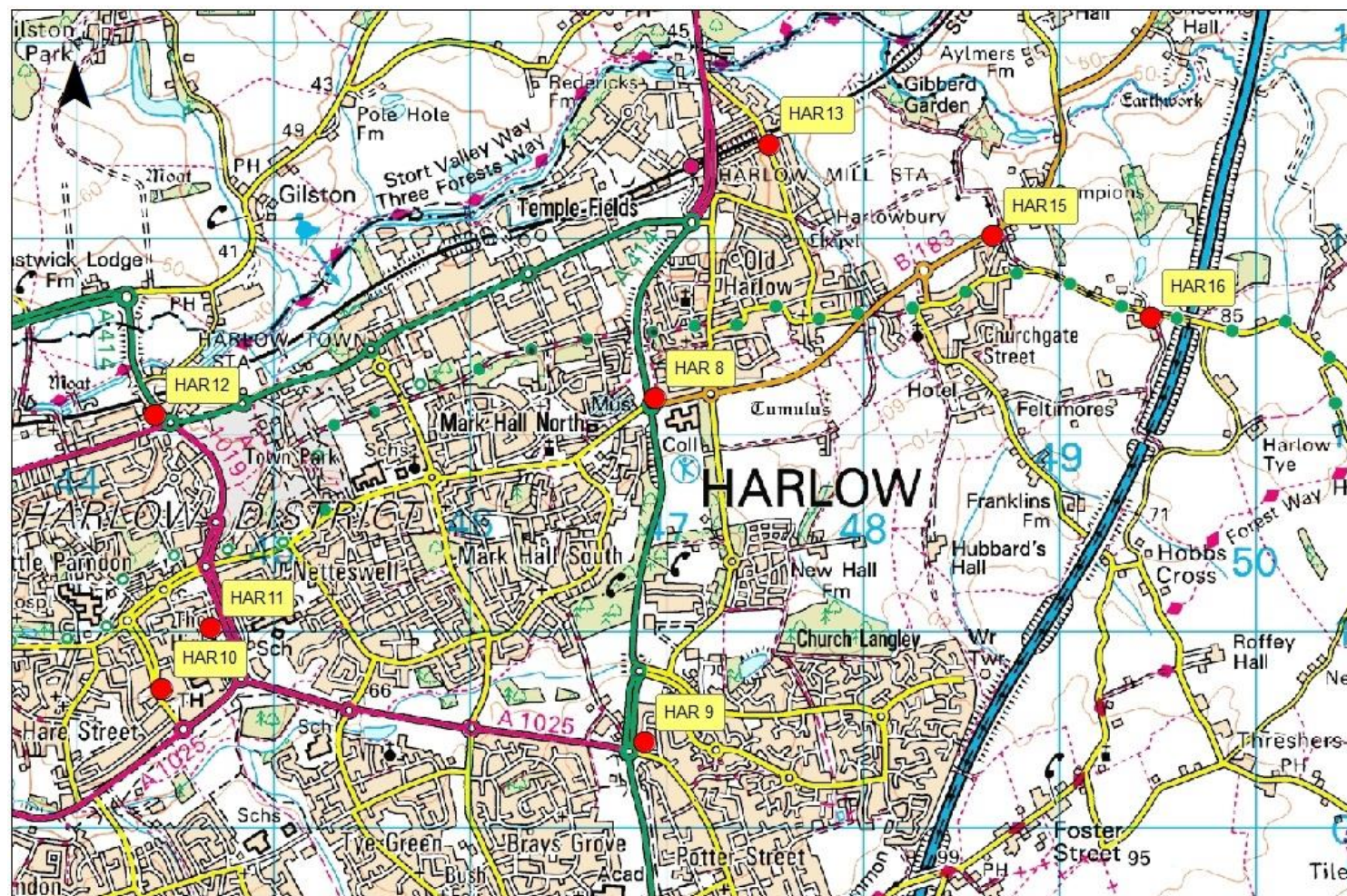
The two new sites of HAR15 and HAR16 had less than 8 months' worth of data so it was necessary to annualise. Harlow Council does not operate a continuous monitor so data from the rural background site at Chignal in Chelmsford was used.

Table D.2 – Diffusion Tube Annualisation

| Start Date | End Date | B1 (Chignal, Chelmsford Rural Background AQMS) | D1 (HAR15 Gilden Way) | B1 when D1 |
|--------------------------|---------------------|--|-----------------------|------------|
| 7th January 2015 | 4th February 2015 | 17.44 | | |
| 4th February 2015 | 4th March 2015 | 16.56 | | |
| 4th March 2015 | 1st April 2015 | 13.88 | | |
| 1st April 2015 | 29th April 2015 | 11.79 | | |
| 29th April 2015 | 27th May 2015 | 9.68 | | |
| 27th May 2015 | 1st July 2015 | 8.61 | | |
| 1st July 2015 | 29th July 2015 | 8.60 | | |
| 29th July 2015 | 26th August 2015 | 9.83 | | |
| 26th August 2015 | 30th September 2015 | 11.01 | 22.00 | 11.01 |
| 30th September 2015 | 28th October 2015 | 13.58 | 29.80 | 13.58 |
| 28th October 2015 | 2nd December 2015 | 15.06 | 36.70 | 15.06 |
| 2nd December 2015 | 6th January 2016 | 17.86 | 31.00 | 17.86 |
| Average | | 12.82 | 29.88 | 14.38 |
| Annualised Concentration | | 0.89 | | |
| Start Date | End Date | B1 (Chignal, Chelmsford Rural Background AQMS) | D1 (HAR16 Chalk Lane) | B1 when D1 |
| 7th January 2015 | 4th February 2015 | 17.44 | | |
| 4th February 2015 | 4th March 2015 | 16.56 | | |
| 4th March 2015 | 1st April 2015 | 13.88 | | |
| 1st April 2015 | 29th April 2015 | 11.79 | | |
| 29th April 2015 | 27th May 2015 | 9.68 | | |
| 27th May 2015 | 1st July 2015 | 8.61 | | |
| 1st July 2015 | 29th July 2015 | 8.60 | | |
| 29th July 2015 | 26th August 2015 | 9.83 | | |
| 26th August 2015 | 30th September 2015 | 11.01 | 25.20 | 11.01 |
| 30th September 2015 | 28th October 2015 | 13.58 | 25.00 | 13.58 |
| 28th October 2015 | 2nd December 2015 | 15.06 | | |
| 2nd December 2015 | 6th January 2016 | 17.86 | 23.70 | 17.86 |
| Average | | 12.82 | 24.63 | 14.15 |
| Annualised Concentration | | 0.91 | | |

Appendix E: Map of Monitoring Locations

Figure E.1 – Map of Monitoring Locations



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Appendix F: Summary of Air Quality Objectives in England

Table F.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective ⁴ | |
|--|--|----------------|
| | Concentration | Measured as |
| Nitrogen Dioxide (NO ₂) | 200 µg/m ³ not to be exceeded more than 18 times a year | 1-hour mean |
| | 40 µg/m ³ | Annual mean |
| Particulate Matter (PM ₁₀) | 50 µg/m ³ , not to be exceeded more than 35 times a year | 24-hour mean |
| | 40 µg/m ³ | Annual mean |
| Sulphur Dioxide (SO ₂) | 350 µg/m ³ , not to be exceeded more than 24 times a year | 1-hour mean |
| | 125 µg/m ³ , not to be exceeded more than 3 times a year | 24-hour mean |
| | 266 µg/m ³ , not to be exceeded more than 35 times a year | 15-minute mean |

⁴ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

| Abbreviation | Description |
|-------------------|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR | Air quality Annual Status Report |
| Defra | Department for Environment, Food and Rural Affairs |
| EU | European Union |
| LAQM | Local Air Quality Management |
| NO ₂ | Nitrogen Dioxide |
| NO _x | Nitrogen Oxides |
| PM ₁₀ | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less |
| PM _{2.5} | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less |
| QA/QC | Quality Assurance and Quality Control |
| TEA | Triethanolamine – substance used for absorbing nitrogen dioxide in diffusion tubes |
| UKAS | United Kingdom Accreditation Service |

References

- 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 NO₂ PT Scheme available at;
[http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-\(April-2014-February-2016\)-NO2-report.pdf](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>
- 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>
- Harlow Council Hackney Carriage Licensing Standard Conditions available at;
<http://www.harlow.gov.uk/sites/harlow/files/documents/files/Hackney%20Carriage%20Vehicle%20licence%20-%20conditions%20for%20existing%2055%20licences%20April%202015.pdf>
- Harlow Carbon Management Plan April 2016 – March 2021 available at;
<http://moderngov.harlow.gov.uk/documents/s7194/Carbon%20Management%20Plan%202016-2021.pdf>
- Harlow Infrastructure available at; <http://www.harlow.gov.uk/infrastructure>
- Proposal for new junction 7a on M11 (Harlow) available at;
<http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/Major-Schemes/Proposal-for-Junction-7a-on-M11-Harlow.aspx>
- Public Health Outcomes Framework Indicator 3.01 available at;
<http://www.phoutcomes.info/public-health-outcomes-framework#page/1/gid/1000043/pat/6/par/E12000006/ati/101/are/E07000073/iid/30101/age/230/sex/4>