# Redbridge Air Quality Annual Status Report for 2015
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This report provides a detailed overview of air quality in the London Borough of Redbridge during 2015. It has been produced to meet the requirements of the London Local Air Quality Management statutory process[1].

## Contact details

Luke Drysdale (Air Quality Lead Officer)
Lynton House (10th Floor Front)
255-259 High Road, Ilford
IG1 1NY
Tel: 0208 708-5611
Email: luke.drysdale@redbridge.gov.uk

[1] LLAQM Policy and Technical Guidance 2016 (LLAQM.TG(16)). https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-boroughs

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**Tables**

## Abbreviations

| | |
|---|---|
| AQAP | Air Quality Action Plan |
| AQMA | Air Quality Management Area |
| AQO | Air Quality Objective |
| BEB | Buildings Emission Benchmark |
| CAB | Cleaner Air Borough |
| CAZ | Central Activity Zone |
| EV | Electric Vehicle |
| GLA | Greater London Authority |
| LAEI | London Atmospheric Emissions Inventory |
| LAQM | Local Air Quality Management |
| LLAQM | London Local Air Quality Management |
| NRMM | Non-Road Mobile Machinery |
| $PM_{10}$ | Particulate matter less than 10 micron in diameter |
| $PM_{2.5}$ | Particulate matter less than 2.5 micron in diameter |
| TEB | Transport Emissions Benchmark |
| TfL | Transport for London |

**Table A. Summary of National Air Quality Standards and Objectives**

| Pollutant | Objective (UK) | Averaging Period | Date[1] |
|---|---|---|---|
| Nitrogen dioxide - $NO_2$ | 200 μg $m^{-3}$ not to be exceeded more than 18 times a year | 1-hour mean | 31 Dec 2005 |
| | 40 μg $m^{-3}$ | Annual mean | 31 Dec 2005 |
| Particles - $PM_{10}$ | 50 μg $m^{-3}$ not to be exceeded more than 35 times a year | 24-hour mean | 31 Dec 2004 |
| | 40 μg $m^{-3}$ | Annual mean | 31 Dec 2004 |
| Particles - $PM_{2.5}$ | 25 μg $m^{-3}$ | Annual mean | 2020 |
| | Target of 15% reduction in concentration at urban background locations | 3 year mean | Between 2010 and 2020 |
| Sulphur Dioxide ($SO_2$) | 266 μg $m^{-3}$ not to be exceeded more than 35 times a year | 15 minute mean | 31 Dec 2005 |
| | 350 μg $m^{-3}$ not to be exceeded more than 24 times a year | 1 hour mean | 31 Dec 2004 |
| | 125 μg $m^{-3}$ mot to be exceeded more than 3 times a year | 24 hour mean | 31 Dec 2004 |

Note: [1]by which to be achieved by and maintained thereafter

## 1. Air Quality Monitoring

### *1.1 Locations*

**Table B. Details of Automatic Monitoring Sites for 2015**

| Site ID | Site Name | X (m) | Y (m) | Site Type | In AQMA? | Distance from monitoring site to relevant exposure (m) | Distance to kerb of nearest road (N/A if not applicable) (m) | Inlet height (m) | Pollutants monitored | Monitoring technique |
|---|---|---|---|---|---|---|---|---|---|---|
| CM7 | Redbridge 7 Ley Street | 544454.8 | 187681.9 | Urban background | Y | 70 | 50m | 2.7 | $NO_2$,$PM_{10}$, $PM_{2.5}$, $O_3$ | Chemiluminescent; BAM |
| CM4 | Redbridge 4 Gardner Close | 540828.3 | 188367.9 | Urban traffic | Y | 12 | 12m | 2. | $NO_2$,$PM_{10}$, $PM_{2.5}$, | Chemiluminescent; BAM |
| | | | | | | | | | | |

**Table C. Details of Non-Automatic Monitoring Sites for 2015**

| Site ID | Site Name | X (m) | Y (m) | Site Type | In AQ MA? | Distance from monitoring site to relevant exposure (m) | Distance to kerb of nearest road (N/A if not applicable) (m) | Site height (m) | Pollutants monitored | Tube co-located with an automatic monitor? (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|
| *DT A* | *Mayfield School* | *547022.3* | *187232.3* | *Urban Background* | *Y* | *<5m* | *>100* | *1.5* | *$NO_2$* | *N* |
| *DT B* | *Ilford Lane* | *543688.0* | *186139.6* | *Roadside* | *Y* | *<5m* | *2.3* | *3.1* | *$NO_2$* | *N* |
| *DT C* | *Ilford Lane BP* | *544132.4* | *184945.6* | *Roadside* | *Y* | *<5m* | *3.0* | *2.7* | *$NO_2$* | *N* |
| *DT D* | *Ley Street* | *544454.8* | *187681.9* | *Urban Background* | *Y* | *>5m* | *50m* | *2.7* | *$NO_2$* | *Y* |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *DT E* | *Gardner Close* | *540828.3* | *188367.9* | *Roadside* | *Y* | *<5m* | *4.2* | *2.6* | *$NO_2$* | *Y* |
| *DT F* | *Fullwell Cross* | *544560.7* | *190400.8* | *Roadside* | *Y* | *<5m* | *1.2* | *1.7* | *$NO_2$* | *N* |
| *DT G* | *Perth Road* | *543421.7* | *188322.6* | *Roadside* | *Y* | *<5m* | *1.5* | *2.8* | *$NO_2$* | *N* |
| *DT H* | *Westbound Eastern Ave* | *543450.6* | *188371.1* | *Roadside* | *Y* | *<5m* | *1.3* | *2.4* | *$NO_2$* | *N* |
| *DT I* | *CentralRes Eastern Ave* | *543453.7* | *188384.4* | *Roadside* | *Y* | *<5m* | *2.0* | *2.5* | *$NO_2$* | *N* |
| *DT J* | *Eastbound Eastern Ave* | *543442.0* | *1888400.2* | *Kerbside* | *Y* | *<5m* | *0.9* | *2.7* | *$NO_2$* | *N* |
| *DT K* | *Parham Dr* | *543498.3* | *188427.6* | *Near Road* | *Y* | *<5m* | *40m from Eastern Ave* | *2.6* | *$NO_2$* | *N* |
| *DT L* | *North Circ. Rd, Northbound Royston Gd* | *541816.3* | *188161.3* | *Roadside* | *Y* | *<5m* | *2.1* | *2.8* | *$NO_2$* | *N* |
| *DT M* | *North Circ. Rd, Southbound Wanstead Pk* | *541887.8* | *188136.2* | *Roadside* | *Y* | *<5m* | *3.0* | *3.0* | *$NO_2$* | *N* |
| *DT N* | *Ethel Davis School* | *546675.6* | *188886.1* | *Near Road* | *Y* | *<5m* | *15* | *2.8* | *$NO_2$* | *N* |
| *DT O* | *Grove Road* | *540025.7* | *190494.3* | *Roadside* | *Y* | *<5m* | *8.0 horizontal* | *2.7* | *$NO_2$* | *N* |
| *DT P* | *High Road Woodford* | *540076.0* | *190682.6* | *Roadside* | *Y* | *<5m* | *2.7* | *2.6* | *$NO_2$* | *N* |
| *DT Q* | *M11* | *541992.1* | *191799.9* | *Near Road* | *Y* | *>10m* | *35* | *2.4* | *$NO_2$* | *N* |
| *DT R* | *Winston Way Primary Sch.* | *544364.1* | *186597.4* | *Roadside* | *Y* | *<5m* | *3.2* | *2.8* | *$NO_2$* | *N* |
| *DT S* | *Winston Way Gyratory* | *544360.4* | *186615.3* | *Kerbside* | *Y* | *>10m* | *0.9* | *2.6* | *$NO_2$* | *N* |
| *DT T* | *Chadwell Heath Primary School* | *547158.3* | *187699.4* | *Kerbside* | *Y* | *<5m* | *0.6* | *2.8* | *$NO_2$* | *N* |
| *DT U* | *Goodmayes Primary School* | *546665.3* | *187046.3* | *Roadside* | *Y* | *<5m* | *9.0* | *2.6* | *$NO_2$* | *N* |
| *DT V* | *Isaac Newton* | *545030.2* | *186919.8* | *Near Road* | *Y* | *<5m* | *15* | *2.6* | *$NO_2$* | *N* |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Academy* | | | | | | | | | |
| *DT W* | *Inside Winston Way Prim.Sch* | *544332.3* | *186571.3* | *Near Road* | *Y* | *<5m* | *17* | *3.0* | *$NO_2$* | *N* |

### *1.2 Comparison of Monitoring Results with AQOs*

The results presented are after adjustments for "annualisation" and for distance to a location of relevant public exposure, the details of which are described in Appendix A.

**Table D. Annual Mean $NO_2$ Ratified and Bias-adjusted Monitoring Results (µg $m^{-3}$)**

| Site ID | Site type | Valid data capture for monitoring period % [a] | Valid data capture 2015 % [b] | Annual Mean Concentration (µgm$^{-3}$) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2009[c] | 2010[c] | 2011[c] | 2012[c] | 2013[c] | 2014[c] | 2015[c] |
| *CM1* | *Automatic Background* | | | 33.6 | 33.0 | 33.3 | 36.8 | 35.4 | 32.8 | |
| *CM7* | *Automatic Background* | *95* | *95* | | | | | | 34.6 | 33.1 |
| *CM3* | *Urban Traffic* | | | **47.8** | **51.1** | **52.0** | | | | |
| *CM4* | *Urban Traffic* | *85* | *85* | **52.0** | **47.9** | **49.2** | **48.3** | **45.0** | **48.3** | **41.0** |
| *CM5* | *Urban Traffic* | | | **51.3** | **55.0** | **54.2** | | | | |

Notes: Exceedance of the $NO_2$ annual mean AQO of 40 µgm$^{-3}$ are shown in **bold**.

$NO_2$ annual means in excess of 60 µg $m^{-3}$, indicating a potential exceedance of the $NO^2$ hourly mean AQS objective are shown in bold and underlined.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

**Trends in Annual Mean $NO_2$ Concentrations**

The data above shows the annual mean $NO_2$ concentrations 7 year trend from 2009 to 2015. The results indicate that the annual mean objective was exceeded for all years monitored at the CM3 (Fullwell Cross) and CM5 (Grove Road) roadside monitoring sites until their closure in 2012. The annual mean objective was also exceeded for all 7 years monitored at the roadside site CM4 (Gardner Close) however the results at CM4 show a distinct downward trend over that period . The background site CM1 at Perth Terrace has shown steady concentrations until its closure in 2014. Similarly the background site CM7 at Ley Street has shown shown steady concentrations since opening in 2014. Both background sites CM1 and CM7 have continually met the annual mean objective concentration.

**Table E. $NO_2$ Automatic Monitor Results: Comparison with 1-hour Mean Objective**

| Site ID | Valid data capture for monitoring period % [a] | Valid data capture 2015 % [b] | Number of Hourly Means > 200 µgm$^{-3}$ | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2009[c] | 2010 [c] | 2011[c] | 2012 [c] | 2013[c] | 2014 [c] | 2015 [c] |
| *CM1* | | | *0* | *0* | *0* | *0* | *1* | *0* | |
| *CM7* | *95* | *95* | | | | | | *0* | *10* |
| *CM3* | | | *0* | *0* | *1* | | | | |
| *CM4* | *85* | *85* | *0* | *1* | *0* | *9* | *1* | *0* | *0* |
| *CM5* | | | *0* | *0* | *0* | | | | |

Notes: Exceedance of the $NO_2$ short term AQO of 200 µgm$^{-3}$ over the permitted 18 days per year are shown in **bold**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

**Table F. Annual Mean $PM_{10}$ Automatic Monitoring Results (µg m$^{-3}$)**

| Site ID | Valid data capture for monitoring period % [a] | Valid data capture 2015 % [b] | Annual Mean Concentration (µgm$^{-3}$) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2009[c] | 2010 [c] | 2011[c] | 2012 [c] | 2013[c] | 2014 [c] | 2015 [c] |
| *CM1(Background)* | | | *15.7* | *14.7* | *16.3* | *14.9* | *17.7* | *16.9* | |
| *CM7(Background)* | *78* | *78* | | | | | | *22.9* | *18.8* |

| Site ID | Valid data capture for monitoring period % [a] | Valid data capture 2015 % [b] | Annual Mean Concentration (µgm$^{-3}$) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2009[c] | 2010[c] | 2011[c] | 2012[c] | 2013[c] | 2014[c] | 2015[c] |
| *CM3(Roadside)* | | | *26.5* | *30.9* | *28.9* | | | | |
| *CM4(Roadside)* | *75* | *38* | *31.8* | *31.1* | *25.9* | *27.0* | *30.3* | *25.4* | *17.0* |
| *CM5(Roadside)* | | | *25.4* | *23.1* | *27.6* | | | | |

Notes: Exceedance of the $PM_{10}$ annual mean AQO of 40 µgm$^{-3}$ are shown in **bold**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

**Table G. $PM_{10}$ Automatic Monitor Results: Comparison with 24-Hour Mean Objective**

| Site ID | Valid data capture for monitoring period % [a] | Valid data capture 2015 % [b] | Number of Daily Means > 50 µgm$^{-3}$ | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2009[c] | 2010[c] | 2011[c] | 2012[c] | 2013[c] | 2014[c] | 2015[c] |
| *CM1(Background)* | | | *1* | *0* | *5* | *2(35)* | *2* | *5(35)* | |
| *CM7(Background)* | *78* | *78* | | | | | | *7(36)* | *3(30)* |
| *CM3(Roadside)* | | | *5* | *17* | *29* | *6(52)* | | | |
| *CM4(Roadside)* | *75* | *38* | *17* | *18* | *11* | *18* | *23* | *9(43)* | *1* |
| | | | | | | | | | |

Notes: Exceedance of the $PM_{10}$ short term AQO of 50 µg m$^{-3}$ over the permitted 35 days per year or where the 90.4th percentile exceeds 50 µg m$^{-3}$ are shown in **bold**.
Where the period of valid data is less than 90% of a full year, the 90.4th percentile is shown in brackets after the number of exceedances.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

**Table H. Annual Mean $PM_{2.5}$ Automatic Monitoring Results (μg $m^{-3}$) (<u>$PM_{2.5}$ Monitor installed at CM7 April 2016. Data will be available for ASR 2017)</u>**

| Site ID | Valid data capture for monitoring period % [a] | Valid data capture 2015 % [b] | Annual Mean Concentration (μg$m^{-3}$) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2009[c] | 2010 [c] | 2011[c] | 2012 [c] | 2013[c] | 2014 [c] | 2015 [c] |
| *CM7(Background)* | | | | | | | | | |
| | | | | | | | | | |

Notes: Exceedance of the $PM_{2.5}$ annual mean AQO of 25 μg$m^{-3}$ are shown in **bold**.
[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year
[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)
[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

## 2. Action to Improve Air Quality

### Table J. Commitment to Cleaner Air Borough Criteria

| Theme | Criteria | | Achieved (Y/N) | Evidence |
|---|---|---|---|---|
| **1. Political leadership** | ***1.a*** | Pledged to become a Cleaner Air for London Borough (at cabinet level) by taking significant action to improve local air quality and signing up to specific delivery targets. | *Y* | *Agreed by cabinet and signed by the council leader in 2013.* |
| | ***1.b*** | Provided an up-to-date Air Quality Action Plan (AQAP), fully incorporated into LIP funding and core strategies. | *Y* | *The 2016 AQAP is currently being revised and when complete it will be available online at: http://www2.redbridge.gov.uk/cms/planning_and_the_environment/the_environment-2/the_environment/environmental_health/pollution_control/air_quality.aspx*<br><br>*The AQAP is Incorporated into LIP process/public health via core stragies such as the Redbridge Environmental Action Plan (REACT), the Local Plan and Development Framework,LIP Transport Strategy, and current JSNA with view for incorporation into the revised Health & Wellbeing Strategy 2016-19, which scheduled for revision in late 2016.* |
| **2. Taking action** | **2.a** | Taken decisive action to address air pollution, especially where human exposure and vulnerability (e.g. schools, older people, hospitals etc) is highest. | *Y* | *Redbridge MAQF schools/public health projects. Modal shifts to more sustainable transport forms and reduced car usage was achieved with round 1 of the MAQF schools projects. Consequently less childern have been exposed to harmful pollution associated with repeated car use.*<br><br>*Round 2 of the MAQF schools/public health project and the Low Emission Neighbourhood (LEN)project implementation aim to achieve more sustainable modal shift and reduced car usage which will reduce pollution and assocaited exposure.Strategic travel planning in the schools project will enable children parents to plan school journeys along less polluted routes.*<br><br>*Promoting AirText in in the borough care homes and social service drop in centres so that older residents can better manage their exposure.* |
| | **2.b** | Developed plans for business engagement (including optimising deliveries and supply chain), retrofitting public buildings using the RE:FIT framework, integrating no engine idling awareness raising into the work of civil enforcement officers, (etc etc) | *Y* | *Lynton House has been retrofitted with a range of energy saving measures using the RE:FIT framework to reduce its carbon foot print. No engine idling awarenes and enforcement has been addressed at cabinet level for implementation and has been incorporated into the air quality action plan (AQAP).*<br><br>*The council is currently assessing the feasibilty of local freight consolodation.* |

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| | **2.c** | Integrated transport and air quality, including by improving traffic flows on borough roads to reduce stop/start conditions | *Y* | *There are various ongoing LIP funded transport projects across the borough which implement actions that delver air quality benefits. Examples are junctions upgrades to radial amd orbital corridors to improve traffic flow and public transport reliability. Addressing trafficlight phasing issues with TFL. Additional improved cycle lanes and walking routes borough wide with improved journey connectivity, cycle parking and enhanced lighting to facilitate an increase in walking and cycling locallyand increased use of public transport.* |
| | **2.d** | Made additional resources available to improve local air quality, including by pooling its collective resources (s106 funding, LIPs, parking revenue, etc). | *Y* | *Matchfunding for MAQF project: Round 1 £ 155,000*<br>*Round 2 £ 51,000* |
| **3. Leading by example** | **3.a** | Invested sufficient resources to complement and drive action from others | *Y* | *One full time AQ officer. Resource investment in AQ officer's training through the MSc in Air Quality Management and Control at Birmingham University and membership of the Institute of Air Quality Management (IAQM). Officer has aquired the necessary AQ competencies to complement and drive the action of others. Examples are working with other departments in the council to influence proactive air quality measures such as introducing anti idling measures in the borough to discourage unecessacry vehicle engine idling. Driving sustainable behaviour change through past and current MAQF projects. Lobbied the Mayor of London to include the London Borough of Redbridge in a potentially proposed expanded ULEZ.* |
| | **3.b** | Maintained an appropriate monitoring network so that air quality impacts within the borough can be properly understood | *Y* | *Two permanent AQM sites and diffusion tubes in triplicate at various locations. Reference PM2.5 monitoring has been added to the background AQM site at Ley Stree to better understand the impact of this species. Additional monitoring capability around schools has been implemented to assist in gaining a better understanding in AQ impacts in these locations.* |
| | **3.c** | Reduced emissions from council operations, including from buildings, vehicles and all activities. | *Y* | *NO2 and particulate emission reductions achieved by upgrading council fleet to Euro V and Euro IV specifications. All fleet is LEZ compliant and preparations are underway to ensure that all council fleet will be Euro IV compliant for ULEZ implementation regardless of the final agreed extension of the zone.*<br>*Council carbon emission reduction programme in place promoting and implementing measures to reduce carbon emissions from energy use and transportation. Examples are the council's particpation the de-centralised energy DEMAP programme, increased provision of sustainable transport options, infrastructure and training. Susaintainable upgrades to council buildings to optimise engery usage and reduce emissions.* |
| | **3.d** | Adopted a procurement code which reduces emissions from its own and its suppliers activities, including from buildings and vehicles operated by and on their behalf (e.g. rubbish trucks). | *Y* | *Currently as a result of our adopted greener fleet procurement code,from a total of 50 refuse vehicles, 19 meet Euro VI standard,14 meet Euro V and 17 meet Euro IV. 10 new Euro VI have been ordered and all Euro IV and V trucks will be replaced by Euro VI. This will result in significant emission reductions of NOx, primary $NO_2$ and particulates.There are additional 285 fleet vehicles. The entire fleet will be Euro VI compliant by 2018 which will result in further emission reductions.* |

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| | | | | |
| **4. Using the planning system** | **4.a** | Fully implemented the Mayor's policies relating to air quality neutral, combined heat and power and biomass. | *Y* | *All approved planning applications must meet the Mayor's requirements relating to AQ neutral, CHP and Biomass. Register is kept on applications that have been subject to AQ neutral and AQ assessment evaluation.Planning conditions are used to ensure that emissions from demolition, building work, on-site machinery, NRMM and transport activites are minimised. Limiting the number of parking spaces with new development, implementing more cycle parking facilities and electric vehicle charging points.* |
| | **4.b** | Collected s106 from new developments to ensure air quality neutral development, ***where possible*** | *Y* | *Planning applications for new developments are evaluted for the potential for s106 contributions. No contribtuions have been collected so far.* |
| | **4.c** | Provided additional enforcement of construction and demolition guidance, with regular checks on medium and high risk building sites. | *Y* | *We will investigate and enforce the requirements relating to dust control on sites subject to receiving nuisance complaints but would require additional staffing resources in matters relating to NRMM .Awaiting training from the GLA regarding NRMM enforcement.* |
| **5. Integrating air quality into the public health system** | **5** | Included air quality in the borough's Health and Wellbeing Strategy and/or the Joint Strategic Needs Assessment | *Y* | *Air Quality has been included the Joint Strategic Needs Assessment. The last Health and Wellbeing Strategy expired in 2015. Inclusion the revised Health and Wellbeing Strategy including air quality as a key theme is currently being proposed.The final revised strategy will be determined late 2016.* |
| **6. Informing the public** | **6.a** | Raised awareness about air quality locally | *Y* | *airTEXT promotion in schools, elderly care homes, social service drop in centres, in local communitesand on the council website and Twitter feed. AQ community MAQF campaign. The promotion and publicity about our schools AQ Projects in the media and the forthcoming schools AQ and Low Emission Neighbourhood (LEN) Projects have raised considerable awareness about local air quality. We are currently in the process of revising our air quality web page to make it more informative regarding all local air quality issues.* |

## 2.1 Air Quality Action Plan Progress

Table K provides a brief summary of Redbridge Council's progress against the Air Quality Action Plan, showing progress made this year. New projects which commenced in 2015 are shown at the bottom of the table.

**Table K. Delivery of Air Quality Action Plan Measures**

The Council's air quality action plan is in the course of being updated. Therefore a selection of key achievements has been selected from the current actions which included in the revised action plan. A new list of achievements against the new action plan currently under preparation will be provided in the 2016 Annual Status Report.

| Measure | Action | Progress | Further information |
|---|---|---|---|
| **1** | Completion of MAQF School Projects Round 1. | • Modal Shifts achieved. Car usage to and from school reduced in favour of more sustainable transport.<br>• Benefits will be reduced emissions around the schools. | |
| **2** | Commencent of MAQF School Projects Round 2. (September 2016-2019)<br>16 schools in 6 clusters. Work to be delivered for 2 school clusters per year. | • More Modal Shifts to be achieved to reduce car usage around schools in favour of more sustainable transport.<br>• Walking routes to be established to reduce | |

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| | | pupil and parent exposure.<br>• AQ/Public Health community campaigns to educate the local community regarding the benefits of reduce car usage in favour of more sustainable transport<br>• Benefits will be reduced emissions around the schools and in the local community. | |
| **3** | Commencement of the joint Redbridge/Newham Low Emission Neighbourhood (LEN) Project 2016-2019 in Ilford Garden Junction | • Vehicle emission reductions in area on the A118 Romford Road through infrastructure improvments that will facillitate increased cycling, walking, greater accessibilty and reduced car usage. | |
| **4** | **Dealing with emissions from Transport** | Fleet services have been evaluated for upgrades to meet ULEZ compliance requirements.<br>Redbridge Transport Team has responded to the Mayor of London's consultation. The council fleet aims to be ULEZ compliant by 2018.<br>The council is currently considering adopting legislation for enforcing against vehicle idling at exposure hotspots (ie outside schools).<br>Smarter driver training is given to all council drivers and all fleet vehicles are fitted with econo-speed governors.<br>Differential parking concessions allow free parking permits for residents in the borough. It is currently being considered to extend this other vehicles to discourage the use of more polluting vehicles.<br>The council is also currently considering local | |

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| | | freight consoldation measures to reduce delivery numbers to council buildings. Encouraging more walking and cycling in Redbridge has progessed through the council's cycling team and through MAQF schools projects. This work continues to progess with the aim of facilitating greater modal shifts to sustainable transport. | |
| **5** | **Dealing with emissions from Bulidings** | Lynton House has been refurbished with a range of energy efficiency improvement measures in 2014. The Mayor London RE:FIT programme is currently working in parternership with 6 Redbridge schools installing solar panels for electricity generation. The council and the RE:FIT team are also currently exploring the options to take forward energy efficiency measures in council buildings identified in the Redbridge Environmental Action Plan. New low emission boilers installation are an example of a range of measures currently being considered that will deliver emission reductions. | |
| **6** | **Raising Awareness** | airTEXT promotion is being delivered in schools, elderly care homes, social service drop in centres, in local communites and on the council website and Twitter feed. Awareness has also being raised in the community through the MAQF campaign. The promotion and publicity about our schools AQ Projects in the media and the forthcoming schools AQ and Low Emission Neighbourhood (LEN) Projects have raised | |

| | | | |
|---|---|---|---|
| | | considerable awareness about local air quality. We are currently in the process of revising our air quality web page to make it more informative regarding all local air quality issues. | |

## 3. Planning Update and Other New Sources of Emissions

### 3.1 New or significantly changed industrial or other sources

London Borough of Redbridge confirms that there are no new or significantly changed industrial or other sources identified.

## Appendix A Details of Monitoring Site QA/QC

### *A.1 Automatic Monitoring Sites*

Air quality monitoring data provides a measure of actual concentrations and therefore exceedences of air quality objectives. Data also provides information on trends in air pollution and can provide the basis for verifying the various models used to predict future pollution levels.

In 2015 London Borough of Redbridge undertook automatic monitoring at the following two sites:

- **CM7 - Redbridge 7** (Ley Street)located northeast of Ilford – an urban background site within the Ley Street Depot that is sited on Ley Street. The site monitored nitrogen dioxide, PM10 (by BAM), and ozone.Since 2016 this site began monitoring PM2.5 (by BAM) . Redbridge 7 (Ley Street) was set up in 2014, and is also identified in this report as CM7.

- **CM4 - Redbridge 4** (Wanstead) – an urban traffic site close to the A12 towards the southwest of the Borough. The site started operating in November 1999. The site monitors nitrogen dioxide, PM10 and PM2.5 (both by BAM). Until March 2012 it also monitored carbon monoxide and sulphur dioxide.

The sites represent relevant exposure within the Borough. The sites are part of the London Air Quality Network and therefore the standards of QA/QC are similar to those of the government's AURN sites. Fortnightly local site operator (LSO) zero/span calibrations of the gas analysers are carried out by the local authority, with subsequent data collection, validation and ratification undertaken by the ERG at King's College London. In all cases the data are fully ratified unless reported otherwise. Details of the sites can be found at www.londonair.org.uk

UKCAS accredited independent site audits are carried out every 6 months by the National Physics Laboratory (NPL). Additional six monthly equipment service visits by Enviro Technology Services Plc.

The Council previously operated three other automatic monitoring stations in the Borough: **Redbridge 2** - a roadside site on Ilford Broadway closed in 2003, **Redbridge 3** – a kerbsite site at Fulwell Cross closed in 2012, and **Redbridge 5** – a roadside site in South Woodford closed in 2012.

#### $PM_{10}$ Monitoring Adjustment

The LLAQM.TG16 guidance highlights that Met-One $PM_{10}$ Unheated BAM 1020 instruments conform to the equivalence criteria relating to the gravimetric European reference method. A correction using a factor of 1.2 is automatically applied to adjust for slope.

## A.2 Diffusion Tube Quality Assurance / Quality Control

- Diffusion Tubes are prepared and analysed by UKAS accredited Gradko International Ltd
- Diffusion Tubes are prepared using 50% triethanolamine with acetone method and analysed using UV spectrophotometry
- The lab follows the procedures set out in the Defra Technical Guidance for LAQM TG(09).

- For details attaining to 'results' – precision, bias adjustment factors; and reference methods are as follows:

  Results of laboratory precision (tube precision and WASP results):

  The LAQM website gives the following precision results for Gradko 50% TEA in acetone:

  2015 Good (15 studies)

  The laboratory performance of Gradko International was tested in April to November 2015 under AIR NO2 PT Rounds AR006, AR007, AR009 and AR010. The performance was 100% in all rounds.

  The version of the bias adjustment factor database used is: 04/16

The bias adjustment factor has been applied to the monthly and annual means as follows:

| | | | Monthly means [µg/m$^3$] (not bias adjusted) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tube nos. | Site ID | Site name | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 1,2,3 | DT A | Mayfield School | 25.3 | 33.3 | 24.5 | 27.6 | 21.1 | | 21.3 | 23.8 | 29.9 | 28.0 | 32.7 | 31.0 |
| 4,5,6 | DT B | Ilford Lane | 51.8 | 58.4 | 47.6 | 54.7 | 52.1 | 50.1 | 56.4 | 58.7 | 59.2 | 49.5 | 62.1 | 55.7 |
| 7,8,9 | DT C | Ilford Lane BP | 56.3 | 60.0 | 49.8 | 51.8 | 48.2 | 52.2 | 55.8 | 53.8 | 63.4 | 55.3 | 63.0 | 60.7 |
| 10,11,12 | DT D | Ley Street | 38.7 | 39.8 | 30.1 | 29.7 | 25.9 | 25.4 | 24.7 | 25.2 | 38.1 | 35.2 | 32.1 | 29.0 |
| 13,14,15 | DT E | Gardner Close | 52.8 | 55.7 | 43.6 | 49.0 | 39.0 | 39.0 | 42.3 | 42.0 | 42.8 | 42.5 | 36.3 | 57.4 |
| 16,17,18 | DT F | Fulwell Cross | 54.3 | 48.2 | 43.9 | 40.0 | 41.2 | 40.0 | 47.5 | 48.7 | 49.9 | 49.2 | 52.9 | 48.5 |
| 19,20,21 | DT G | Perth Road | 48.7 | 46.1 | 40.5 | 85.2 | 27.5 | 60.1 | 35.9 | 35.9 | 73.2 | 48.4 | 56.3 | 35.4 |
| 22,23,24 | DT H | WestB Eastern Ave | 74.4 | 83.9 | 68.0 | 38.9 | 36.7 | 36.6 | 46.0 | 63.9 | 60.4 | 53.8 | 47.4 | 60.4 |
| 25,26,27 | DT I | Central Res | 65.7 | 59.7 | 50.3 | 32.2 | | 30.2 | 68.9 | 93.6 | 40.6 | 51.2 | 57.7 | 49.6 |
| 28,29,30 | DT J | EastB Eastern Ave | 54.2 | 53.8 | 45.2 | 59.8 | 29.9 | 56.2 | 80.1 | 46.6 | 51.8 | 39.3 | 42.6 | 46.6 |
| 31,32,33 | DT K | Parham Drive | 39.4 | 37.4 | 32.2 | 47.9 | 51.9 | 51.8 | 30.6 | 33.7 | 55.5 | 62.5 | 65.0 | 58.4 |
| 34,35,36 | DT L | NCR Nth Royston Gdns | 45.5 | 52.5 | 49.9 | 77.9 | 36.4 | 40.2 | 38.5 | 39.1 | 59.0 | 58.7 | 46.4 | 32.7 |
| 37,38,39 | DT M | NCR Sth Wanstead Park | 74.9 | 85.7 | 67.2 | 49.5 | 75.6 | 73.3 | 84.3 | 87.0 | 90.4 | 83.1 | 81.0 | 69.9 |
| 40,41,42 | DT N | Ethal Davis School | 36.4 | 31.9 | 25.2 | 26.2 | 21.8 | 21.3 | 23.5 | 22.2 | 31.2 | 27.2 | 31.5 | 27.6 |
| 43,44,45 | DT O | Grove Road | | 50.9 | 40.4 | 48.4 | 39.7 | 34.1 | 46.3 | 47.7 | 51.7 | 47.8 | 59.9 | 61.8 |
| 46,47,48 | DT P | High Road Woodford | 41.1 | 44.8 | 38.1 | 36.8 | 30.0 | 46.8 | 32.8 | 37.8 | 41.1 | 40.9 | 43.0 | 47.1 |
| 49,50,51 | DT Q | Chigwell Rd M11 | 51.1 | 52.5 | | | 43.9 | 43.9 | 50.1 | 48.9 | 40.2 | 40.5 | 57.0 | 64.6 |
| 52,53,54 | DT R | Winston Way Primary | 54.9 | 55.8 | 51.2 | 54.8 | 45.2 | 55.9 | 53.6 | 52.8 | 39.7 | 60.7 | 59.4 | 49.7 |
| 55,56,57 | DT S | Winston Way Gyratory | 57.5 | 60.6 | 48.2 | 56.6 | 49.5 | 55.8 | 53.9 | 55.5 | 64.2 | 64.3 | 53.6 | 44.8 |
| 58,59,60 | DT T | Chadwell Heath Primary | 43.7 | 48.5 | 42.2 | 48.2 | 36.9 | 40.5 | 43.6 | 40.2 | 50.3 | 44.3 | 48.4 | 43.8 |
| 61,62,63 | DT U | Goodmayes Primary | 43.6 | 44.3 | 31.3 | 37.8 | 30.3 | 32.1 | 33.5 | 29.7 | 41.2 | 35.5 | 42.9 | 36.8 |
| 64,65,66 | DT V | Isaac Newton Academy | 41.4 | 43.8 | 35.8 | 33.0 | 26.4 | 27.1 | 28.4 | 27.5 | 36.8 | 36.1 | | 27.2 |
| 67,68,69 | DT W | Inside Winston Way Prim. | 43.2 | 43.6 | 33.4 | 36.6 | 27.8 | 29.3 | 29.6 | 31.8 | 60.8 | 40.1 | 31.1 | 31.8 |

| 2015 | Calculation of period adjusted and bias adjusted annual means | | | | | | | | bias factor | 0.95 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculation of period adjustment factors | | | | | | |
| Site ID | Site name | Period mean | Period | Period mean | Ratio Am/Pm | Period mean | Ratio Am/Pm | Period adjustm'nt factor ($R_a$) | Annual means before bias adj | Bias adjusted annual means |
| DT A | Mayfield School | 27.1 | 11 months | | | | | 1.000 | 27.1 | 25.8 |
| DT B | Ilford Lane | 54.7 | Whole year | | | | | 1.000 | 54.7 | 52.0 |
| DT C | Ilford Lane BP | 55.9 | Whole year | | | | | 1.000 | 55.9 | 53.1 |
| DT D | Ley Street | 31.2 | Whole year | | | | | 1.000 | 31.2 | 29.6 |
| DT E | Gardner Close | 45.2 | Whole year | | | | | 1.000 | 45.2 | 42.9 |
| DT F | Fulwell Cross | 47.0 | Whole year | | | | | 1.000 | 47.0 | 44.7 |
| DT G | Perth Road | 49.4 | Whole year | | | | | 1.000 | 49.4 | 46.9 |
| DT H | WestB Eastern Ave | 55.9 | Whole year | | | | | 1.000 | 55.9 | 53.1 |
| DT I | Central Res | 54.5 | 11 months | | | | | 1.000 | 54.5 | 51.8 |
| DT J | EastB Eastern Ave | 50.5 | Whole year | | | | | 1.000 | 50.5 | 48.0 |
| DT K | Parham Drive | 47.2 | Whole year | | | | | 1.000 | 47.2 | 44.8 |
| DT L | NCR Nth Royston Gdns | 48.1 | Whole year | | | | | 1.000 | 48.1 | 45.7 |
| DT M | NCR Sth Wanstead Park | 76.8 | Whole year | | | | | 1.000 | 76.8 | 73.0 |
| DT N | Ethal Davis School | 27.2 | Whole year | | | | | 1.000 | 27.2 | 25.8 |
| DT O | Grove Road | 48.1 | 11 months | | | | | 1.000 | 48.1 | 45.7 |
| DT P | High Road Woodford | 40.0 | Whole year | | | | | 1.000 | 40.0 | 38.0 |
| DT Q | Chigwell Rd M11 | 49.3 | 10 months | | | | | 1.000 | 49.3 | 46.8 |
| DT R | Winston Way Primary | 52.8 | Whole year | | | | | 1.000 | 52.8 | 50.2 |
| DT S | Winston Way Gyratory | 55.4 | Whole year | | | | | 1.000 | 55.4 | 52.6 |
| DT T | Chadwell Heath Primary | 44.2 | Whole year | | | | | 1.000 | 44.2 | 42.0 |
| DT U | Goodmayes Primary | 36.6 | Whole year | | | | | 1.000 | 36.6 | 34.8 |
| DT V | Isaac Newton Academy | 33.0 | 11 months | | | | | 1.000 | 33.0 | 31.4 |
| DT W | Inside Winston Way Prim | 36.6 | Whole year | | | | | 1.000 | 36.6 | 34.8 |

Factor from Local Co-location Studies (if available)

The local co-location studies at the Redbridge 7, Ley Street, CMT = DT D and Redbridge 4, Gardner Close, CM4 = DT E gave an averaged local bias factor for 2015 of 0.955

| 2015 | Bias adjustment factor |
|---|---|
| Background Redbridge local: CM7=DT D | 1.04 |
| Roadside Redbridge local: CM4=DT E | 0.87 |
| Average local: CM7=DT D and CM4=DT E | 0.955 |
| National Default – (15 studies) | 0.95 |

Discussion of Choice of Factor to Use

For each of the two local sites there were 12 months of "Good Precision" data. The diffusion tubes are in similar exposure positions to the sampler inlets of the chemiluminescent analysers at the continuous sites. We have applied the National Default factor of 0.95 in our calculations in preference to the local factor of 0.955 since the former derives from fifteen study sites.

Bias adjustment factors for previous years:

2014: A national bias factor of 0.76 used (Lab: ESG Glasgow)

2013: A local bias factor of 0.80 used (Lab: ESG Glasgow)

### *A.3 Adjustments to the Ratified Monitoring Data*

Short-term to Long-term Data Adjustment

**Table M. Short-Term to Long-Term Monitoring Data Adjustment**

| **2015 $PM_{10}$ Annualisation calculations** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Nearby long-term, continuous monitoring sites** | | Annual capture rate | Annual mean Am | | Jul-Dec Period mean Pm1 | Ratio Am/Pm 1 | | |
| B & D - Scrattons Fm | BG2 | 94 | 20.6 | | 18.9 | 1.089 | | |
| Bexley - Belvedere West | BQ7 | 94 | 17.9 | | 17.4 | 1.032 | | |
| Havering - Rainham | HV1 | 94 | 17.9 | | 17.5 | 1.026 | | |
| | | | | | Average ratio ($R_a1$) | 1.049 | | |
| **Redbridge sites** | | Annual capture rate | Period capture rate | Annual 99.8 hourly percentile | Jul-Dec Period mean | Period mean x $R_a1$ | Annual mean estimate | |
| Perth Terrace | RB1 | | | | | | | |
| | | | | | | | | |
| Ley Street | RB7 | | | | | | | |
| | | | | | | | | |
| Gardner Close | RB4 | 38 | 75 | | 16.2 | 17.0 | | |
| Annual mean RB4 Estimate: | | | | | | | 17.0 | |

| **Site** | **Site Type** | **Annual Mean ($\mu g/m^3$)** | **Period Mean ($\mu g/m^3$)** | **Ratio** |
|---|---|---|---|---|
| BG2 | Background | 20.6 | 18.9 | 1.089 |
| BQ7 | Background | 17.9 | 17.4 | 1.032 |
| HV1 | Background | 17.9 | 17.5 | 1.026 |
| | | | **Average** | 1.049 |

## Appendix B Full Monthly Diffusion Tube Results for 2015

**Table N. $NO_2$ Diffusion Tube Results**

| *Site ID* | *Valid data capture for monitoring period %* [a] | *Valid data capture 2015 %* [b] | *Annual Mean $NO_2$ (Bias Adj Factor =0.95)* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Jan* | *Feb* | *March* | *Apr* | *May* | *June* | *Jul* | *Aug* | *Sept* | *Oct* | *Nov* | *Dec* | *Annual mean – raw data* [c] | *Annual mean – bias adjusted* [c] |
| DT A | 92 | 92 | 25.3 | 33.3 | 24.5 | 27.6 | 21.1 | | 21.3 | 23.8 | 29.9 | 28.0 | 32.7 | 31.0 | 27.1 | 25.8 |
| DT B | 100 | 100 | 51.8 | 58.4 | 47.6 | 54.7 | 52.1 | 50.1 | 56.4 | 58.7 | 59.2 | 49.5 | 62.1 | 55.7 | **54.7** | **52.0** |
| DT C | 100 | 100 | 56.3 | 60.0 | 49.8 | 51.8 | 48.2 | 52.2 | 55.8 | 53.8 | 63.4 | 55.3 | 63.0 | 60.7 | **55.9** | **53.1** |
| DT D | | | 38.7 | 39.8 | 30.1 | 29.7 | 25.9 | 25.4 | 24.7 | 25.2 | 38.1 | 35.2 | 32.1 | 29.0 | 31.2 | 29.6 |
| DT E | 100 | 100 | 52.8 | 55.7 | 43.6 | 49.0 | 39.0 | 39.0 | 42.3 | 42.0 | 42.8 | 42.5 | 36.3 | 57.4 | **45.2** | **42.9** |
| DT F | 100 | 100 | 54.3 | 48.2 | 43.9 | 40.0 | 41.2 | 40.0 | 47.5 | 48.7 | 49.9 | 49.2 | 52.9 | 48.5 | **47.0** | **44.7** |
| DT G | 100 | 100 | 48.7 | 46.1 | 40.5 | 85.2 | 27.5 | 60.1 | 35.9 | 35.9 | 73.2 | 48.4 | 56.3 | 35.4 | **49.4** | **46.9** |
| DT H | 100 | 100 | 74.4 | 83.9 | 68.0 | 38.9 | 36.7 | 36.6 | 46.0 | 63.9 | 60.4 | 53.8 | 47.4 | 60.4 | **55.9** | **53.1** |
| DT I | 92 | 92 | 65.7 | 59.7 | 50.3 | 32.2 | | 30.2 | 68.9 | 93.6 | 40.6 | 51.2 | 57.7 | 49.6 | **54.5** | **51.8** |
| DT J | 100 | 100 | 54.2 | 53.8 | 45.2 | 59.8 | 29.9 | 56.2 | 80.1 | 46.6 | 51.8 | 39.3 | 42.6 | 46.6 | **50.5** | **48.0** |
| DT K | 100 | 100 | 39.4 | 37.4 | 32.2 | 47.9 | 51.9 | 51.8 | 30.6 | 33.7 | 55.5 | 62.5 | 65.0 | 58.4 | **47.2** | **44.8** |
| DT L | 100 | 100 | 45.5 | 52.5 | 49.9 | 77.9 | 36.4 | 40.2 | 38.5 | 39.1 | 59.0 | 58.7 | 46.4 | 32.7 | **48.1** | **45.7** |
| DT M | 100 | 100 | 74.9 | 85.7 | 67.2 | 49.5 | 75.6 | 73.3 | 84.3 | 87.0 | 90.4 | 83.1 | 81.0 | 69.9 | **76.8** | **73.0** |
| DT N | 100 | 100 | 36.4 | 31.9 | 25.2 | 26.2 | 21.8 | 21.3 | 23.5 | 22.2 | 31.2 | 27.2 | 31.5 | 27.6 | 27.2 | 25.8 |
| DT O | 92 | 92 | | 50.9 | 40.4 | 48.4 | 39.7 | 34.1 | 46.3 | 47.7 | 51.7 | 47.8 | 59.9 | 61.8 | **48.1** | **45.7** |
| DT P | | | 41.1 | 44.8 | 38.1 | 36.8 | 30.0 | 46.8 | 32.8 | 37.8 | 41.1 | 40.9 | 43.0 | 47.1 | **40.0** | 38.0 |
| DT Q | 83 | 83 | 51.1 | 52.5 | | | 43.9 | 43.9 | 50.1 | 48.9 | 40.2 | 40.5 | 57.0 | 64.6 | **49.3** | **46.8** |

| Site ID | Valid data capture for monitoring period % [a] | Valid data capture 2015 % [b] | Annual Mean $NO_2$ (Bias Adj Factor =0.95) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Jan | Feb | March | Apr | May | June | Jul | Aug | Sept | Oct | Nov | Dec | Annual mean – raw data [c] | Annual mean – bias adjusted [c] |
| DT R | 100 | 100 | 54.9 | 55.8 | 51.2 | 54.8 | 45.2 | 55.9 | 53.6 | 52.8 | 39.7 | 60.7 | 59.4 | 49.7 | **52.8** | **50.2** |
| DT S | 100 | 100 | 57.5 | 60.6 | 48.2 | 56.6 | 49.5 | 55.8 | 53.9 | 55.5 | 64.2 | 64.3 | 53.6 | 44.8 | **55.4** | **52.6** |
| DT T | 100 | 100 | 43.7 | 48.5 | 42.2 | 48.2 | 36.9 | 40.5 | 43.6 | 40.2 | 50.3 | 44.3 | 48.4 | 43.8 | **44.2** | **42.0** |
| DT U | 100 | 100 | 43.6 | 44.3 | 31.3 | 37.8 | 30.3 | 32.1 | 33.5 | 29.7 | 41.2 | 35.5 | 42.9 | 36.8 | 36.6 | 34.8 |
| DT V | 92 | 92 | 41.4 | 43.8 | 35.8 | 33.0 | 26.4 | 27.1 | 28.4 | 27.5 | 36.8 | 36.1 | | 27.2 | **33.0** | 31.4 |
| DT W | 100 | 100 | 43.2 | 43.6 | 33.4 | 36.6 | 27.8 | 29.3 | 29.6 | 31.8 | 60.8 | 40.1 | 31.1 | 31.8 | 36.6 | 34.8 |

Exceedance of the $NO_2$ annual mean AQO of 40 $\mu gm^{-3}$ are shown in **bold**.

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

[b] data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

[c] Means should be "annualised" in accordance with LLAQM Technical Guidance, if valid data capture is less than 75%

Distance Adjustment

The bias-adjusted $NO_2$ annual mean diffusion tube concentration exceedances reported at the sites listed in table N (above) have been distance corrected for the nearest location relevant for exposure. These predictions have been done using the $NO_2$ fall-off with distance calculator available on the LAQM Support website.

The following factors are have been used to predict the annual mean NO2 concentration (in µg/$m^3$) at the the receptor/relevant exposure :

- How far from the KERB is the location where the measurement was made (in meters)
- How far from the KERB is the receptor/relevant exposure (in meters)
- The local annual mean background NO2 concentration (in µg/$m^3$)
- The measured annual mean NO2 concentration (in µg/$m^3$)

The measurement and background concentrations must be for the same year. The background concentration could come from the national maps published at ( http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html) or from a nearby monitor in a background location. 2015 National map background concentrations have been in this report. Use of a measured result from nearby background monitor for background concetration will be denoted by *****

Data for the distance of the kerb to the measurement location has been taken from table B in this report.

The calculator follows the proceedure set out in Box 2.3 of LAQM TG(09). The results will have greater uncertainity than 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. Each distance should be greater than 0.1m and less than 50m. The $NO_2$ fall off with distance correction has only been applied to sites with relevant exposure that exceed the AQ objectives and that also meet the distance requirement.

**Table O. $NO_2$ Distance Corrected Diffusion Tube Results**

| *Site ID* | *Annual mean – raw data* [c] | *Annual mean – bias adjusted* [c] | *Local Annual mean – background* | *Distance of measurement from kerb of nearest road (m)* | *Distance of receptor from kerb (m)* | *Annual mean – distance corrected* |
|---|---|---|---|---|---|---|
| DT A | 27.1 | 25.8 | | | | |
| DT B | **54.7** | **52.0** | 30.6 | 2.3 | 2 | **52.7** |
| DT C | **55.9** | **53.1** | 25.4 | 3.0 | 4.9 | **49.6** |
| DT D | 31.2 | 29.6 | | | | |
| DT E | **45.2** | **42.9** | 29 | 4.2 | 11.3 | 39 |
| DT F | **47.0** | **44.7** | 20.8 | 1.2 | 8.7 | 34.8 |
| DT G | **49.4** | **46.9** | 26.3 | 1.5 | 6.4 | **40.3** |
| DT H | **55.9** | **53.1** | 26.3 | 1.3 | 4.3 | **49.3** |
| DT I | **54.5** | **51.8** | | | | |
| DT J | **50.5** | **48.0** | 26.3 | 0.9 | 7.5 | 38.9 |
| DT K | **47.2** | **44.8** | 26.3 | 40 | 43.9 | **43.4** |
| DT L | **48.1** | **45.7** | 33 | 2.1 | 26.2 | 38.1 |
| DT M | **76.8** | **73.0** | 33 | 3.0 | 4.8 | **68.1** |
| DT N | 27.2 | 25.8 | | | | |
| DT O | **48.1** | **45.7** | 34.1 | 8.0 | 12.8 | **43.8** |
| DT P | **40.0** | 38.0 | | | | |
| DT Q | **49.3** | **46.8** | | | | |
| DT R | **52.8** | **50.2** | 26.8 | 3.2 | 16.8 | **40.0** |
| DT S | **55.4** | **52.6** | | | | |

| *Site ID* | *Annual mean – raw data* [c] | *Annual mean – bias adjusted* [c] | *Local Annual mean – background* | *Distance of measurement from kerb of nearest road (m)* | *Distance of receptor from kerb (m)* | *Annual mean – distance corrected* |
|---|---|---|---|---|---|---|
| DT T | **44.2** | **42.0** | 21.8 | 0.6 | 6.6 | 33.1 |
| DT U | 36.6 | 34.8 | | | | |
| DT V | **33.0** | 31.4 | | | | |
| DT W | 36.6 | 34.8 | | | | |