2014 Air Quality Progress Report for London Borough of Redbridge

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

February 2015

Local Authority Officer	Peter Russell
Department	Environmental Health / Community Safety
Address	10th Floor Lynton House, 255-259 High Road, Ilford, Essex, IG1 1NY
Telephone	020 8708 5497
e-mail	peter.russell@redbridge.gov.uk
Report Reference number	Redbridge2014PR
Date	February 2015

Executive Summary

This is the Air Quality and Action Plan Progress Report 2014 for the London Borough of Redbridge ("the Council"). This report is the latest report produced by the Council to fulfil this part of the continuing commitment to the Local Air Quality Management (LAQM) process. This Report provides an annual update of recent air quality issues in Redbridge, based on the results of air quality monitoring in the Borough to the end of 2013, as well as a focus on the Council's progress on reducing air pollution through its Air Quality Action Plan, which was adopted in March 2008.

The Council's previous Updating and Screening Assessment 2012 of air quality confirmed that there were locations across the Borough with relevant public exposure where the Government's air quality objectives might be exceeded.

Previous assessments have shown the Council's monitoring results for carbon monoxide, benzene and sulphur dioxide indicate that the objectives for these pollutants are not being exceeded. However monitoring of nitrogen dioxide in this report confirms that the Government's air quality objectives are still being exceeded widely at locations with relevant public exposure. Concentrations of PM_{10} have also remained mostly constant at the Council's monitoring sites. In view of these findings the Council will therefore maintain its AQMA for these two pollutants.

Table of Contents

List of Tables

List of Figures

Appendices

1 Introduction

1.1 Description of Local Authority Area

The London Borough of Redbridge is situated in northeast London. It is a densely populated area with a population of around 258,000 covering an area of approximately 56km^2. The Borough includes Aldersbrook, Barkingside, Cranbrook, Gants Hill, Hainault, Ilford, Newbury Park, Seven Kings, Snaresbrook, Wanstead and Woodford. The area is mainly suburban in character. The largest commercial centre is in Ilford, which is one of the major metropolitan centres identified in the London Plan.

Rail services from Liverpool Street station pass through the Borough along an east to west axis with stations at Ilford, Seven Kings and Goodmayes. These stations are to be converted for operation on the Crossrail route.

The Borough is also well served by London Underground Central Line, with stations at Snaresbrook, South Woodford and Woodford on the Epping branch and Wanstead, Redbridge, Gants Hill, Newbury Park, Barkingside, Fairlop and Hainault on the Hainault branch, following the route of the A12 road from Wanstead to Newbury Park. The East London Transit (ELT) is currently being developed for a new fast reliable service from Ilford to Dagenham Dock.

The main sources of air pollutants are the busy and congested roads. The main roads that run through the Borough include the A406, A12, A118, A123, A124, A1400 and the southern section of the M11 and it's interchange with the A406. Roads are busy at all times, particularly during the rush hours; there are 12 controlled parking zones in the Borough, to prevent commuter parking.

There are no large (Part A) processes in the Borough; however the Council permits more than 70 smaller Part B industrial and other minor installations.

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the LAQM process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

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

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

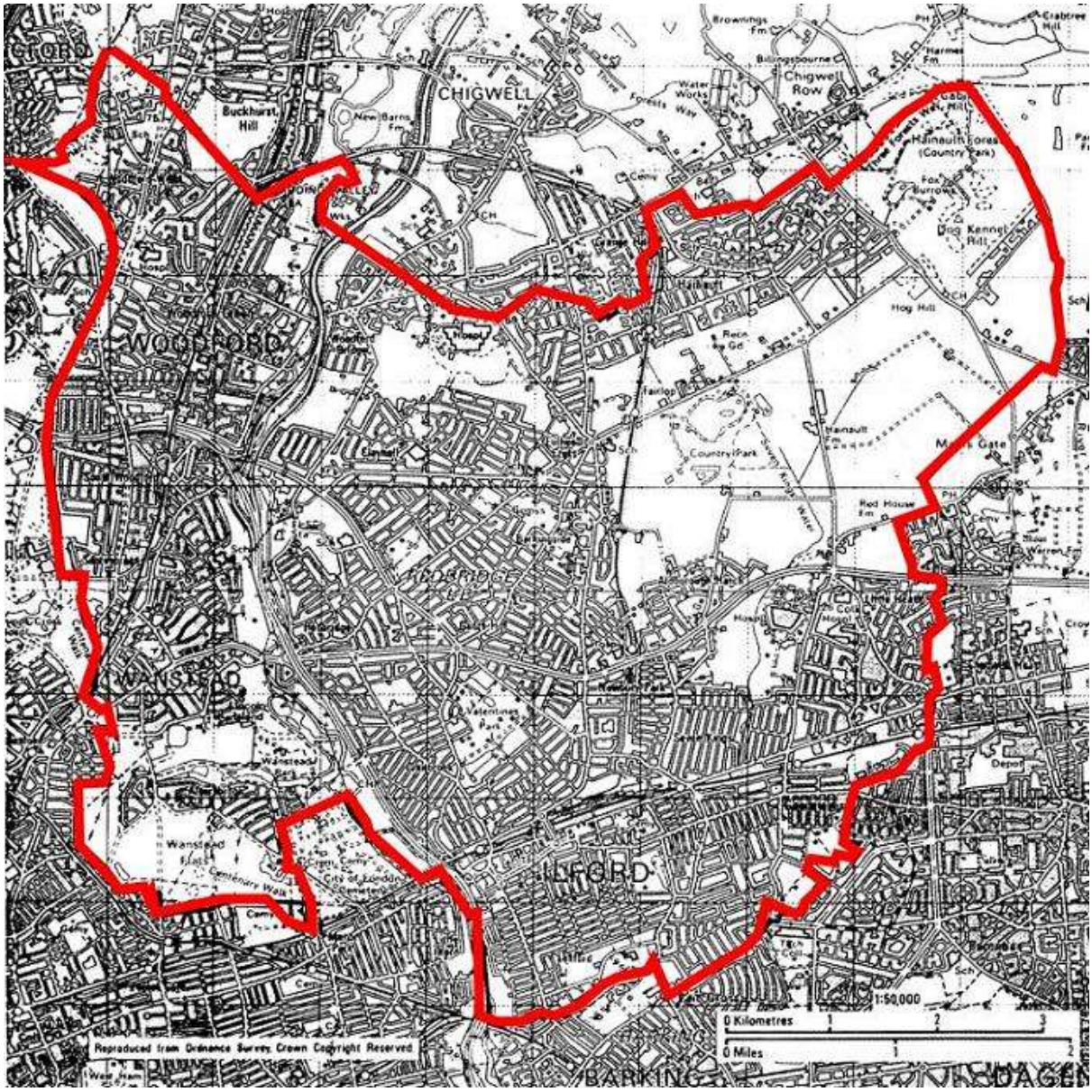
The London Borough of Redbridge completed its first round review and assessment of air quality during 2000. This established that the main issue with respect to local air quality was emissions emanating from road vehicles and predicted that the national objective levels for NO_2 and PM_{10} AQS would be exceeded. As a result of these findings the Council designated an Air Quality Management Area (AQMA) in 2003 across the entire Borough for both NO_2 and PM_{10}. The findings for the other five LAQM pollutants were that the relevant AQS objectives were likely to be met and therefore an AQMA for these pollutants was not needed.

As a result of designating its area an AQMA the Council then undertook a further assessment to refine understanding and inform its proposed air quality actions. These were set out in the Council's Air Quality Action Plan.

The third round of review and assessment published in 2006, confirmed that the air quality objectives for NO_2 and PM_{10} were exceeded in the Borough (based on the Council's monitoring results). As a result of the findings from these assessments the Council maintained its AQMA and continues to update and implement its Action Plan in pursuit of the AQS objectives.

In 2009 the fourth round of LAQM review and assessment was undertaken using the updated guidance given in Technical Guidance LAQM.TG (09) (Defra, 2009). The report confirmed there was no significant risk of the objectives for carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide being exceeded within the Council's area. Whilst for nitrogen dioxide and particles (PM_{10}) the report confirmed that the previously designated AQMA should be maintained.

Figure 1.1 London Borough of Redbridge AQMA (for NO_2 and PM_{10}) boundary



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 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 2013 London Borough of Redbridge undertook continuous monitoring at the following two sites:

- **CM1 - Redbridge 1** (located northeast of Ilford) – an urban background site in Perth Terrace approximately 300m from Valentines Park, towards the south of the Borough. The site monitors **nitrogen dioxide**, **PM_{10}** (by BAM) and **ozone**.

- **CM4 - Redbridge 4** (Wanstead) – a roadside site close to the A12 towards the southwest of the Borough. The site started operating in November 1999. The site monitors **nitrogen dioxide**, **PM_{10}** and **$PM_{2.5}$** (both by BAM). Until March 2012 it also monitored **carbon monoxide** and **sulphur dioxide**.

The sites represent relevant exposure within the Borough. All of 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. Regular (fortnightly) calibrations 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

Site audits are carried out every 6 months by the National Physics Laboratory.

Data from the Beta Attenuation Monitors (BAM) were corrected by dividing the hourly mean concentrations by 1.21 as advised in paragraph 3.39 of the technical guidance LAQM TG (09).

The Council previously operated three other continuous 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. The results for those sites were given in earlier Council reports and are not repeated in this report.

Figure 2.1 Map of Automatic Monitoring Sites (including sites closed in 2012)

CM1 - Redbridge 1 **Perth Terrace IG2 6AT**

CM3 - Redbridge 3 **Fulwell Cross 2EA 6AT (closed March 2012)**

CM4 - Redbridge 4 **Gardner Close E11 2HP**

CM5 - Redbridge 5 **Grove Road E18 9JY (closed March 2012)**

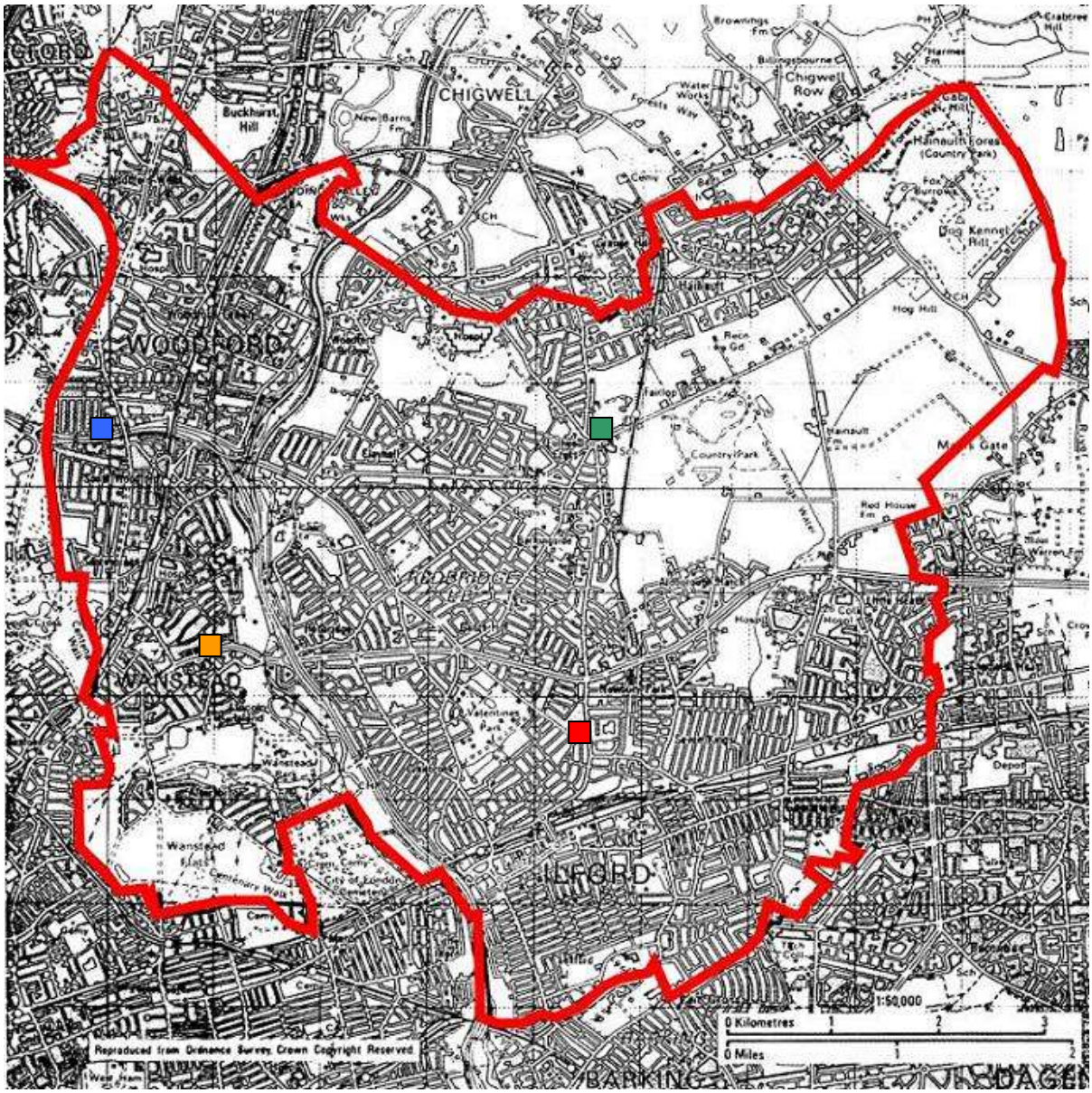


Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CM1	Redbridge 1 Perth Terrace	Urban background	544381.0	187649.4	3.2	NO2 PM10 O3	Y	API BAM	Y (5m)	3m	N
CM4	Redbridge 4 Gardner Close	Roadside	540828.3	188367.9	2.5	NO2 PM10 PM2.5	Y	API BAM	Y (12m)	12m	Y

2.1.2 Non-Automatic Monitoring Sites

Monitoring using diffusion tubes has advantages over continuous monitoring in that it is far cheaper and therefore more sites can be established and assessed. The main disadvantage is that the method is less precise and accurate than continuous monitoring. The recommended methods to reduce these errors include the use of good QA/QC practices and bias adjustment factors that are derived from co-location studies between continuous analysers and diffusion tubes.

The London Borough of Redbridge monitors nitrogen dioxide in its area, using passive diffusion tubes. In 2006 the existing diffusion tube survey was reviewed and it was decided to reduce the number of monitoring sites from 31 to 16 whilst at the same time improving the precision of the results by tri-locating all sites. An additional site was also added during 2010 along side the M11 at Woodford Bridge.

At the beginning of 2013 diffusion tube monitoring survey was based on 17 locations, including 2 co-located sites at the Redbridge continuous sites. The co-located sites enable a comparison between the two methods of monitoring so that local bias adjustment factors for the diffusion tubes can be calculated: see Appendix A

Details of co-located sites

Diffusion tube site	Continuous site
Perth Terrace PABX, DT D	Redbridge 1, CM1
Gardner Close, DT E	Redbridge 4, CM4

From April 2013 five more sites were added making a total of 22. The additional sites (DT R,S,T,U and V) were at schools and related to a project supported by the Mayor's Air Quality Fund. Diffusion tubes are exposed at 3 kerbside,13 roadside, 4 near-road and 3 background locations across the Borough and details of the all sites are given in Table 2.2. Most site locations are considered to represent relevant public exposure, or are within 5m of a relevant façade. The three exceptions are tube locations DT I on the central reservation of the A12, DT Q in a playing field near the M11 and DT S on a traffic gyratory in Ilford.

Figure 2.2 Map of Non-Automatic Monitoring Sites

Location of Redbridge diffusion tube (DT) sites (refer to Table 2.2 below).

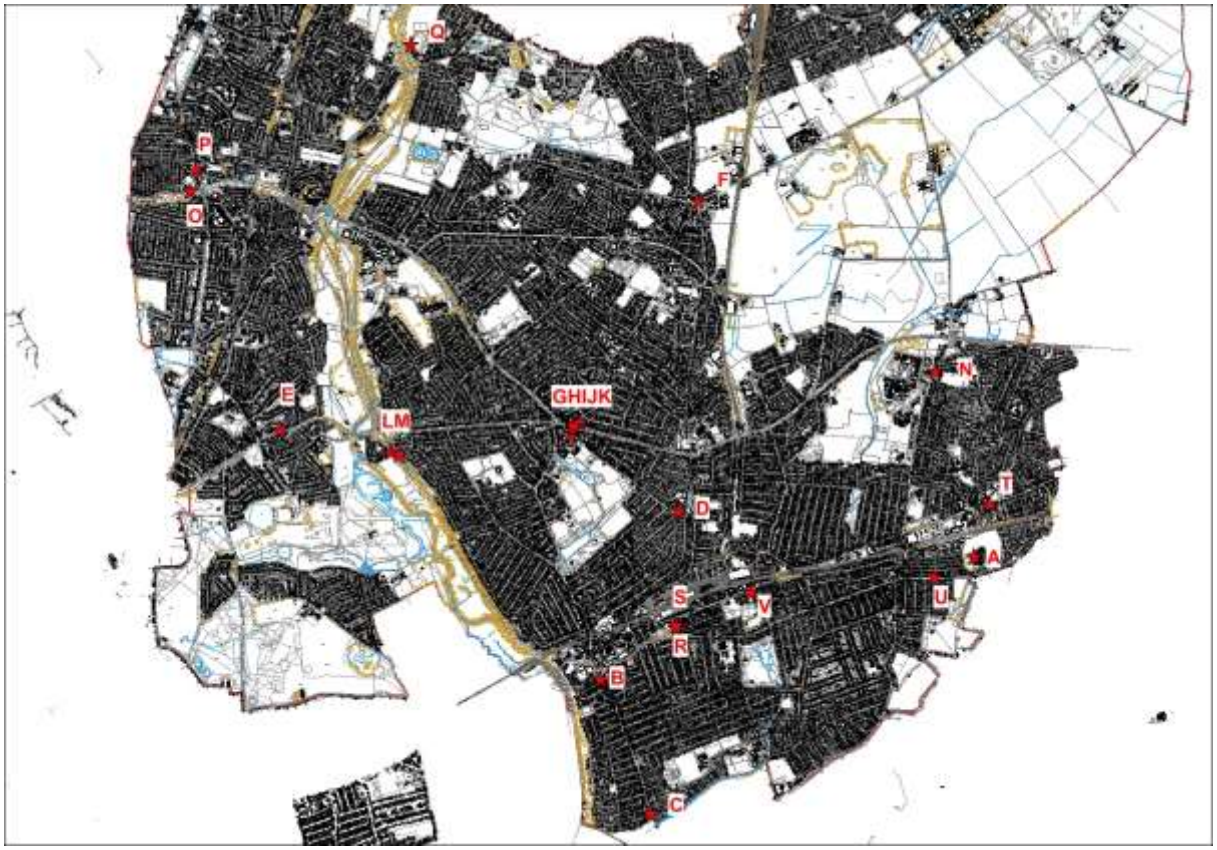


Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT A	Mayfield School	Urban Background	547022.3	187232.3	2.9	NO_2	Y	N	Y (<5m)	>100	Y
DT B	Ilford lane	Roadside	543688.0	186139.6	3.1	NO_2	Y	N	Y (<5m)	2.3	Y
DT C	Ilford Lane BP	Roadside	544132.4	184945.6	2.7	NO_2	Y	N	Y (<5m)	3.0	Y
DT D	Perth Terrace	Urban Background	544381.2	187637.6	3.1	NO_2	Y	Y	Y (<5m)	40m from minor road	Y
DT E	Gardiner Close	Roadside	540828.3	188367.9	2.6	NO_2	Y	Y	Y (<5m)	4.2	Y
DT F	Fulwell Cross	Roadside	544560.7	190400.8	1.7	NO_2	Y	Y	Y (<5m)	1.2	Y
DT G	Perth Road	Roadside	543421.7	188322.6	2.8	NO_2	Y	N	Y (<5m)	1.5	Y
DT H	Westbound Eastern Ave	Roadside	543450.6	188371.1	2.4	NO_2	Y	N	Y (<5m)	1.3	Y
DT I	Central Res Eastern Ave	Roadside	543453.7	188384.4	2.5	NO_2	Y	N	N (>10m)	2.0	N
DT J	Eastbound Eastern Ave	Kerbside	543442.0	188400.2	2.7	NO_2	Y	N	Y (<5m)	0.9	Y
DT K	Parham Dr	Near Road	543498.3	188427.6	2.6	NO_2	Y	N	Y (<5m)	40m from Eastern Ave	Y
DT L	North Circ. Rd, Northbound Royston Gd	Roadside	541816.3	188161.3	2.8	NO_2	Y	N	Y (<5m)	2.1	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DT M	North Circ. Rd, Southbound Wanstead Pk	Roadside	541887.8	188136.2	3.0	NO_2	Y	N	Y (<5m)	3.0	Y
DT N	Ethel Davis School	Near Road	546675.6	188885.1	2.8	NO_2	Y	N	Y (<5m)	15	Y
DT O	Grove Road	Roadside	540025.7	190494.3	2.9	NO_2	Y	Y	Y (<5m)	8.0 horizontal	Y
DT P	High Road Woodford	Roadside	540076.0	190682.6	2.6	NO_2	Y	N	Y (<5m)	2.7	Y
DT Q	M11	Near Road	541992.1	191799.9	2.4	NO_2	Y	N	N (>10m)	35	N
DT R	Winston Way Primary Sch.	Roadside	544364.1	186597.4	2.8	NO_2	Y	N	Y (<5m)	3.2	Y
DT S	Winston Way Gyratory	Kerbside	544360.4	186615.3	2.6	NO_2	Y	N	N (>10m)	0.9	N
DT T	Chadwell Heath Primary School	Kerbside	547158.3	187699.4	2.8	NO_2	Y	N	Y (<5m)	0.6	Y
DT U	Goodmayes Primary School	Roadside	546665.3	187046.3	2.6	NO_2	Y	N	Y (<5m)	9.0	Y
DT V	Isaac Newton Academy	Near Road	545030.2	186919.8	2.6	NO_2	Y	N	Y (<5m)	15	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

The results for the continuous sites operated in the Borough of Redbridge are shown for the years 2009 to 2013 inclusive. The results include details relating to the annual mean and hourly mean objectives, as well as data capture. Please note the data for 2013 is fully ratified

Automatic Monitoring Data

The results indicate that the annual mean objective was exceeded for all years monitored at CM3, CM4 and CM5 monitoring sites which are all close to roads. When examining these three roadside sites there is no obvious trend up or down. The background site at CM1 shows a slight increase in 2012 whilst remaining consistently below the annual mean for the last 5 years.

The number of hourly periods exceeding 200 µg m^{-3} has been very few apart from 8 hours of exceedence at CM4 in 2012.

Table 2.3 Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Annual Mean Concentration (µg/m^3)				
					2009* [c]	2010* [c]	2011* [c]	2012* [c]	2013 [c]
CM1	Background	Y	94	94	33.6	33.0	33.3	36.8	35.4
CM3	Roadside	Y	0	0	**48.1**	**51.1**	**52.0**		
CM4	Roadside	Y	99	99	**52.0**	**47.9**	**49.2**	**48.3**	**45.0**
CM5	Roadside	Y	0	0	**51.4**	**55.0**	**54.2**		

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

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

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

[c] Means should be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

* Annual mean concentrations for previous years are optional

Figure 2.3 Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites

The following chart shows NO_2 annual mean results for 2000 to 2013. The results for roadside sites [CM4 & CM5] and the urban background site [CM1] do not show an obvious trend. Results for the roadside site [CM3] may suggest an overall downward trend.

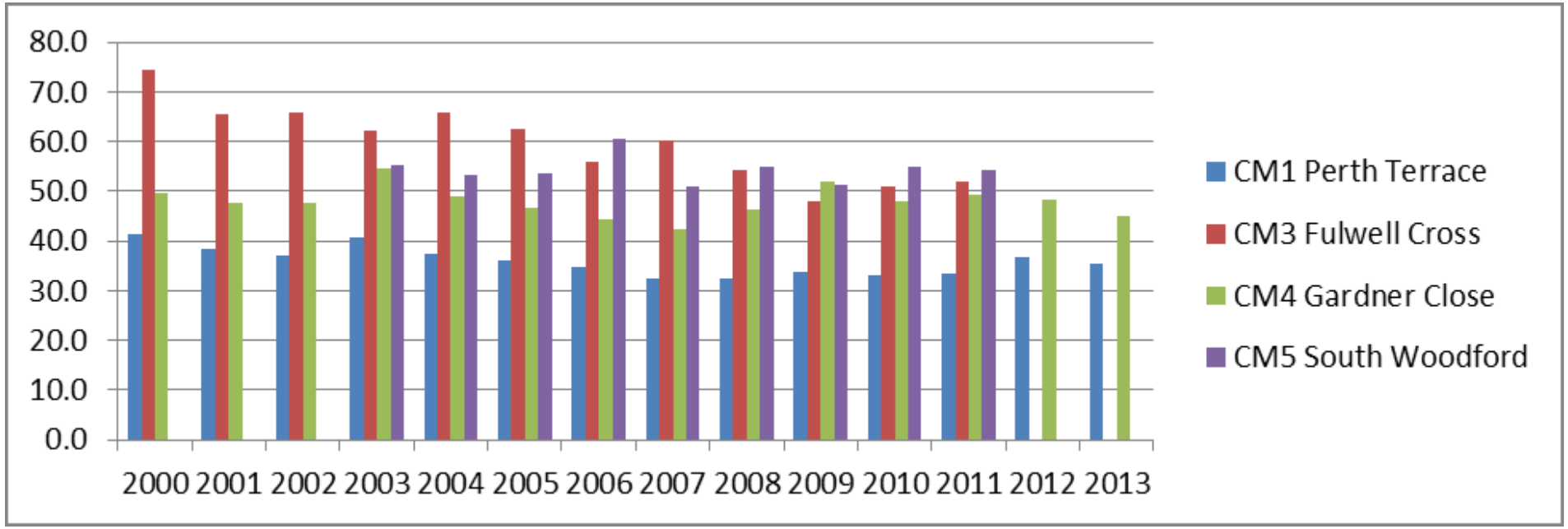


Table 2.4 Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Number of Hourly Means > 200µg/m^3				
					2009* [c]	2010* [c]	2011* [c]	2012* [c]	2013 [c]
CM1	Background	Y	94	94	0	0	0	0	1
CM3	Roadside	Y	0	0	0	0	1		
CM4	Roadside	Y	99	99	0	1	0	8	1
CM5	Roadside	Y	0	0	0	0	0		

In bold, exceedence of the NO_2 hourly mean AQS objective (200µg/m^3 – not to be exceeded more than 18 times per year)

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

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

[c] If the data capture for full calendar year is less than 90%, include the 99.8th percentile of hourly means in brackets

* Number of exceedences for previous years is optional

Diffusion Tube Monitoring Data

Tables 2.5 and 2.6 list the bias adjusted results for the nitrogen dioxide diffusion tube sites in Redbridge. Exceedences of the annual mean objective are shown bold. Annual means in excess of 60 µg/m^3 indicating a potential exceedence of the NO_2 hourly mean objective are highlighted in bold and underlined.

The full dataset of monthly mean values is tabulated in Appendix B together with a chart showing the same.

At six sites there is 9 months (75%) of data in 2013. According to the rule it is not necessary to annualise the results. But we did it anyway – just for fun - following the annualisation procedure described in Box 3.2 of the Technical Guidance LAQM.TG(09). This applies to site DT A: 9 months of data Jan-Sep, and sites DT R,S,T,U,V: 9 months of data Apr-Dec. Data from the other 16 sites has been used to calculate the average ratios (R_a) of annual means to period means (Am/Pm). The period and estimated annual means are shown in the second table in Appendix B.

Table 2.5 Results of NO_2 Diffusion Tubes 2013

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.80
DT A	Mayfield School	Background	Y	Triplicate	9	24.1
DT B	Ilford Lane	Roadside	Y	Triplicate	12	**52.5**
DT C	Ilford Lane BP	Roadside	Y	Triplicate	11	**47.5**
DT D	Perth Terrace	Background	Y	Trip & co-loc	12	33.7
DT E	Gardner Close	Roadside	Y	Trip & co-loc	12	**46.8**
DT F	Fullwell Cross	Roadside	Y	Triplicate	12	**44.0**
DT G	Perth Road	Roadside	Y	Triplicate	12	**43.9**
DT H	Westbound Eastern Ave	Roadside	Y	Triplicate	12	**58.1**
DT I	Central Reservation, Eastern ave	Roadside	Y	Triplicate	12	**56.7**
DT J	Eastbound Eastern Ave	Kerbside	Y	Triplicate	12	**45.1**
DT K	Parham Drive	Near Road	Y	Triplicate	12	**43.1**
DT L	North Circ Rd, North Royston Gdns	Roadside	Y	Triplicate	12	**46.2**
DT M	North Circ Rd, Sth Wanstead Park	Roadside	Y	Triplicate	12	**66.7**
DT N	Ethal Davis School	Near Road	Y	Triplicate	12	32.9
DT O	Grove Road	Roadside	Y	Triplicate	12	**45.2**
DT P	High Road, Woodford	Roadside	Y	Triplicate	11	**40.7**
DT Q	M11	Near Road	Y	Triplicate	12	**41.4**
DT R	Winston Way Primary School	Roadside	Y	Triplicate	9	**53.6**
DT S	Winston Way Gyratory	Kerbside	Y	Triplicate	9	**53.2**
DT T	Chadwell Heath Primary School	Kerbside	Y	Triplicate	9	**47.2**
DT U	Goodmayes Primary School	Roadside	Y	Triplicate	9	35.6
DT V	Isaac Newton Academy	Near Road	Y	Triplicate	9	34.7

Table 2.6 Results of NO_2 Diffusion Tubes (2007 to 2013)

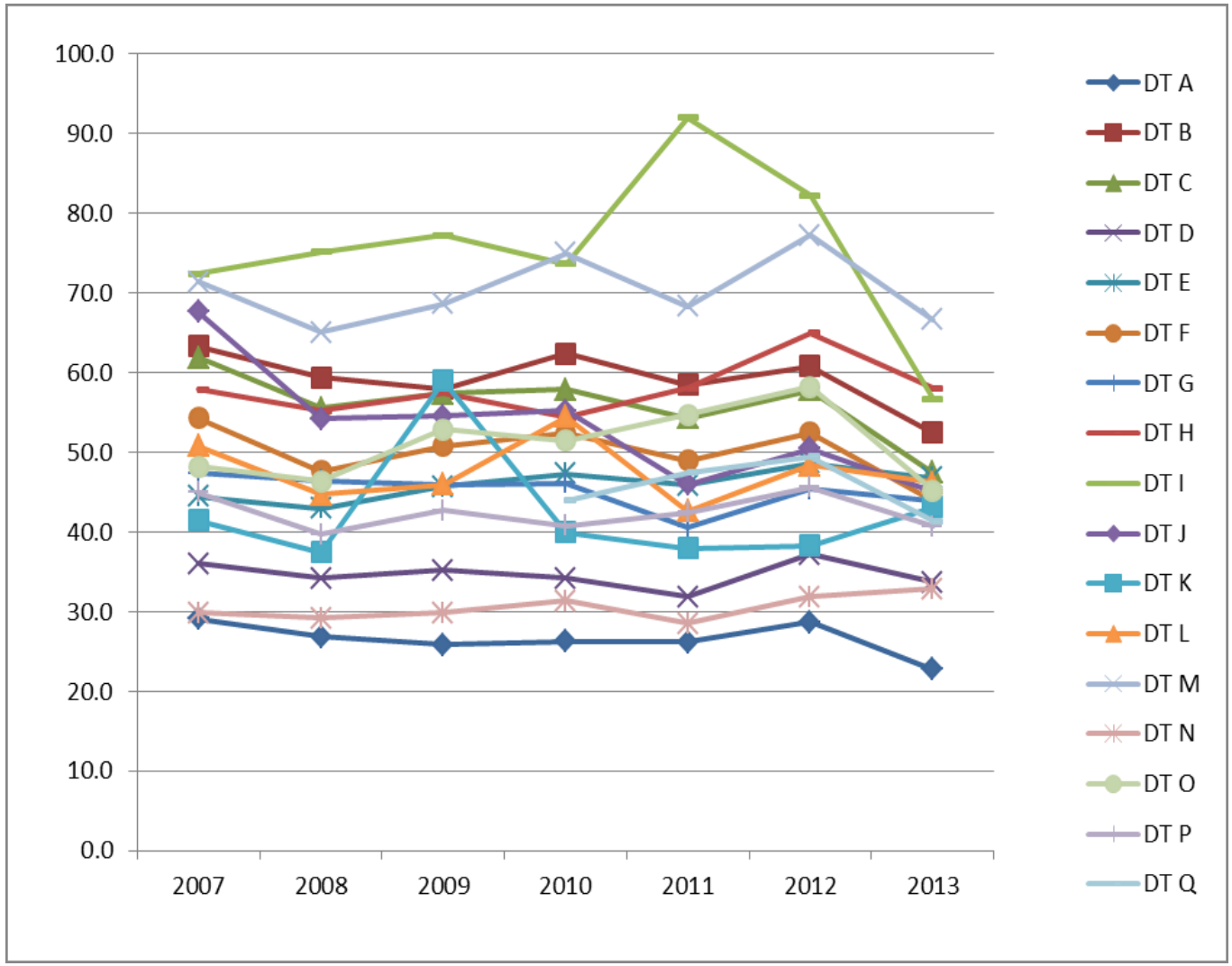
		Year	2007	2008	2009	2010	2011	2012	2013
		Bias adjustment factor	0.99	0.94	0.98	0.79	0.87	0.86	0.80
Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for bias [a]						
DT A	Background	Y	29.1	26.9	25.9	26.3	26.2	28.7	24.1
DT B	Roadside	Y	**63.3**	**59.4**	**58.0**	**62.4**	**58.5**	**60.8**	**52.5**
DT C	Roadside	Y	**61.9**	**55.6**	**57.4**	**57.9**	**54.3**	**57.8**	**47.5**
DT D	Background	Y	36.0	34.2	35.2	34.2	31.9	37.2	33.7
DT E	Roadside	Y	44.5	**43.0**	**45.7**	**47.3**	**45.9**	**48.6**	**46.8**
DT F	Roadside	Y	**54.3**	**47.6**	**50.8**	**52.4**	**49.0**	**52.5**	**44.0**
DT G	Roadside	Y	**47.4**	**46.5**	**46.0**	**46.1**	**40.6**	**45.4**	**43.9**
DT H	Roadside	Y	**57.9**	**55.2**	**57.5**	**54.4**	**58.1**	**65.0**	**58.1**
DT I	Roadside	Y	**72.4**	**75.2**	**77.3**	**73.7**	**92.0**	**82.3**	**56.7**
DT J	Kerbside	Y	**67.7**	**54.2**	**54.6**	**55.2**	**46.0**	**50.5**	**45.1**
DT K	Near Road	Y	**41.5**	37.5	**59.0**	**40.0**	38.0	38.3	**43.1**
DT L	Roadside	Y	**50.8**	**44.7**	**46.0**	**54.5**	**42.6**	**48.4**	**46.2**
DT M	Roadside	Y	**71.4**	**65.1**	**68.7**	**75.0**	**68.3**	**77.3**	**66.7**
DT N	Near Road	Y	29.9	29.2	29.9	31.4	28.5	31.9	32.9
DT O	Roadside	Y	**48.2**	**46.4**	**52.9**	**51.5**	**54.7**	**58.2**	**45.2**
DT P	Roadside	Y	**45.0**	39.7	**42.7**	**40.8**	**42.5**	**45.6**	**40.7**
DT Q	Near Road	Y				**44.0**	**47.5**	**49.5**	**41.4**
DT R	Roadside	Y							**53.6**
DT S	Kerbside	Y							**53.2**
DT T	Kerbside	Y							**47.2**
DT U	Roadside	Y							35.6
DT V	Near Road	Y							34.7

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

[a] Means should be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if full calendar year data capture is less than 75%

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites 2007 to 2013



2.2.2 Particulate Matter (PM_{10})

During 2013 continuous PM_{10} analysers were operated at two sites CM1 and CM4.

CM1, CM3 and CM4 sites first monitored PM_{10} in 1999. CM5 was opened in 2003. In March 2012 CM3 and CM5 were closed.

CM1 is a background site. The others are close to roads. 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, with subsequent data ratification undertaken by the ERG at King's College London. The Redbridge sites each use a BAM instrument. In all cases the data are fully ratified.

The TG09 guidance highlights that Met-One BAM instruments conform to the equivalence criteria relating to the gravimetric European reference method. A correction using a factor of 1.21 has been applied to adjust for slope. (LAQM.TG(09) 3.39)

The results for the Redbridge sites are reported below as reference equivalent, these represent BAM measurements that were corrected using the above correction factor.

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

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m^3)				
						2009* [c]	2010* [c]	2011* [c]	2012* [c]	2013 [c]
CM1	Background	Y	98	98	Y	15.7	14.7	16.3	14.9	17.7
CM3	Roadside	Y			Y	26.5	30.9	28.9		
CM4	Roadside	Y	95	95	Y	31.8	31.1	25.9	27.0	30.3
CM5	Roadside	Y			Y	25.4	23.1	27.6		

In bold, exceedence of the PM_{10} annual mean AQS objective of 40µg/m^3

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

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

[c] Means should be "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

* Annual mean concentrations for previous years are optional

Figure 2.5 Trends in Annual Mean PM_{10} Concentrations

The following chart shows annual mean PM_{10} concentrations from 2000 to 2013. The background site at Perth Terrace shows a downward trend over that period. Otherwise there is no obvious medium term trend.

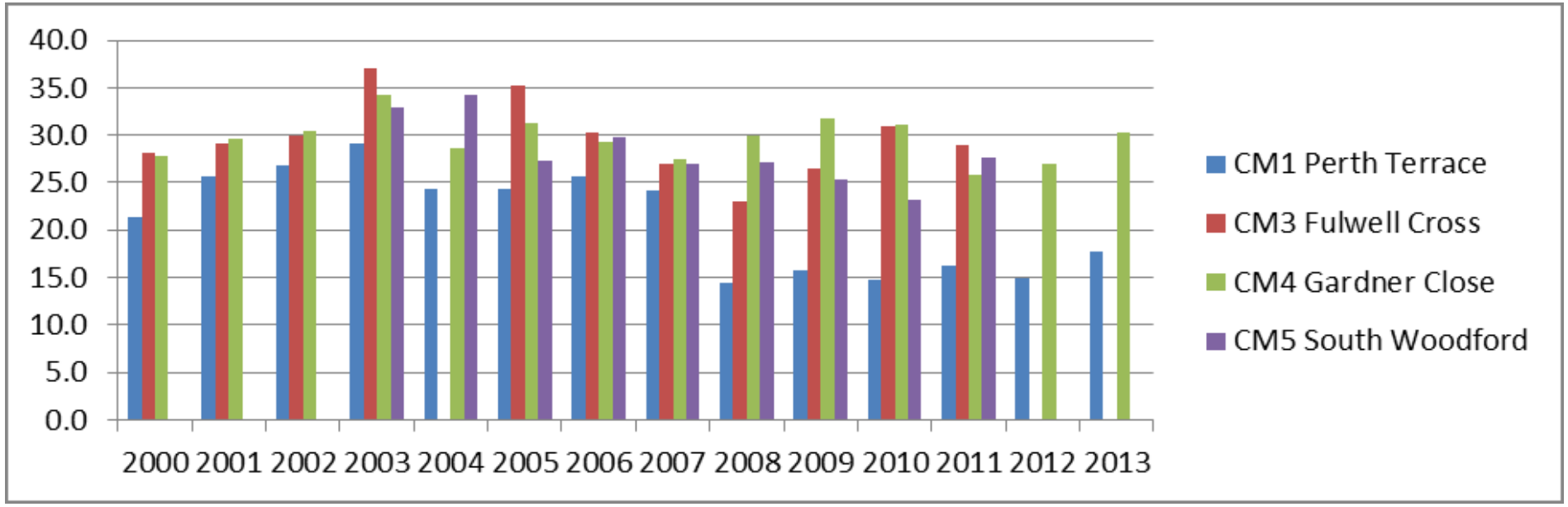


Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % [a]	Valid Data Capture 2013 % [b]	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m^3				
						2009* [c]	2010* [c]	2011* [c]	2012* [c]	2013 [c]
CM1	Background	Y	98	98	Y	1	0	5	2 (35)	2
CM3	Roadside	Y			Y	5	17	29		
CM4	Roadside	Y	95	95	Y	17	18	11	18	23
CM5	Roadside	Y			Y	2	7	27		

In bold, exceedence of the PM_{10} daily mean AQS objective (50µg/m^3 – not to be exceeded more than 35 times per year)

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

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

[c] if data capture for full calendar year is less than 90%, include the 90.4th percentile of 24-hour means in brackets

* Number of exceedences for previous years is optional

2.2.3 Sulphur Dioxide (SO_2)

Sulphur dioxide was monitored at CM4 since 1999. There have been no exceedences of any of the averaging means. Monitoring ceased at the end of March 2012.

2.2.4 Benzene

No benzene monitoring is undertaken by LB Redbridge.

2.2.5 Other Pollutants Monitored

Carbon Monoxide

Until 2012 the London Borough of Redbridge undertook carbon monoxide monitoring both at the Redbridge 4 and Redbridge 5 sites. The levels monitored were well below the EU limits and monitoring of Carbon Monoxide at both sites.

2.2.6 Summary of Compliance with AQS Objectives

The London Borough of Redbridge has declared the whole borough an AQMA area for NO_2 and PM10. All monitoring in Redbridge for these pollutants is therefore within the AQMA.

Monitored NO2 concentrations are above the annual mean objective at all roadside locations and none of the urban background locations. For the some of the roadside diffusion tubes, the monitored concentration exceeds 60 µg/m3, indicating the 1-hour mean objective may also be exceeded.

The monitoring data for NO2 indicates that the AQMA for this pollutant should be retained; therefore there is no need to proceed to a Detailed Assessment for NO2 concentrations.

Monitored PM10 concentrations are below both the annual mean and 24-hour mean objectives. Although the monitoring data for PM10 could justify proceeding to a Detailed Assessment to revoke the AQMA for this pollutant, a precautionary approach has been taken to retain the AQMA.

3 New Local Developments

London Borough of Redbridge confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

London Borough of Redbridge confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Air Quality Planning Policies

The LB Redbridge Core Strategy Development Plan Document (adopted in 2008) contains the following policy:

> *Policy E8 – Air Quality*
> *To complement the Air Quality Area Action Plan, the Council will:*
> *1. Require air quality assessments for major development proposals considered likely to have a significant and harmful impact on air quality.*
> *2. Refuse development proposals which could cause significant deterioration in air quality or expose members of the public to poor air quality, unless appropriate mitigating measures are put into place.*
> *3. Require developers to use the most up to date Best Practice Guidance for all stages of development, with particular reference to dust, vapours, plant and vehicle emissions.*
>
> *In accordance with Strategic Policy 2 (Green Environment), the National Air Quality Strategy, NPPF (National Planning Policy Framework) the Mayor's Air Quality Strategy, Policy E8 seeks to minimise the emissions of key pollutants and to reduce concentrations to levels at which no, or minimal effects on human health are likely to occur.*
> *The objectives of the Air Quality Area Action Plan will also be advanced by:*
> *(a) Integrating land use and transport policy and reducing the need to travel, especially by car (Policy T1)*
> *(b) Promoting sustainable design and construction (Policy BD1).This Policy requires that all new development demonstrates that there is no significant adverse impact on surrounding uses in terms of air, water, noise pollution, and of fume ans smell nuisance.*

In January 2012 a new Supplementary Planning Document (SPD) entitled *Sustainable Design and Construction* was adopted by the Council. It contained the following requirements for air quality:

> *(a) All new development should be 'air quality neutral' or better through the management and mitigation of emissions. An air quality assessment is required for all development:*
> *(i) likely to have a significant and harmful impact on air quality (i.e. it will increase pollutant concentrations) either through the operation of the proposed development or trip generation arising from the development.*
> *(ii) located in an area of poor air quality (i.e. it will expose future occupiers to unacceptable pollutant concentrations / new exposure).*
> *(iii) if the demolition / construction phase will have a significant impact on the local environment (i.e. through fugitive dust and exhaust emissions). If this is the case, the Mayor of London's 'control of dust and emissions from construction and demolition' must be followed.*
> *(iv) if the development prevents implementation of measures in the Air Quality Action Plan.*
> *(b) The air quality assessment should include an emissions assessment, particularly for developments proposing Combined Heat and Power (CHP) or*

biomass. This must demonstrate compliance with the Mayor of London's emissions limits for CHP and biomass.
(c) If a biomass boiler is proposed, it must be demonstrated that there will be no adverse air quality effects from the boiler relative to a conventional gas boiler. Small biomass boilers (below 500kWth) will be considered unsuitable unless it can be demonstrated that they have no adverse air qulaity effects.

The same SPD contained the following general air quality and biomass specific guidance:

Development in Redbridge should be air quality neutral or better in the management and mitigation26 of emissions. The construction and operation of developments should contribute to the delivery of policies within the Mayor's Air Quality Strategy 'Clearing the Air' (December 2010).

Most of the air pollution in Redbridge (and London) is caused by road traffic, and promoting sustainable transport options is important. This is further outlined in Chapter 12.

The whole of Redbridge is an Air Quality Management Area and the Council has therefore produced an Air Quality Action Plan (AQAP) that sets out how it intends to improve air quality in the borough and work towards complying with the Government's air quality objectives within the Borough. The AQAP is available on the Council's website.

Biomass boilers can adversely affect air quality as they produce nitrogen dioxide (NO2), particulate matter (PMs) and sulphur dioxide (SO2). Particulate matter and nitrogen dioxide are the two pollutants that cause most concern in London.

As a general rule, biomass boilers will not be acceptable in Redbridge in areas with already high levels of particulate matter or where nitrogen dioxide emissions are greater than 40 micrograms per cubic metre. This will include areas running nearby / parallel to the North Circular (A406) and the Eastern Avenue (A12). Small biomass boilers (below 500kWth) will be considered unsuitable unless it can be demonstrated that they have no adverse effects on local air quality when compared with a conventional gas boiler.

Where a biomass boiler is proposed for a development, a detailed air quality assessment should be completed, including an emissions assessment, demonstrating that there will be no adverse air quality effects from the boiler relative to a conventional gas boiler. A development proposing Combined Heat and Power must also complete an emissions assessment as part of the air quality assessment.

The Mayor of London's biomass emissions limits / Combined Heat and Power emissions limits must be met. The Greater London Authority will require biomass operators / Combined Heat and Power operators to monitor and provide evidence on a yearly basis (through an annual monitoring report), demonstrating on-going compliance with the Mayor's emissions limits.

5 Local Transport Plans and Strategies

Actions include reducing speed limits and the introduction of 20mph zones, supporting roadside emissions testing in the Borough and working with Transport for London (TfL).

The Council also allocated funds for the current year in its Local Implementation Programme (LIP) towards highways and transport improvements, including bus priority, support for road renewal, bus priority, walking, cycling and the London Cycle Network and other improvements.

The Council's LIP includes provision for School Travel plans and Work travel plans. The Council also has a dedicated Travel Plan Co-ordinator to give advice and information specifically on travel plans.

The Borough has specific air quality issues relating to the M11 and TLRN throughtraffic, which is largely outside of the Borough's control to address. The A118 High Road, A1199 Woodford Road and A113 Chigwell Road are similarly heavily used by tidal commuter flow simply passing through the Borough.

The Borough is somewhat constrained by its legal duty to accommodate the passage of vehicles on these strategic roads although the scheme in Gants Hill has demonstrated the Borough's willingness to recognise a district centre's sense of place rather than bow to the ever increasing capacity demands of the associated road network. The principal roads entering these primary retail areas bring both the trade that feeds the shopping outlets but they also damage the cohesion of the public places through severance and negative environmental impact.

The Council's Local Development Framework (LDF) seeks to focus development on existing town centres where public transport accessibility is high (so as to promote use of public transport instead of private vehicles) and requires energy efficient buildings, sustainable design and construction, and renewable energy. The framework contains specific policies relating to air quality and includes a range of specific projects that will contribute positively to air quality over the period of the LIP.

6 Climate Change Strategies

Targets and aspirations for action on climate change are contained in the Redbridge Environmental Action Plan (Reviewed 2012) and “Shaping our future together” – a sustainable community strategy for Redbridge 2008-2018.

The targets set to be aceived by 2018 are:

- All new homes to be zero carbon by 2016 and non-domestic buildings zero carbon by 2019.
- Develop a Cycle Network for the Borough and have a Cycle Hub in one area of the Borough.
- All new NHS buildings in Redbridge to achieve BREEAM Excellent.
- Aim for 50 more car club bays in the Borough by 2015 (from 2010).
- Write and implement a policy to reduce carbon emissions from existing buildings.

7 Implementation of Action Plans

Table 9.1 Action Plan Progress

	Action	Serv area	Completed	Progress	Other comments
1	The Council will continue to monitor air quality in the Borough through the use of 4 automatic monitoring stations, NO_2 diffusion tubes and a smoke site.	CS	Ongoing	Monitoring has continued at 4 Redbridge automated sites until March 2012 and at two sites thereafter. Monitoring of NO2 by diffusion tubes has continued at 12 locations.	Reductions in automatic monitoring capability reflected a cutback in local authority budgets generally.
2	The Council will participate in the London LEZ stakeholder consultation on strategy revisions in 2006. This is potentially the most effective action for improving air quality in London.	All	2007	The Council participated in stakeholder discussions.	The LEZ was introduced by the GLA in February 2008.
3	If the LEZ is to be implemented the Council will inform local transport operators of relevant developments and funding opportunities for fleet improvements.	All	2007	The Council provides advice upon request.	As above.
4	The Council will carry out research on dispersal of NO_2 using passive monitoring tubes in appropriate locations	CS	2007	The diffusion tube monitoring network was re-organised to include triplicate exposure of tubes and ensure that sites were co-located with automatic sites.	
5	As a means to extend the Councils air quality monitoring network and ensure that the air quality associated with traffic management schemes is monitored, NO_2 and PM_{10} levels will be monitored prior to, during and after some schemes are implemented.	CS	Ongoing	There has been no new monitoring established during 2012.	Unlikely to be implemented while staffing level remains low.

Action		Who	Completed	Progress	Other comments
6	Carry out exhaust emission surveys from time to time	CS	Discontinued	Emission surveys have not been undertaken recently due to a lack of staff resources.	The program is unlikely to be resumed in the forseeable future.
7	Continue with trials with nitrogen inflated tyres, if successful implement within the Borough fleet and maybe, for a fee, employees cars	FM	2006	The trials have not identified major benefits to ordinary car users and therefore further implementation is not planned.	
8	The Council will investigate grants available for assistance with greening its fleet	FM	2006	This was investigated and no suitable grants were identified.	
9	The Council will investigate how to bring its fleet up to the Euro standard as required by the LEZ either through using alternative fuels or contracting out some of its fleet vehicles and having a green contract policy	FM	Completed 2013	From Sept 2013 all new vehicles purchased comply with Euro VI	In 2012/13 roll out of EconoSpeed for passenger fleet (one third of fleet = 100 vehicles), which limits the driver's ability to increase the engine revs.
10	Ensure that the Council vehicles are: ▪ used sensibly (via staff training) and are well maintained ▪ not left idling unnecessarily ▪ used on routes and tasks which are worked out to be as efficient as possible by co-ordinating deliveries of goods and services ▪ operated by appropriately trained staff who utilise practices which improve fuel economy	ALL	Ongoing	The Council encourages good eco driving practice by its staff.	

	Action	Who	Completed	Progress	Other comments
11	Develop and implement a range of traffic management and calming measures to regulate through traffic and to protect residential areas from incoming traffic, particularly commercial traffic.	EBS	Ongoing	There is a series of weight restrictions on the main roads running through the Borough that stop heavy vehicles accessing residential streets. There is a programme of investment based along the Boroughs Neighbourhoods and Corridors to mitigate the impact of traffic on the local environment and other users.	Other benefits include reducing vehicle speeds and may reduce accidents and improved pedestrian crossing facilities.
12	Consider utilising models for traffic calming which gives the best outcome for air quality	HCS	Ongoing	The current approach is to keep traffic flowing smoothly rather than stop start by utilising SCOOT and promoting alternatives to the private car.	
13	Ensure traffic signals are phased for optimum benefit of air quality	HCS	Ongoing	SCOOT is being enhanced and expanded through the Borough.	This is operated by Transport for London (TfL).
14	Continue road resurfacing during off-peak times using a one stage resurfacing material	HCS	Ongoing	Each streetworks scheme is looked at on its merits and the hours of operation programmed accordingly using the following times as a guideline: For traffic sensitive routes 0930 – 1530 For non traffic sensitive routes 0800 - 1700	
15	Following public consultation, seek to increase the use of Controlled Parking Zones in appropriate locations in the Borough	HCS	Ongoing	The Council has introduced 14 CPZ's to date which cover roughly 15% of the Borough.	There are also 10 Residents Permit Parking Zones incorporating Visitor and Business Permit Parking.
16	Continue to offer residents with electric cars free resident's parking permits and free entry into Council car parks	HCS	Ongoing	This was implemented although there has been no take up to date.	
17	Consider extending the scheme in Action 16 to business users	HCS	Ongoing	Not implemented yet.	

	Action	Who	Completed	Progress	Other comments
18	The Council's Parking and Enforcement Plan will help regulate traffic volumes and may encourage a shift from private vehicle use to more sustainable modes of transport, which is supported by the Council's Local Implementation Plan.	HCS	Ongoing	This is an ongoing action. Enforcement is not uniform across the Borough, but targeted to tackle problem areas.	The Council employs Civil Enforcement Officers, fixed and mobile CCTV enforcement.
19	Continue to participate in the Thames Gateway Regional Partnership freight forums and work with TfL to achieve the aims of the London Sustainable Distribution partnership.	HCS	Not completed	No progress	Due to a decision taken by the Leader the Council no longer takes part in the sub regional groups for freight, the TGLP group no longer exists.
20	Provide help, encouragement and awareness raising to road freight groups within the Borough, concerning funding for cleaner vehicles.	ALL	Ongoing	The Council provides advice upon request	
21	Continue enforcing ban on HGVs parking in residential streets between 18.30 - 08.00 hrs, seven days a week.	HCS	Ongoing	The Council continues to enforce these restrictions Borough-wide between the hours of 18.30 and 08.00, seven days a week.	A lorry is defined as a vehicle that has a gross weight of at least 5.0 tonnes.
22	The Council will support and encourage the improvement of public transport including new transport links, bus priority schemes, improved interchanges and access for the disabled.	HCS	Ongoing	There is a programme of investment based along the Boroughs Neighbourhoods and Corridors to provide Kassel kerbs, bus boarders and accessibility improvements.	This can be measured by the Public Transport Accessibility Levels (PTAL) index.
23	The Council will encourage the extension of the Docklands Light Railway to Ilford Station (LIP 5-6)	HCS	Not completed	No progress	No longer applicable
24	Improve accessibility to buses Borough wide	HCS	Starting 2006	50% of the Borough bus stops are fully accessible as of May 2014	
25	The Council will progress with the implementation of the East London Transit	HCS	First stage 2010	Phase One complete	No further works in the Borough are proposed

	Action	Who	Completed	Progress	Other comments
26	The Council will continue to support the Thames Gateway Partnership to promote major infrastructure and London-wide action.	ALL	Ongoing	TGLP has been replaced by the East and South East London Transport Partnership.	There is no political engagement in this group from the Borough.
27	The Council has proposed measures for Ilford Station to become a major transport interchange; elements of this are in conjunction with the Crossrail project.	HCS	2019	The Council produced an Ilford Urban Integration Study with TfL and is seeking funding to transform the urban realm around Ilford station before the new rail service opens.	Funding package includes external and S106 /CIL funds
28	Continue to provide bus clearways for more efficient journeys	HCS	Ongoing	This is ongoing	
29	In partnership with TfL, London Buses and the Underground provide interchange facilities at Barkingside station for buses and taxis	HCS	2007		No longer an aspiration
30	In order to encourage walking the Council will improve paving, lighting, street furniture and security.	HCS	Ongoing	The Council through its current LIP supports the enhancement of its streets. Improved walking conditions was part of 5 Neighbourhood and Corridor schemes in 2013.	The Neighbourhoods and Corridors programme focuses on the areas of high footfall.
31	Work with the Cross London Strategic Walking Partnership to complete and promote the 6 Strategic Walking Routes.	HCS	Completed	The London Loop (section 20) in the Borough is complete. Remove action	The strategic cross-London partnership to promote walking no longer exists.
32	Where the Borough has responsibility for maintaining any of the 6 Strategic Walking Routes it will continue its maintenance duties.	HCS	Ongoing	The Borough continues to maintain its part of six strategic walking routes.	
33	Lobby for a dedicated 'Walking Officer'	HCS	Withdrawn	Walking is covered by the Transportation Strategy Group	This is no longer an aspiration due to Council restructures.

Action		Who	Completed	Progress	Other comments
34	The Council will continue to carry out Cycle Route Implementation and Stakeholder Plan (CRISP) studies on all appropriate sections of the LCN as part of the development process.	HCS	Superceded	This has been superceded by the Superhighway and Quietway programmes.	
35	Continue to offer cycle training to children aged 10 and over and 2 hours free, one to one training for anyone aged over 14 who lives, works or studies in Redbridge	HCS	Ongoing	All schools offered free Bikeability training for pupils. Additional courses offered to school staff/ volunteers.	31 schools have set up a bike club or are delivering cycling PE lessons.
36	Redbridge London Cycle Campaign in conjunction with other partners will continue to run short courses in basic cycle maintenance	LCC	Ongoing	These are provided via Cycle Training UK.	Bike maintenance courses delivered in 2013 as part of the LBR Biking Borough Project
37	The Council will continue to develop its own Travel Plan, including: Revision of existing cycling policy with a view to enhance facilities and safety Promote the car share scheme Pilot flexible working arrangements Provide new staff with a Sustainable Travel Pack Develop intranet page to inform staff of public transport timetables Continue to offer interest free annual season ticket loans to employees Consider alternatively fuelled pool cars throughout the Council for business use Review the tariff structures for essential and casual car users Review business cycle allowance	ALL	Ongoing	The Council has a private car sharing scheme, staff can apply for an interest-free season ticket loan and the Council has signed up to the Cycle to Work Scheme where staff can obtain a bike tax-free (both run by HR). The LBR Transportation Team is also trialing a pool bike scheme and the use of a car club vehicle. The borough takes part in National Walk to Work Week (May) and seasonal free walks are arranged by the Learning and Development Team.	
38	The Council will continue to engage local schools in the School Travel Plan initiative with the aim that all schools have a TP in place by 2009.	HCS	Ongoing	49 schools (51%) were STAR accredited in 2013 – an increase from 39 schools (40%) in 2011.	

	Action	Who	Completed	Progress	Other comments
39	Raise awareness through campaigns such as 'Good Going Week' and 'Walk to School Week'.	HCS	Ongoing	'Good Going Week' no longer exists. However National Walk to School Week, Nat. Walk to Work Week and Nat. Bike Week are promoted.,	Cycling promoted at community festivals. Competitions organised throughout the year for schools to help them encourage more sustainable travel as part of the school travel plan programme.
40	Actively discourage new development that generates significant numbers of trips at locations poorly served by public transport.	CS/P/HCS	Ongoing	Policy E8 (air quality) of the Borough wide primary policies compliments the Action Plan. The Local Development Framework (LDF) focuses new growth in the most accessible locations in the Borough (i.e. town centres, underground stations)	Development plans usually have a variety of environmental and socio-economic impacts
41	Ensure air quality is given material consider in assessment of proposals for development as stated in Gov. guidance PPS 23	CS/P	Ongoing	As above. Air quality mapping is available in planning GIS system and triggers referral to Community Safety.	Note: PPS23 replaced by National Planning Policy Framework (NPPF) and National Planning Practice Guidance (NPPG)
42	The Council will produce an Air Quality Supplementary Planning Guidance for developers	CS/P	Completed	Sustainable Design & Construction Supplementary Planning Document (2012) provides detailed guidance on a range of issues, including air quality.	
43	Investigate using Section 106 planning obligations to address air quality issues	CS/P		Changes to planning regulations and the introduction of CIL limits the scope to do this by mitigating site or proposed specific air quality impacts.	
44	Where a potential development is well served by public transport, the Council will encourage 'car-free parking' developments.	CS/P/HCS	2006	The Council introduced Policy T5 – Parking Standards in its Borough wide primary policies to complement the Action Plan	

45	The Council require that planning applications for new developments consider the provision of cycle parking where feasible.	P/HCS	Ongoing	As above, in addition Policy T3 also included. The Redbridge Cycling Strategy provides further detail.	T3 also considers cycle routes
46	Developments with the potential to generate a large number of journeys are required to provide a Transport Assessment and a Green Travel Plan; an Air Quality Assessment will be a new requirement	P/HCS/CS	Ongoing	Policy T1 (sustainable transport) requires this on all major applications. Policy E8 covers air quality assessments	Also requires reduced reliance on private vehicles.
47	Ensure the latest Codes of Practice and 'best practice' are followed by property developers	P/CS	Ongoing	Construction Traffic Management Plans and BREEAM Excellent (consideration constructors) cover this issue	
48	Develop an Air Quality Supplementary Planning Guidance	CS/P	Adopted January 2012	Sustainable Design & Construction SPD provides air quality guidance.	
49	Produce a Climate Change Action Plan	P	2006	The Council produced this plan in 2006. The Redbridge Environmental Action Plan (REAct) (2013) replaces this and covers climate change and air quality	

50	Continue to encourage the Council's public and private partners to carry out environment audits and develop environmental action plans	P	Ongoing	Partners such as the NHS, London Fire Brigade and Met Police currently do this. Green Business Redbridge works with the Borough's businesses to improve their environmental impact	
51	The Council is investigating membership of the Local Authority Carbon Management Programme run by the Carbon Trust	P/HCS	Adopted January 2012	REAct (2013) aims to reduce carbon emissions from the authority's activities.	The Council currently holds a Carbon Saver Gold Award
52	Work with schools and the local community to raise awareness of climate change	LBR-Education ReBEP, private sector	Ongoing	The Council produces regular updates on environmental issues and responds to requests for information. This is part of REAct. Green Travel Team also works with schools re sustainable transport. REAct aims include green front gardens and the protection of trees.	Recycling officers also visit schools and play schemes to encourage recycling and waste awareness.
53	Continue with awareness raising campaigns such as 'In Town Without My Car'	EP in conjunction with the Local Economy and Health cluster groups	Ongoing	The Council will continue to participate in campaigns subject to resources.	

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Monitoring within the Borough confirmed that the annual mean nitrogen dioxide objective has recently been widely exceeded at roadside and background locations. In 2013 the Council carried out automatic continuous monitoring throughout the year at 2 locations. Monitoring with diffusion tubes was maintained at 17 locations across the Borough through the year and with the addition of five more schools sites from March 2013. Most of the sites monitored are considered to represent relevant exposure. As in previous years the automatic site towards the south of the Borough in a background location met the annual mean objective for nitrogebn dioxide in 2013. The three background diffusion tube sites sited elsewhere in the Borough also met the objective. However all of the other monitoring sites located at roadside sites across the Borough exceeded the objective.

The 2013 results are mainly consistent with previous years in relation to the objectives. An analysis of trends from the Redbridge continuous monitoring sites however indicates that there have been no significant reductions to NO_2 concentrations since the previous round of Review and Assessment.

The hourly mean objective has not been exceeded at any of the Redbridge continuous monitoring sites since 2008. During 2013 one diffusion tube roadside site gave an annual mean exceeding 60 $\mu g\ m^{-3}$ which can indicate a potential for exceedence of the hourly mean objective, although this is the lowest number of exceeding sites in recent years.

The Council's AQMA is Borough wide; however it will assess all of these sites for relevant exposure and amend its AQMA order if appropriate to include the hourly objective for these sites.

The Council's PM_{10} monitoring indicates that the daily objective was not exceeded in 2013 at its automatic monitoring sites. The sites also all met the less stringent annual mean objective.

Based on these findings from monitoring in the Borough, the Council does not need to undertake a Detailed Assessment as no new potential or actual exceedences at relevant locations were established

8.2 Conclusions relating to New Local Developments

There are no new local developments requiring more detailed consideration in the next Updating and Screening Assessment.

8.3 Other Conclusions

Communications between the Redbridge Planning Service and air quality officers in the Environmental Health Service with regard to particular development proposals and planning applications has improved during 2012/2013. Air quality officers have shown initiative to become more involved with planning decisions. Planning officers are becoming more aware of the air quality aspect to developments. The new Supplementary Planning Document (see Section 4 above) has helped with a move towards greater air quality input to development control.

8.4 Proposed Actions

The monitoring data has not identified a need to proceed to a detailed assessment.

It would be desirable to return to operating the two automatic stations that were closed in 2012. Current financial constraints do not permit but this remains an option for the future as long as the enclosures are kept in place and the monitoring equipment is available.

It is not proposed to make any changes to the Air Quality Management Area.

In 2013 Redbridge Council made a successful bid for funding from the London Mayor's Air Quality Fund. The grant is being used on a new project addressing air quality at one existing and one new school in the Borough. The main effort is directed to the building of green walls, tree planting, associated monitoring and educational programmes for schoolchildren.

Redbridge officers have made a start on rewriting and updating the Air Quality Action Plan. The new version may be ready within a matter of months. The need for revision of the actions list has been recognised for some time and was urged by the GLA, Poppy Lyle, in comments on the 2013 Progress Report. Following another recommendation from Poppy I have included some charts in this report.

9 References

Defra, 2009a. Local Air Quality Management, Technical Guidance LAQM.TG09

London Borough of Redbridge Air Quality Action Plan (adopted 2008)

Redbridge 2012 Updating and Screening Assessment

Redbridge 2013 Action lan Progress Report

LondonAir website: www.londonair.org.uk

Redbridge Sustainable Design and Construction Supplemetary Planning Document (adopted 2012)

Redbridge 2011 Local Implementation Plan

Redbridge Environmental Action Plan 2013

Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Appendix B: Diffusion tube monitoring data.

Table of monthly mean values in 2013.

Chart of monthly mean values in 2013

Table showing calculation of period adjusted and bias adjusted annual means.

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The diffusion tubes used are prepared by Gradko using a preparation method of 50% TEA in acetone. Gradko are UKAS accredited (ISO 17025) and participate in the Workplace Analysis Scheme for Proficiency (WASP) scheme and the AEA field inter-comparison exercise. Analysis is carried out at the ESG Glasgow laboratory for Bureau Veritas who are UKAS accredited, participate in the WASP scheme and follow guidance laid out in the Harmonisation Practical Guidance.

The bias adjustment factors are specific to each year, analysing laboratory, method of analysis and location. The factors are therefore also limited to the data supplied. The Review and Assessment website advises that "in many cases, using an overall correction factor derived from as many co-location studies as possible will provide the 'best estimate' of the 'true' annual mean concentration, it is important to recognise that there will still be uncertainty associated with this bias adjusted annual mean. One analysis has shown that the uncertainty for tubes bias adjusted in this way is ± 20% (at 95% confidence level). This compares with a typical value of ± 10% for chemiluminescence monitors subject to appropriate QA/QC procedures."

A default bias adjustment factor of 0.73 is available from Version 09/14 of the National Diffusion Tube Bias Adjustment Factor Spreadsheet for ESG Glasgow, 50% in Acetone, 2012, from one study of data from the London Marylebone Road intercomparison site. Precision of that study is classified as "Good".

Factor from Local Co-location Studies

The local co-location studies at the Redbridge 1, Perth Terrace, CM1 = DT D and Redbridge 4, Gardner Close, CM4 = DT E gave an averaged local bias factor for 2013 of 0.80.

2012	Bias adjustment factor
Background Redbridge local: CM1=DT D	0.84
Roadside Redbridge local: CM4=DT E	0.76
Average local: CM1=DT D and CM4=DT E	0.95
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 average local factor of 0.80 in our calculations in preference to the National Default since the latter derives from only one study site.

PM Monitoring Adjustment

Data from the Beta Attenuation Monitor (BAM) at all 4 monitoring sites was corrected by dividing the hourly mean concentration by 1.21 as advised by paragraph 3.39 of LAQM TG(09)

Short-term to Long-term Data adjustment

Particulate matter data capture was over 90% for the year so no adjustment is necessary.

QA/QC of Automatic Monitoring

All of 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. Regular (fortnightly) calibrations are carried out by trained local authority officers, 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. Site audits are carried out every 6 months by the National Physics Laboratory.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes used are prepared by Gradko using a preparation method of 50% TEA in acetone. Gradko are UKAS accredited (ISO 17025) and participate in the Workplace Analysis Scheme for Proficiency (WASP) scheme and the AEA field inter-comparison exercise. Analysis is carried out by Bureau Veritas who are UKAS accredited, participate in the WASP scheme and follow guidance laid out in the Harmonisation Practical Guidance.

The summary of precision results for nitrogen dioxide diffusion tubes collocation studies shows that of 20 studies in 2013 Gradko 50% TEA in acetone had good precision in 19 studies and poor precision in 1 study. Therefore, the overall result is good precision in 2013.

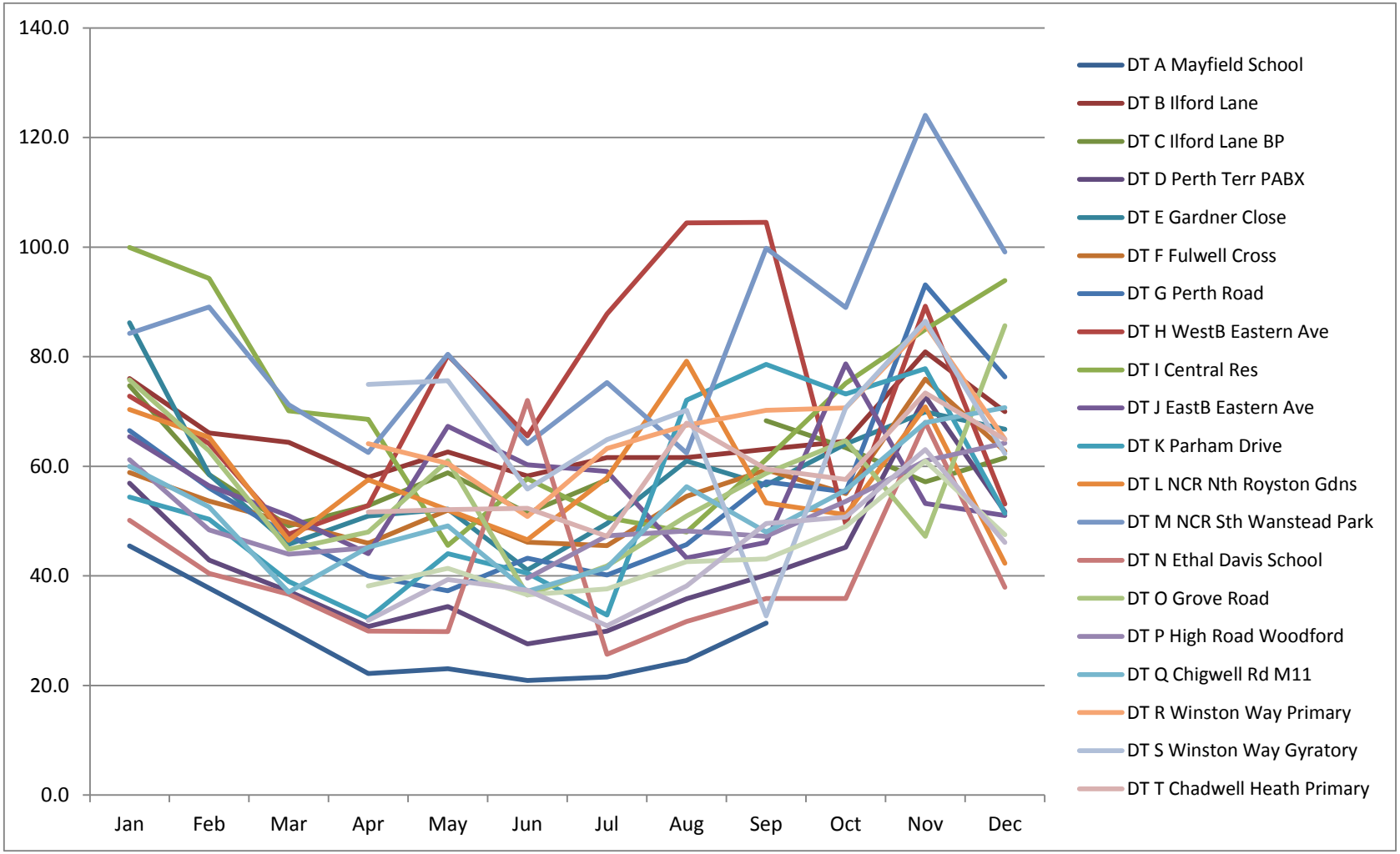
Environmental Services Group (Bureau Veritas) Workplace Analysis Scheme for Proficiency (WASP) 2013 results

R120 Jan-Mar	R121 Apr-Jun	R122 Jul-Sep	R123 Oct-Dec
100%	100%	100%	100%

Appendix B Diffusion tubes monitoring data. Table of monthly mean values – 2013

2013			Monthly means of triplicate tubes [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	45.4	37.8	30.1	22.2	23.0	20.9	21.6	24.6	31.4			
4,5,6	DT B	Ilford Lane	76.0	66.1	64.4	58.0	62.6	58.2	61.6	61.6	63.1	64.6	80.9	70.0
7,8,9	DT C	Ilford Lane BP	74.7	58.5	49.1	52.8	58.8	51.4	57.6		68.3	63.4	57.1	61.6
10,11,12	DT D	Perth Terr PABX	56.9	42.9	37.2	30.8	34.4	27.6	29.9	35.8	40.2	45.2	72.7	51.7
13,14,15	DT E	Gardner Close	86.2	58.5	45.7	50.9	52.2	41.1	49.5	61.0	56.6	64.1	69.9	66.8
16,17,18	DT F	Fulwell Cross	58.9	53.6	49.8	46.0	52.0	46.2	45.5	54.5	59.3	55.0	75.9	62.7
19,20,21	DT G	Perth Road	66.5	56.0	47.4	40.0	37.3	43.2	40.1	45.7	57.1	55.3	93.1	76.3
22,23,24	DT H	WestB Eastern Ave	72.8	64.1	47.6	52.8	80.3	65.5	87.8	104.4	104.5	49.4	89.2	53.1
25,26,27	DT I	Central Res	99.9	94.3	70.1	68.6	45.6	57.7	50.6	48.0	61.2	75.1	85.0	93.9
28,29,30	DT J	EastB Eastern Ave	65.4	56.4	51.0	44.1	67.3	60.3	59.1	43.3	46.1	78.7	53.2	51.0
31,32,33	DT K	Parham Drive	54.4	50.3	39.0	32.3	44.0	40.5	32.8	72.1	78.6	73.2	77.8	51.4
34,35,36	DT L	NCR Nth Royston Gdns	70.4	65.3	46.5	57.6	52.0	46.6	57.9	79.2	53.3	51.2	70.9	42.3
37,38,39	DT M	NCR Sth Wanstead Park	84.2	89.1	71.2	62.5	80.5	64.1	75.3	62.4	99.8	89.0	124.0	99.1
40,41,42	DT N	Ethal Davis School	50.1	40.4	36.6	29.9	29.8	72.0	25.7	31.7	35.9	35.9	68.0	37.9
43,44,45	DT O	Grove Road	75.8	62.8	44.8	48.0	61.0	36.5	41.8	50.9	58.7	64.7	47.2	85.6
46,47,48	DT P	High Road Woodford	61.2	48.4	43.9	45.1		39.6	47.3	48.2	47.2	53.6	61.0	64.2
49,50,51	DT Q	Chigwell Rd M11	60.0	52.6	37.0	45.2	49.1	37.2	41.5	56.3	48.0	55.7	68.0	70.7
52,53,54	DT R	Winston Way Primary				64.1	60.5	50.8	63.2	67.5	70.2	70.7	85.8	65.0
55,56,57	DT S	Winston Way Gyratory				74.9	75.6	55.8	64.9	70.2	32.7	70.7	86.5	62.3
58,59,60	DT T	Chadwell Heath Primary				51.6	52.1	52.3	47.2	67.9	59.5	57.6	73.4	64.9
61,62,63	DT U	Goodmayes Primary				38.1	41.4	36.5	37.6	42.6	43.1	49.0	60.9	47.5
64,65,66	DT V	Isaac Newton Academy				31.9	39.3	37.4	30.9	38.2	49.5	50.7	63.0	46.1

Diffusion tubes monitoring data. Chart of monthly mean values – 2013



2013	Calculation of period adjusted and bias adjusted annual means								bias factor	0.80
				Calculation of period adjustment factors						
Site ID	Site name	Whole year & period means	Period	Jan - Sep period mean	Ratio Am/Pm Jan-Sep	Apr - Dec period mean	Ratio Am/Pm Apr-Dec	Period adjustm'nt factor (R_a)	Annual means not bias adjusted	Bias adjusted annual means
DT A	Mayfield School	28.5	Jan-Sep					1.057	30.2	24.1
DT B	Ilford Lane	65.6	Whole year	63.5	1.033	64.5	1.017	1.000	65.6	52.5
DT C	Ilford Lane BP	59.4	11 months	58.9	1.008	58.9	1.009	1.000	59.4	47.5
DT D	Perth Terr PABX	42.1	Whole year	37.3	1.129	40.9	1.029	1.000	42.1	33.7
DT E	Gardner Close	58.5	Whole year	55.7	1.050	56.9	1.029	1.000	58.5	46.8
DT F	Fulwell Cross	55.0	Whole year	51.8	1.062	55.2	0.995	1.000	55.0	44.0
DT G	Perth Road	54.8	Whole year	48.2	1.139	54.2	1.011	1.000	54.8	43.9
DT H	WestB Eastern Ave	72.6	Whole year	75.5	0.962	76.3	0.951	1.000	72.6	58.1
DT I	Central Res	70.8	Whole year	66.2	1.070	65.1	1.088	1.000	70.8	56.7
DT J	EastB Eastern Ave	56.3	Whole year	54.8	1.028	55.9	1.008	1.000	56.3	45.1
DT K	Parham Drive	53.9	Whole year	49.3	1.092	55.9	0.964	1.000	53.9	43.1
DT L	NCR Nth Royston Gdns	57.7	Whole year	58.7	0.983	56.8	1.017	1.000	57.7	46.2
DT M	NCR Sth Wanstead Park	83.4	Whole year	76.6	1.090	84.1	0.992	1.000	83.4	66.7
DT N	Ethal Davis School	41.2	Whole year	39.1	1.052	40.8	1.010	1.000	41.2	32.9
DT O	Grove Road	56.5	Whole year	53.4	1.058	54.9	1.028	1.000	56.5	45.2
DT P	High Road Woodford	50.9	11 months	47.6	1.069	50.8	1.002	1.000	50.9	40.7
DT Q	Chigwell Rd M11	51.8	Whole year	47.4	1.091	52.4	0.988	1.000	51.8	41.4
DT R	Winston Way Primary	66.4	Apr-Dec					1.009	67.0	53.6
DT S	Winston Way Gyratory	66.0	Apr-Dec					1.009	66.6	53.2
DT T	Chadwell Heath Primary	58.5	Apr-Dec					1.009	59.0	47.2
DT U	Goodmayes Primary	44.1	Apr-Dec					1.009	44.5	35.6
DT V	Isaac Newton Academy	43.0	Apr-Dec					1.009	43.4	34.7
	Average Am/Pm ratios = Period adjustment factor (R_a)			Jan-Sep	1.057	Apr-Dec	1.009			