2016 Air Quality Annual Status Report (ASR)

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

June 2016

Local Authority Officer	None
Department	Public Health
Address	Epping Forest District Council Civic Offices High Street Epping Essex CM16 4BZ
Telephone	01992 564496
E-mail	erefuse@eppingforestdc.gov.uk
Report Reference number	WK/201621405
Date	July 2016

Executive Summary: Air Quality in Our Area

Breathing clean air is a crucial part of our health and well-being.

Our atmosphere has always been polluted by natural sources like volcanoes, desert dust and forest fires, but what concerns us today is man-made pollution and the impact it has on us, and on our surroundings. Urban air pollution is certainly not a new problem: the effects of the London smog's are well documented, and remembered by many, but today, and in Essex, the biggest source of air pollution is road traffic.

Air Quality in Epping Forest District

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

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

The Council continues to monitor air quality across the district, using nitrogen dioxide as the key air quality indicator. The air quality in the district is reasonably good with only small pockets of increased concentrations of vehicle emissions related polutants, limited to congested high street areas and busy junctions. The results for 2015 indicate an overall improvement in terms of a reduction in nitrogen dioxide concentrations measured. It is not known if this reduction is attributable to actual improvements in air quality, or the change of Laboratory and diffusion tube preparation method. The Council retains one small AQMA for the Bell Common junction, which remains above the 40µg/m^3, but now not at risk of exceeding the hourly average. For details of the AQMA, see: http://www.essexair.org.uk/AQInEssex/LA/EppingForest.aspx?View=aqma

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

No new sources of emissions needed to be considered, nor were any new AQMAs declared. The Council continues to work with out partners including County Council and the Environment Agency on environmental protection and air quality matters, and we are about to embark on project with the Corporation of London, Middlesex University, Essex CC and the Health authority on a research project on the impart of air pollution on the Forest.

Actions to Improve Air Quality

Because the single largest influence on air quality in the District is the motor car, the Council is generally reliant on national strategies and vehicle emissions regulations for the improvement of air quality.

Local Priorities and Challenges

Particular challenges in the area include the ageing service bus fleet providing essentially a rural transport service where London transport network ends. This also means that the motor car remains the first transport choice.

Local priorities remain as the overall improvement of air quality via a variety of means, including non-specific but health-related activities, raising awareness at the local level and changing habits.

How to Get Involved

Get involved – it's easy! Ride your bike, walk or scoot to work (have you noticed how my 'gown-ups' have scooters now?), walk your children to school. Make it fun! The Essex Air Web site can also help you get out and about and involved, see: http://www.essexair.org.uk/

Table of Contents

List of Tables

1 Local Air Quality Management

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

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Epping Forest District Council can be found in Table 2.1. Further information related to the AQMA, including maps of AQMA boundaries are available online at:

http://www.essexair.org.uk/AQInEssex/LA/EppingForest.aspx?View=aqma

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
AQMA Epping Forest District Council No.2	NO_2 annual mean	Epping	An area encompassing 2 of properties at the junction of Theydon Road and Epping High Road.	District-wide actions. Previous action plan completed. New plan to be finalised.

2.2 Progress and Impact of Measures to address Air Quality in Epping Forest District

Epping Forest District Council has taken forward a number of measures during 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Environmental Permitting inspections	Environmental Permits	Environment charges through permit systems and economic instruments	EFDC	N/A	N/A	100% inspection of inspection due	Applicable to the whole district not just the AQMA	100% to date	Ongoing	
2	Enhanced particulate controls on biomass boiler	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	EFDC	N/A	N/A	Permit issued	Applicable to the whole district not just the AQMA	Completed	May 2016	Energy generation system also installed
3	Updates to Essex Air web site	Public information	Via the internet	Essex Air	N/A	N/A	None	Applicable to the whole district not just the AQMA	Ongoing	Ongoing	
4	Fleet vehicle standards for CO_2	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	EFDC	TBC	TBC	TBC	Applicable to the whole district not just the AQMA	Email exchanges		
5	Natural Capital Asset Check with a focus on Air Quality	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Essex County Council	TBC	TBC	TBC	Applicable to the whole district not just the AQMA	Scoping project		

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

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

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

- Effective regulation of Part B and Part A2 regulated activities, including regular reviews for unregulated activities.
- Effective regulation of solvent emission activities.
- Middlesex University research project likely to include $PM_{2.5}$ element.
- Natural Capital Asset Check with a focus on Air Quality.

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

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

Epping Forest District Council did not undertake automatic (continuous) monitoring at any location in the district during 2015. National monitoring results are available at http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

3.1.2 Non-Automatic Monitoring Sites

Epping Forest District Council undertook non- automatic (passive) monitoring of NO_2 at 25 sites during 2015. Table A.1 – Details of Non-Automatic Monitoring Sites in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites can be seen on the EssexAir web site: http://www.essexair.org.uk/AQInEssex/LA/EppingForest.aspx?View=diffusion Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the bias adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

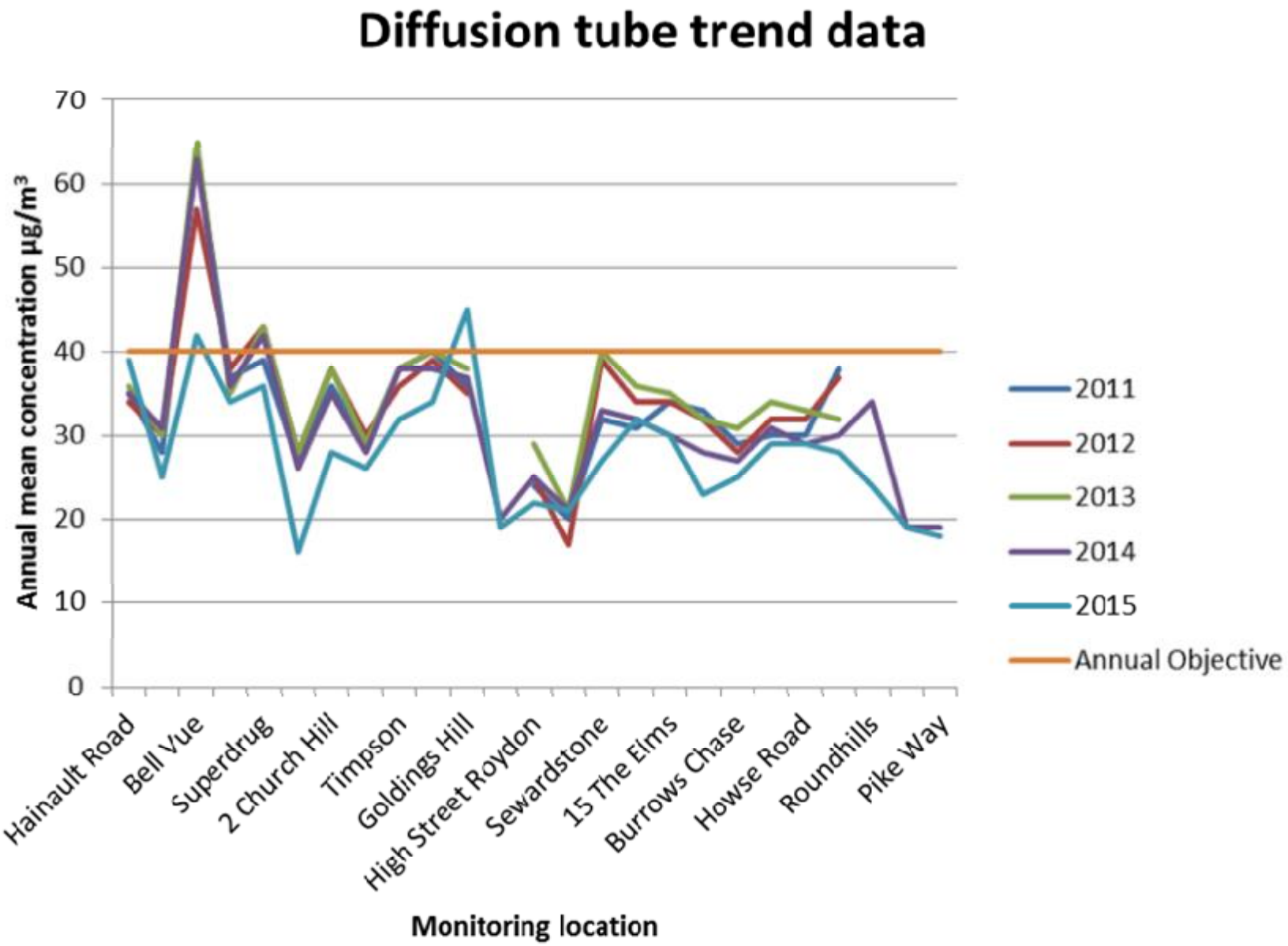
For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B. Contractual arrangements with diffusion tube suppler meant that data for 2015 was April to December inclusive. ESG provided all diffusion tubes in this period, using the 50% TEA in acetone method. There was however sufficient data capture, meaning that results did not need to be annualised.

All bias adjusted annual averages were below the 40µg/m^3 annual average objective, save for the following exceptions:

- Site 3: Epping, Bell Vue (42µg/m^3)
- Site 11: Goldings Hill (45µg/m^3)

Bell Vue is the exisiting AQMA. Receptors at Goldings Hill are set back from the diffusion tube location. When adjusted for distnace, the annual average becomes 37.4µg/m^3, which is below the annual average objective. The distance adjustment can be found in Appendix C.

No location returned an annual mean greater than 60µg/m^3, which indicates that an exceedance of the 1-hour mean objective is unlikely at any sensitive receptor.


Diffusion tube trend data
Annual mean concentration µg/m³
70
60
50
40
30
20
10
0
Hainault Road
Bell Vue
Superdrug
2 Church Hill
Timpson
Goldings Hill
High Street Roydon
Sewardstone
15 The Elms
Burrows Chase
Howse Road
Roundhills
Pike Way
Monitoring location
2011
2012
2013
2014
2015
Annual Objective

3.2.2 Particulate Matter (PM_{10})

PM_{10} monitoring is not undertaken in the district.

3.2.3 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ monitoring is not undertaken in the district, and because PM_{10} monitoring is not undertaken either, it is not possible to estimate $PM_{2.5}$ from PM_{10} measurements.

3.2.4 Sulphur Dioxide (SO_2)

Sulphur dioxide monitoring is not undertaken in the district.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Height (m)
1	Chigwell: Hainault Road	Kerbside triplicate	544234	192236	NO_2	No	Residential (8.5m)	1m	2.0m
2	Epping: 15 High Street	Urban Background triplicate	545555	201732	NO_2	No	Yes (0m)	13.7m	2.0m
3	Epping: Bell Vue	Roadside triplicate	544928	201281	NO_2	Yes	Residential (0m)	1.8m	2.0m
4	Epping: Ladbrokes	Roadside triplicate	546196	202355	NO_2	No	Public (0m)	5.6m	2.5m
5	Epping: Superdrug	Roadside triplicate	546058	202193	NO_2	No	Public (0m)	4.9m	2.5m
6	Hastingwood: Canes Cottages	Urban Background triplicate	547838	206819	NO_2	No	Residential (0m)	15.6m	2.0m
7	Loughton: 2 Church Hill	Roadside co-location	542505	196668	NO_2	No	Public (0m)	4.2m	2.0m

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Height (m)
8	Loughton: 72 Church Hill	Urban Background co-location	542664	196868	NO_2	No	Residential (0m)	12.7m	2.0m
9	Loughton: 249 High Road (Timpson)	Roadside triplicate	542339	196360	NO_2	No	Public (0m)	6.4m	2.0m
10	Loughton: 252 High Road (P!nk)	Roadside duplicate	542373	196478	NO_2	No	Public (0m)	5.7m	2.0m
11	Loughton: Goldings Hill	Roadside co-location	543091	197316	NO_2	No	Residential (4.8m)	1m	2.0m
12	North Weald: Tempest Mead	Urban Background triplicate	549648	203671	NO_2	No	Residential (4.2m)	1.0m	2.0m
13	Roydon: High Street	Roadside triplicate	540919	209956	NO_2	No	Residential (0.75m)	2.5m	2.0m
14	Roydon: Netherhall Lane	Urban Background triplicate	539711	208662	NO_2	No	Background (16m)	1.7m	2.0m
15	Sewardstone: Albion Terrace	Roadside co-location	537727	196187	NO_2	No	Residential (3.1m)	4.6m	2.0m
16	Waltham Abbey: 13 The Elms	Urban Background triplicate	541308	200037	NO_2	No	Residential (0m)	36.6m	2.0m

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Height (m)
17	Waltham Abbey: 15 The Elms	Urban Background triplicate	541320	200020	NO_2	No	Residential (0m)	55.8m	2.0m
18	Waltham Abbey: Abbeyview	Urban Background co-location	537808	200644	NO_2	No	Residential (6.1m)	24m	2.0m
19	Waltham Abbey: Burrows Chase	Urban Background co-location	538570	199509	NO_2	No	Residential (0m)	14.6m	2.0m
20	Waltham Abbey: Hayden Road	Urban Background co-location	538386	199557	NO_2	No	Residential (0m)	12m	2.0m
21	Waltham Abbey: Howse Road	Urban Background co-location	537956	199565	NO_2	No	Residential (0m)	19m	2.0m
22	Waltham Abbey: Lodge Lane	Roadside triplicate	538710	199860	NO_2	No	Residential (7.3m)	0.5m	2.0m
23	Waltham Abbey: Roundhills	Urban Background co-location	538954	199973	NO_2	No	Residential (6.7m)	1.0m	2.0m
24	Ongar: Marks Avenue	Urban Background triplicate	555074	203600	NO_2	No	Residential (0m)	0.5m	2.0m

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Height (m)
25	North Weald: Pike Way	Urban Background co-location	549087	203573	NO_2	No	Residential (0m)	0.5m	2.0m

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

(2) N/A if not applicable.

Table A.2 – Annual Mean NO_2 Monitoring Results

Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
Chigwell: Hainault Road	Kerbside triplicate	Diffusion tube	97.2%	75%	35	34	36	35	39
Epping: 15 High Street	Urban Background triplicate	Diffusion tube	100%	75%	28	30	30	31	25
Epping: Bell Vue	Roadside triplicate	Diffusion tube	100%	75%	**64**	**57**	**65**	**63**	**42**
Epping: Ladbrokes	Roadside triplicate	Diffusion tube	100%	75%	37	38	35	36	34
Epping: Superdrug	Roadside triplicate	Diffusion tube	100%	75%	39	**43**	**43**	**42**	36
Hastingwood: Canes Cottages	Urban Background triplicate	Diffusion tube	100%	75%	27	28	28	26	16
Loughton: 2 Church Hill	Roadside co-location	Diffusion tube	100%	75%	36	38	38	35	28

Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
Loughton: 72 Church Hill	Urban Background co-location	Diffusion tube	95.8%	75%	29	30	29	28	26
Loughton: 249 High Road (Timpson)	Roadside triplicate	Diffusion tube	100%	75%	38	36	38	38	32
Loughton: 252 High Road (P!nk)	Roadside duplicate	Diffusion tube	100%	75%	**40**	39	**40**	38	34
Loughton: Goldings Hill	Roadside co-location	Diffusion tube	100%	75%	36	35	38	37	**45**
North Weald: Tempest Mead	Urban Background triplicate	Diffusion tube	100%	75%	-	-	-	20	19
Roydon: High Street	Roadside triplicate	Diffusion tube	100%	75%	24	25	29	25	22
Roydon: Netherhall Lane	Urban Background triplicate	Diffusion tube	100%	75%	20	17	21	21	21
Sewardstone: Albion Terrace	Roadside co-location	Diffusion tube	100%	75%	32	39	**40**	33	27

Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
Waltham Abbey: 13 The Elms	Urban Background triplicate	Diffusion tube	100%	75%	31	34	36	32	32
Waltham Abbey: 15 The Elms	Urban Background triplicate	Diffusion tube	100%	75%	34	34	35	30	30
Waltham Abbey: Abbeyview	Urban Background co-location	Diffusion tube	100%	75%	33	32	32	28	23
Waltham Abbey: Burrows Chase	Urban Background co-location	Diffusion tube	100%	75%	29	28	31	27	25
Waltham Abbey: Hayden Road	Urban Background co-location	Diffusion tube	100%	75%	30	32	34	31	29
Waltham Abbey: Howse Road	Urban Background co-location	Diffusion tube	100%	75%	30	32	33	29	29
Waltham Abbey: Lodge Lane	Roadside triplicate	Diffusion tube	100%	75%	38	37	32	30	28
Waltham Abbey: Roundhills	Urban Background co-location	Diffusion tube	100%	75%	-	-	-	34	24

Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
Ongar: Marks Avenue	Urban Background triplicate	Diffusion tube	100%	75%	-	-	-	19	19
North Weald: Pike Way	Urban Background co-location	Diffusion tube	100%	75%	-	-	-	19	18

Notes:

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

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2015

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

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw average	Adjusted average[1]
1a				52.0	41.4	2.2	67.4	57.0	57.3	66.0	56.8	62.1		
1b				50.0	40.1	24.1	35.8	25.6	56.5	65.0	59.8	53.2	48	39
1c				52.7	16.8	30.4	22.9	28.3	56.1	66.0	-	57.5		
2a				24.9	25.8	24.3	30.1	30.5	26.6	33.4	43.4	46.5		
2b				28.2	28.1	19.4	26.4	29.1	31.0	37.6	39.9	39.1	31	25
2c				29.6	25.8	23.4	27.1	27.8	30.9	37.1	42.0	42		
3a				63.5	69.0	26.7	20.7	29.3	50.3	57.3	69.3	78.8		
3b				35.9	76.8	23.6	22.3	29.8	49.3	58.2	65.2	67.0	52	42
3c				75.6	62.3	33.5	23.1	28.0	52.7	52.6	74.7	81.7		
4a				35.7	38.8	35.5	38.2	39.5	34.1	36.7	57.5	58.6		
4b				34.8	38.8	35.3	38.6	39.7	38.7	33.2	54.4	60.1	42	34
4c				37.2	38.2	38.5	40.2	40.2	37.2	36.7	54.3	57.7		
5a				42.3	34.9	37.4	38.0	46.5	43.9	52.2	45.6	59.6		
5b				49.4	35.3	35.6	25.4	47.4	43.2	48.1	48.8	56.2	44	36
5c				45.2	35.2	38.4	34.8	46.4	45.9	51.7	46.0	54.2		
6a				30.0	26.4	14.6	14.8	18.1	31.1	37.7	2.38	31.1	25	16

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw average	Adjusted average[1]
6b				25.6	29.9	14.2	16.3	118.0	30.5	37.4	18.3	31.7		
6c				30.8	22.5	15.6	19.3	23.6	30.6	38.4	27.0	33.2		
7a				32.9	26.9	31.4	39.6	33.9	33.9	40.9	36.6	37.0	35	28
7b				30.3	26.5	37.3	32.6	33.0	30.4	43.0	38.6	37.4		
8a				34.2	27.5	24.4	22.0	34.2	30.2	35.8	36.7	33.3	32	26
8b				31.2	24.5	23.1	-	33.1	26.9	37.5	37.1	35.6		
9a				42.2	37.4	33.0	36.8	36.2	41.5	46.3	37.1	55.1	40	32
9b				47.3	36.2	20.7	35.7	34.7	40.7	52.9	44.6	47.4		
9c				46.7	38.4	26.7	32.2	38.4	41.6	42.8	45.0	52.6		
10a				46.1	44.8	31.6	29.2	31.9	49.6	48.6	51.5	51.8	42	34
10b				38.9	36.4	37.6	35.3	33.3	45.8	42.1	47.8	50.0		
11a				50.2	41.3	52.7	61.1	60.1	58.1	54.4	55.3	55.8	55	45 (37.4)*
11b				54.6	42.9	55.3	79.1	58.2	56.1	66.4	45.4	41.9		
12a				18.2	15.8	18.8	23.4	31.9	20.4	27.4	26.1	29.7	24	19
12b				15.1	15.0	24.6	30.1	30.2	18.6	23.7	26.2	28.1		
12c				18.0	15.5	28.0	32.8	36.3	17.8	23.9	26.8	26.9		
13a				25.8	17.8	19.5	18.4	19.9	27.0	36.3	34.9	33.7	27	22
13b				26.5	21.9	21.9	19.8	24.6	29.5	34.8	33.4	35.6		
13c				22.4	22.3	25.0	25.0	27.3	30.5	38.1	31.2	31.8		

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw average	Adjusted average[1]
14a				20.0	16.6	23.8	24.8	28.7	19.8	28.3	27.9	30.6	26	21
14b				19.2	19.3	22.5	25.7	25.9	18.7	25.9	29.5	30.1		
14c				16.7	18.3	38.0	45.1	47.0	19.6	25.2	28.3	31.7		
15a				34.2	26.5	27.8	22.3	26.6	42.1	50.4	46.7	41.3	33	27
15b				37.2	29.6	14.4	17.4	14.0	42.6	41.3	42.5	43.3		
16a				35.2	35.4	35.2	46.6	47.5	41.2	39.9	40.7	31.5	40	32
16b				37.9	36.8	45.6	46.2	49.8	37.8	47.1	35.3	35.9		
16c				37.7	35.8	39.3	35.4	38.7	42.6	44.5	44.5	33.0		
17a				34.0	34.4	40.7	38.9	47.0	37.7	46.0	34.6	30.3	37	30
17b				31.1	32.6	27.4	39.7	39.7	38.6	50.5	40.2	30.4		
17c				33.2	27.7	31.7	43.5	43.5	39.3	47.7	33.9	31.9		
18a				32.9	23.9	11.4	18.1	15.7	30.9	32.4	47.1	47.1	28	23
18b				32.3	24.7	10.5	13.8	12.6	32.3	34.9	42.5	42.8		
19a				36.5	25.1	27.0	22.0	29.4	35.5	41.3	29.9	29.7	31	25
19b				36.5	24.4	28.1	24.6	26.5	31.1	43.3	31.9	27.0		
20a				34.7	27.0	39.0	44.2	40.2	40.0	42.8	34.5	33.3	36	29
20b				37.5	29.7	27.1	27.8	29.9	39.7	42.6	34.5	34.6		
21a				35.4	25.6	25.9	32.3	41.8	37.9	43.8	9.9	49.8	36	29
21b				34.9	26.4	36.3	46.7	43.0	37.4	46.9	31.1	34.4		

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw average	Adjusted average[1]
22a				39.8	38.8	13.1	17.7	17.3	46.5	53.8	45.6	42.8	35	28
22b				42.9	32.8	15.2	16.5	14.9	45.7	51.1	53.0	37.6		
22c				46.1	38.8	14.6	17.8	17.9	41.6	52.8	47.5	39.1		
23a				34.6	32.8	10.4	14.1	14.8	36.4	38.3	49.4	50.7	30	24
23b				22.0	27.1	12.0	17.3	14.6	31.7	40.0	50.7	50.8		
24a				17.2	14.1	29.0	28.8	34.6	17.2	25.6	24.3	27.9	23	19
24b				14.5	11.0	25.8	21.2	29.1	18.3	23.7	27.6	24.2		
24c				15.6	14.0	28.4	22.2	27.8	17.5	24.5	25.5	29.6		
25a				19.1	18.1	19.1	27.9	31.5	20.5	23.1	28.1	26.2	22	18
25b				17.3	18.0	12.6	16.5	17.8	18.4	26.0	25.3	28.1		

(1) See Appendix C for details on bias adjustment.

(2) * adjusted for distance to receptor.

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

Laboratory QA/QC

ESG participates in the AIR NO_2 PT laboratory performance scheme. Rounds AR0007 to AR011 of the testing scheme cover the monitoring periods contained in this air quality status report. 100% of results were considered to be 'satisfactory'. Full details can be found here:

http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-(April-2014-February-2016)-NO2-report.pdf

Bias adjustment

Bias adjustment factor of 0.81 based on 21 co-location studies nationally for ESG Didcot diffusion tubes prepared as 50% TEA in Acetone.

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/16

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2016

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AEDOM and the National Physical Laboratory

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

Step 2: Select a Preparation Method from the Drop-Down List

Step 3: Select a Year from the Drop-Down List

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[5]	Bias Adjustment Factor (A) (Cm/Dm)
ESG Didcot	50% TEA in acetone	2015	R	Dumfries and Galloway Council	12	35	39	14.6%	G	0.87
ESG Didcot	50% TEA in acetone	2015	R	Gravesham Borough Council	12	40	30	34.1%	G	0.75
ESG Didcot	50% TEA in acetone	2015	R	Gravesham Borough Council	12	30	23	29.6%	P	0.77
ESG Didcot	50% TEA in acetone	2015	UI	North Lincolnshire	11	24	18	36.5%	P	0.73
ESG Didcot	50% TEA in acetone	2015	R	Slough BC	11	38	32	19.3%	P	0.84
ESG Didcot	50% TEA in acetone	2015	R	Slough BC	10	40	29	31.0%	G	0.83
ESG Didcot	50% TEA in acetone	2015	R	Slough Borough Council	11	40	34	19.7%	P	0.84
ESG Didcot	50% TEA in acetone	2015	R	Wrexham County Borough Council	12	12	12	0.0%	G	0.99
ESG Didcot	50% TEA in acetone	2015	UC	Cardiff Council	10	26	25	1.6%	G	0.98
ESG Didcot	50% TEA in acetone	2015	RS	Marylebone Road Intercomparison	12	104	81	27.9%	G	0.78
ESG Didcot	50% TEA in acetone	2015	R	Vale of White Horse District Council	11	34	29	15.2%	G	0.86
ESG Didcot	50% TEA in acetone	2015	UI	Stockton on Tees	12	24	18	29.4%	G	0.77
ESG Didcot	50% TEA in acetone	2015	R	Stockton on Tees	12	17	14	21.5%	G	0.82
ESG Didcot	50% TEA in acetone	2015	RS	Suffolk Coastal DC	12	44	35	25.6%	P	0.79
ESG Didcot	50% TEA in acetone	2015	SU	Thanet District Council	9	17	15	10.8%	G	0.90
ESG Didcot	50% TEA in acetone	2015	R	Thanet District Council	12	27	23	17.8%	G	0.85
ESG Didcot	50% TEA in acetone	2015	UI	Medway Council	12	21	12	77.3%	G	0.56
ESG Didcot	50% TEA in acetone	2015	R	Medway Council	11	32	23	42.6%	G	0.70
ESG Didcot	50% TEA in acetone	2015	R	North East Lincolnshire Council	10	34	28	21.2%	P	0.83
ESG Didcot	50% TEA in acetone	2015	R	North East Lincolnshire Council	11	39	28	39.6%	G	0.72
ESG Didcot	50% TEA in acetone	2015	R	North East Lincolnshire Council	11	66	47	16.2%	G	0.86
ESG Didcot	50% TEA in acetone	2015		Overall Factor[3] (21 studies)				Use		0.81

Adjustment for distance

The following monitoring locations are closer to the source than the receptor:

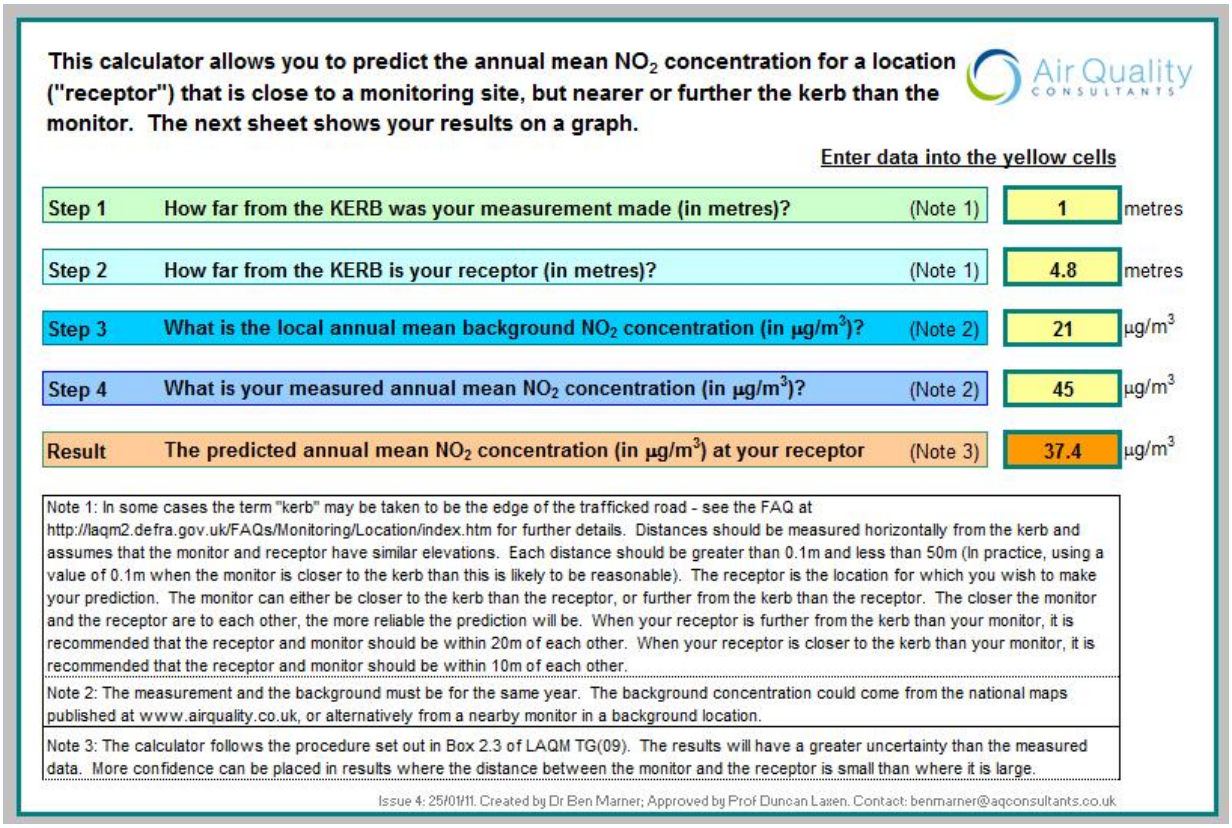
Goldings Hill, Loughton

Albion Terrace, Sewardstone

Lodge Lane, Waltham Abbey

Hainault Road, Chigwell

The annual average result for all locations except Goldings hill were below the annual average objective. The result for Goldings hill has been distance adjusted as follows:



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

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.8	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	21	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	45	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	37.4	µg/m^3

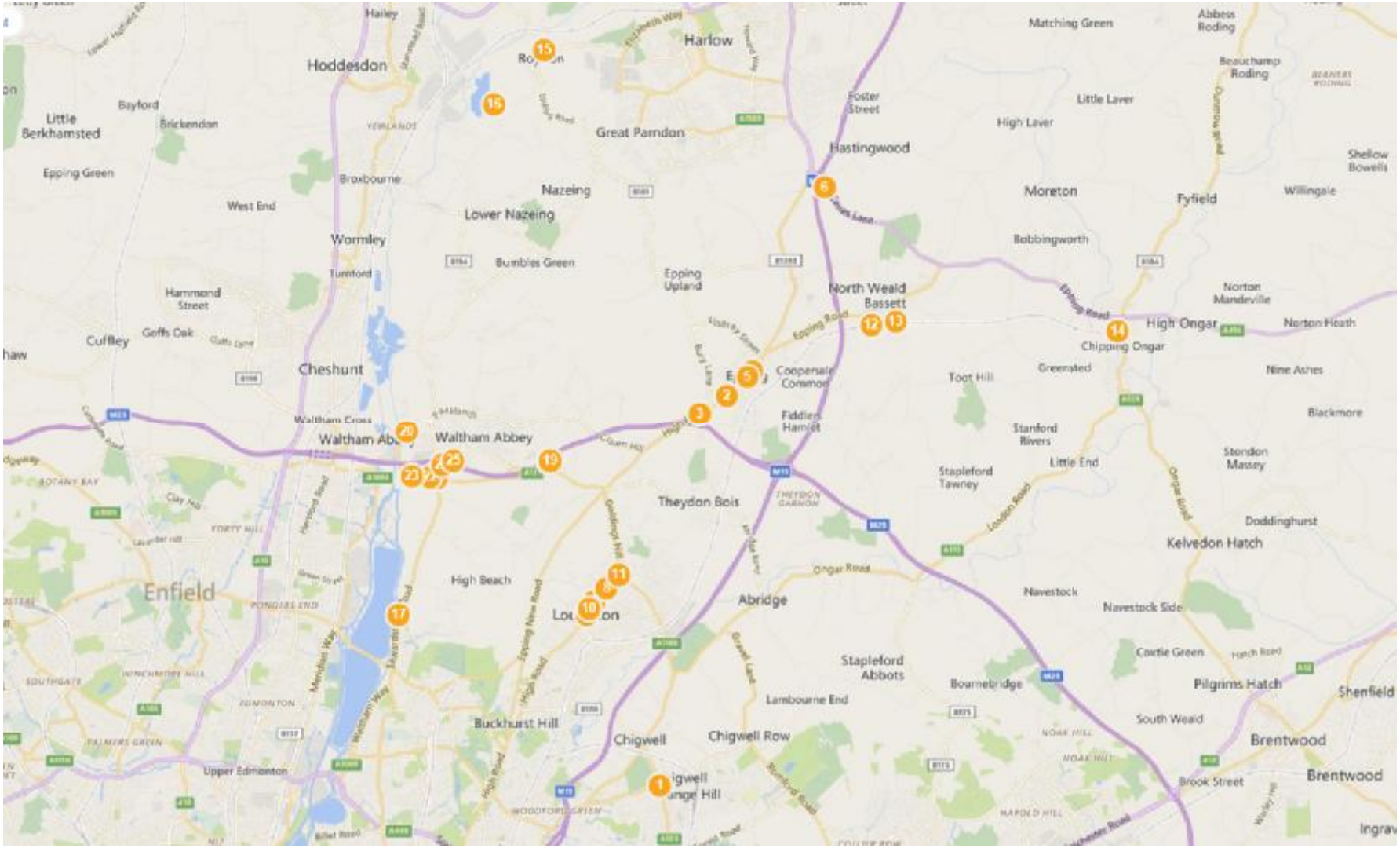
Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations.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

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

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

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

Appendix D: Map(s) of Monitoring Locations



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

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

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
…	…

References

Nitrogen Dioxide Bias Adjustment Factor Spreadsheet

http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Local Air Quality Management Technical Guidance LAQM:TG(16)

http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

Summary of Laboratory Performance in Workplace Analysis Scheme for Proficiency (WASP/AIR PT)

http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html