



South Bucks
District Council

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	Tracy Farrell
Department	Strategic Environment Team
Address	Capswood, Oxford Road, Denham, Bucks UB9 4LH
Telephone	01895 837264
E-mail	tfarrell@chiltern.gov.uk
Report Reference number	ASR1-16SBv2
Date	June 2016

Executive Summary: Air Quality in Our Area

Air Quality in South Bucks District Council

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

Air quality in South Bucks is generally good, and NO₂ levels have remained constant over the monitoring period. Diffusion tube monitoring data has indicated that there was one exceedance of the annual mean objective value for nitrogen dioxide in 2015 which was within the Air Quality Management Area (AQMA), which was declared in 2004.

There have been no new major sources of emissions, since the Annual Review and Assessment Report in early 2015.

Owing to the largely rural nature of the district, the primary sources of pollution are transport related sources including the motorways (M25, M40, M4) which pass through the district. An AQMA was declared around the motorway corridors in 2004.

As South Bucks is now a shared service with Chiltern District Council, there will be opportunities to work together, and also with the Bucks Air Quality Management Group on county wide initiatives to address large infrastructure developments in the south-east.

The Bucks Air Quality Management Group consisting of Aylesbury Vale, Milton Keynes, Chiltern, High Wycombe and South Bucks authorities has been reinvigorated in order to look at area wide air quality initiatives and to build a closer working relationship with departments within Bucks County Council (BCC) such as

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

Transport and Public Health Departments and outside agencies such as The Environment Agency, Public Health England and Highways for England.

Actions to Improve Air Quality

Many of the actions contained with the Action Plan have now been completed or are ongoing. The Air Quality Action plan will be reviewed over the next six months and further actions will be considered alongside identifying potential funding opportunities.

As part of the new shared service with Chiltern District Council the Air Quality Action plan will be reviewed over the next six months. SBDC will also be looking at funding options later in the year.

Local Priorities and Challenges

There are currently no new local developments that require more detailed consideration at this time.

However, there is concern that the area will be impacted on by a series of proposed national infrastructure projects including:-

- Crossrail project progressed to work on the ground
- Highways Agency proposal for Smart M4
- Western Rail access for Heathrow consultation and promotion
- HS2 Phase 1
- Heathrow Express Depot relocation proposal to Langley
- Slough International Freight Exchange Proposal
- Heathrow third runway proposals
- Proposed redevelopment of Wilton Park, Beaconsfield

Seven new nitrogen dioxide diffusion tubes will be placed within the district in the coming year, at sites identified as haulage routes for the development, which could see increased traffic levels.

How to Get Involved

Further information relating to air quality can be found on the council's award winning web page: <http://www.bucksairquality.co.uk/>

The site provides a wealth of information suitable for all backgrounds and ages on air quality. It has been developed following requests and feedback from local schools interested in air quality and environmental issues, and residents that need more detailed information.

Table of Contents

Executive Summary: Air Quality in Our Area	i
Air Quality in South Bucks	i
Actions to Improve Air Quality	ii
Local Priorities and Challenges.....	ii
How to Get Involved.....	ii
1 Local Air Quality Management	1
2 Actions to Improve Air Quality	2
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in South Bucks District Council.....	2
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and or Concentrations.....	10
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	12
3.1 Summary of Monitoring Undertaken	12
3.1.1 Automatic Monitoring Sites	12
3.1.2 Non-Automatic Monitoring Sites.....	12
3.2 Individual Pollutants	12
3.2.1 Nitrogen Dioxide (NO ₂).....	12
3.2.2 Particulate Matter (PM ₁₀).....	13
3.2.3 Particulate Matter (PM _{2.5})	
Appendix A: Monitoring Results	14
Appendix B: Full Monthly Diffusion Tube Results for 2015	22
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	24
Appendix D: Map(s) of Monitoring Locations	25
Appendix E: Summary of Air Quality Objectives in England	26
Glossary of Terms	27
References	28

List of Tables

Table 2.1 – Declared Air Quality Management Areas.....	2
Table 2.2 – Progress on Measures to Improve Air Quality	4

1 Local Air Quality Management

This report provides an overview of air quality in South Bucks District Council 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 South Bucks 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 South Bucks District Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at

<http://www.southbucks.gov.uk/article/3814/Air-Quality-Review-and-Assessment>

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
SBDC 1	<ul style="list-style-type: none"> • NO₂ annual mean • PM₁₀ 24-hour mean 	South Bucks	M25, M40 and M4 corridors	2006 South Bucks District Council Action Plan

2.2 Progress and Impact of Measures to address Air Quality in South Bucks District Council

South Bucks District Council has taken forward a number of measures during the current reporting year of 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. One air quality initiative undertaken this year was to obtain an electric car for a two week trial period for council officers to use for business trips undertaken on behalf of the Authority.



South Bucks DC expects that the following measures will be completed over the course of the next reporting year:

A bid for grant funding will be submitted to Defra to establish an “Eco-Stars” scheme for freight vehicles within the district.

Electric charging points will continue to be addressed through grant opportunities and the planning process, with measures to improve/address air quality being put forward as policies within the emerging Local Plan.

SBDC’s priorities for the coming year are to assess the impact of the proposed infrastructure in and around the district.

The priorities for the coming year will be further considered when the Action Plan is updated later in the year. South Bucks District Council is now a shared service with Chiltern District Council, and the two councils will work together, and with the wider Bucks Air Quality Management Group. In particular the authorities will work together to address the potential impact of proposed infrastructure development locally, (HS2, Crossrail, possible Heathrow Airport Expansion).

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	Buckinghamshire and Milton Keynes Regional Air Quality Strategy (BMKAQS)	Policy Guidance & Development	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	CDC/SBDC AVDC/MK	2006	2006-2016			Ongoing	Ongoing	
2	Partnership working with Highways	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	SBDC	2009	2009			Ongoing	Ongoing	
3	Working in partnership to provide data for New National Indicators (N194) on Air Quality (PM10/NOx) and climate change	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality			2008					
4	Working in partnership with local PCT	Public Information	Other		2008	2008					
5	Buckinghamshire travel plan	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services		2009	2009			Review monitoring		
6	Review Air Quality monitoring provision in the District, in order to ensure most effective coverage	Public Information	Via other mechanisms		2009	2009			Ongoing		

Classification: OFFICIAL
South Bucks District Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
7	Publication of a residential design guide	Public Information	Via leaflets		2008	2008					
8	Planning referrals and Air Quality impact assessments	Public Information	Via leaflets		2009	Ongoing			Ongoing		Reviewed
9	Continue to apply to Defra for grant funding to maintain air quality monitoring equipment and data	Public Information	Other						Annual		Reviewed
10	Implement an EMAS system at SBDC	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		2008	2008			Completed	2010	
11	Clean Air Act and EPA enforcement	Promoting Travel Alternatives	Other						Ongoing		
12	Air quality complaints and investigations	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		2011	2011			Ongoing	Ongoing	
13	Cleaner vehicles	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport		2008	2008				2009	
14	SBDC to use cleaner available technologies for vehicles undertaking its function, where this does not impact upon service provided	Vehicle Fleet Efficiency	Testing Vehicle Emissions		2007	2007	CO2				

Classification: OFFICIAL
South Bucks District Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
15	Smoky vehicles reporting forms	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport		2010	2010	££		Ongoing		
16	Heavy Good Vehicles emissions on the motorway network	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport		2010	2010	CO2		Ongoing		
17	HGV routing	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	BCC	2007	2007			Ongoing	Continually reviewed	
18	Parking provision	Transport Planning & Infrastructure	Public transport improvements-interchanges stations and services	SBDC/BCC	2010	2010			Ongoing		
19	Public transport promotion	Transport Planning & Infrastructure	Public transport improvements-interchanges stations and services	SBDC/BCC	2010	2010	CO2		Dormant	Annual Review	
20	SBDC travel plan (Oxford Road)	Transport Planning & Infrastructure	Public transport improvements-interchanges stations and services	SBDC	2007	2007	££		Completed		
21	Encourage energy efficiency in homes	Policy Guidance and Development Control	Sustainable Procurement Guidance	SBDC	2008	2008	££		Ongoing	Ongoing	
22	SBDC to promote mixed use development particularly in town centres	Transport Planning & Infrastructure	Other		2007	2007	££		Ongoing	Ongoing	

Classification: OFFICIAL
South Bucks District Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
23	Regulate the Permitted Processes under the Environmental Permitting regime 2010	Environmental Permits	Introduction/increase of environmental charges through permit systems and economic instruments		2010	2010			Ongoing	Ongoing	
24	Real time air monitoring	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		2001	2001	££		Ongoing	Ongoing	
25	Nitrogen Dioxide and Benzene tube information	Public Information	Via the Internet		2001	2001	££/CO2		Ongoing		Stopped Benzene
26	MOT testing stations	Vehicle Fleet Efficiency	Testing Vehicle Emissions	BCC/SBDC	2001	2001					
27	Revisit and review AQMA status	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CDC/SBDC	2015	2015			Ongoing		Review
28	Harmonised and Joined-up Air Quality Review with Chiltern District Council	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CDC/SBDC	2015	2015	££		Completed	2015	
29	Audit NO2 data around AQMA to ensure compliance within National Indicators	Public Information	Other		2015	2015	££		Ongoing		
30	To improve data capture with AEA to ensure data is accurate and representative	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		2015	2015	££		Ongoing		

Classification: OFFICIAL
South Bucks District Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
31	Review data capture and reporting of NO2 and PM10 for Beaconsfield Services Air Quality Monitoring	Public Information	Other		2015	2015			Ongoing		
32	Draft Updating and Screening Assessment for South Bucks District Council	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	SBDC	2015	2015			Completed 2015		
33	Review current and potential impacts from environmental threats such as Motorway Route Widening, HS2, Crossrail etc	Transport Planning and infrastructure	Public transport improvements-interchanges stations and services		2015	2015			Ongoing		Detailed assessment lver
34	To provide and improve better discussion on trends at longer term monitoring sites	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance						Ongoing		
35	To review and audit implementation of Air Quality Action Planning and publicise progress	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance						Ongoing	Update 2016	
36	Partnership working with Highways Agency (HA) to address traffic flow monitoring	Transport Planning and infrastructure							Ongoing		

Classification: OFFICIAL
South Bucks District Council

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
37	Update on Freight Strategy to be included in SBDC Updating and Screening Assessment 2015	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		2015	2015			Completed		
38	Review Diffusion Tube spread and Network with a view to identifying gaps	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	SBDC	2014	2014	Nox	Y	Ongoing	Ongoing	
39	Refuse collection vehicles now Euro 6 compliant	Vehicle Fleet Management	Testing Vehicle Emissions						Completed		
40	New 3.5 tonne street response vehicles ordered for 2015	Vehicle Fleet Management	Other		2015	2015			Completed		
41	Recycling transfer station now carried out in district to encourage efficiently through less mileage	Vehicle Fleet Management	Other		2014	2014			Completed		

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.

There is no regulatory standard applied to the PM_{2.5} role (for local authorities in England) with respect to action to reduce emissions or concentrations of fine particulate air pollution, although action to tackle PM₁₀/NO_x would usually contribute to this. The EU Ambient Air Quality Directive does however set out air quality standards for PM_{2.5} including an exposure reduction obligation, a target value and a limit value, which may act as a guide to local authorities when interpreting their role.

South Bucks District Council will consider actions to address PM_{2.5} when it reviews its current action plan within the next six months with the following steps:

- Identifying measures already in place that can help with reducing levels of PM_{2.5};
- Identifying new priority measures to tackle PM_{2.5} (in discussion with the Director of Public Health and other relevant partners in the proposed steering group);
- Seeking to move towards a specific objective in line with the annual average EU limit value for PM_{2.5}: 25 µg/m³ to be met by 2020 (most authorities already meet this target hence the authority may wish to set a lower target concentration to benefit public health); and
- Seeking to move towards applying a specific objective in line with the EU target value of 15% reduction at background urban locations between 2010 and 2020.

Classification: OFFICIAL
South Bucks District Council

Many local authorities will consider how to address PM_{2.5} alongside other pollutants when tackling their own vehicle fleets and services and/or work with communities and businesses to achieve improvements in air quality.

To achieve the above, the authority will form working partnerships with Public Health England, Bucks County Council and members of the Bucks Air Quality Group, to ensure links to the Public Health Outcomes Framework.

The current action plan already has measures to reduce levels of pollutants as it promotes travel alternatives, smarter choices, cleaner vehicle technology and low emission transport.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

South Bucks District Council undertook automatic (continuous) monitoring at one site during 2015. Table A.1 in Appendix A shows the details of the sites.

A map of the location of the monitoring site is provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

South Bucks District Council undertook non-automatic (passive) monitoring of NO₂ at 17 different sites during 2015. Table A.2 in Appendix A shows the details of the sites.

A map showing the location of the monitoring sites are provided in Appendix D. 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 (NO₂)

There was one monitored exceedence of the Nitrogen Dioxide objective in 2015 at a location adjacent to the existing AQMA. The annual mean concentration of NO₂ at the automated monitoring station for 2015 was 41 µg/m³. However, this is 45m from a relevant receptor.

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

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

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

Table A.6 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past 5 years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

The annual mean for PM₁₀ was 21 µg/m³ when the gravimetric correction factor of 1.03 was applied. This correction factor relates to the use of a TEOM analyser to measure PM₁₀ and is set up with this default factor included.

Using this correction factor, there were four exceedances of the daily mean of 50 µg/m³ which is well below the limit of 35. Thus PM₁₀ levels within the district are well below the Air Quality Objective level.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
SBDC 1	Gerrards Cross	Roadside	501626	187211	NO ₂ ; PM ₁₀	Y	TEOM, IT	45	15	1.5

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

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
1	Iver: Old Slade Lane	Roadside	503679	178586	NO ₂	N	13m	1m	N	2.5
2	Iver: Victoria Crescent	Roadside	504056	180901	NO ₂	N	7m	1m	N	2.6
3	Iver: High Street	Roadside	503688	181229	NO ₂	N	12m	2m	N	3.7
4	Iver Heath: Uxbridge Rd	Roadside	502072	182753	NO ₂	N	11m	2.5m	N	2.3
5	New Denham, Oxford Rd/Knighten Way	Roadside	504754	185138	NO ₂	N	9m	2m	N	2.4
6	Denham Green, Nightingale Way	Roadside	503678	188192	NO ₂	N	8m	2m	N	discontinued
7	Gerrards Cross Tatling End – Police St	Roadside	501717	187175	NO ₂	N	30m	6m	N	2.5
8	Gerrards Cross Packhorse Road	Roadside	500259	188613	NO ₂	N	8m	2m	N	2.5
9	Fulmer Village	Roadside	499954	185599	NO ₂	N	20m	1m	N	1.4

Classification: OFFICIAL
South Bucks District Council

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
10	Wexham, Black Park Rd	Roadside	500518	184244	NO ₂	N	N	1m	N	1.4
11	Hedgerley Village	Roadside	496895	187215	NO ₂	N	19m	3m	N	2.1
12	Farnham Common: Beaconsfield Rd	Roadside	496095	185599	NO ₂	N	25m	3m	N	2.4
13	Beaconsfield, Station Rd	Roadside	493873	191040	NO ₂	N	20m	2m	N	2.2
14	Beaconsfield North Drive	Roadside	584728	192313	NO ₂	N	20m	3m	N	2.0
15	Beaconsfield Shepherds Lane	Roadside	494600	190081	NO ₂	N	18m	1m	N	2.6
16	Burnham: High St	Roadside	493136	182503	NO ₂	N	0m	1m	N	2.6
17	Taplow A4	Roadside	491668	181187	NO ₂	N	20m	2m	N	2.5
18	AQMS GX	Roadside	501626	187211	NO ₂	Y	45m	15m	Y	2.5
19	AQMS GX	Roadside	501626	187211	NO ₂	Y	45m	15m	Y	2.5
20	AQMS GX	Roadside	501626	187211	NO ₂	Y	45m	15m	Y	2.5

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2015 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2011	2012	2013	2014	2015
SBDC	Roadside	Automatic	98	98	36	32	40	42	41
1	Roadside	Diffusion Tube		92		34	40	30	26
2	Roadside	Diffusion Tube		100		38	35	33	28
3	Roadside	Diffusion Tube		100		38	35	31	31
4	Roadside	Diffusion Tube		100		-		42	38
5	Roadside	Diffusion Tube		100		36	37	33	31
6	Roadside	Diffusion Tube		100		24	22	21	19
7	Roadside	Diffusion Tube		100		47	37	36	33
8	Roadside	Diffusion Tube		92		34	32	32	26
9	Roadside	Diffusion Tube		100		29	26	24	21
10	Roadside	Diffusion Tube		100		20	18	16	15
11	Roadside	Diffusion Tube		100		19	18	14	14
12	Roadside	Diffusion Tube		100		33	30	29	26
13	Roadside	Diffusion Tube		92		46	38	33	31
14	Roadside	Diffusion Tube		100		38	32	42	35
15	Roadside	Diffusion Tube		100		-		27	26
16	Roadside	Diffusion Tube		100		24	23	23	19
17	Roadside	Diffusion Tube		100		43	36	34	32
18	Roadside	Diffusion Tube		100		51	41	38	36
19	Roadside	Diffusion Tube		100		54	40	39	36
20	Roadside	Diffusion Tube		92		58	41	41	36

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

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

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

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

Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2015 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2011	2012	2013	2014	2015
SBDC 1	Roadside	Automatic	96	96	0	0	0	0	0

Notes: Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

(3) If the period of valid data is less than 90%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2015 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2011	2012	2013	2014	2015
SBDC1 Gerrards Cross	Roadside	96	96	22	21	22	21	21

Notes: Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

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

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2015 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2011	2012	2013	2014	2015
SBDC 1 Gerrards Cross	Roadside	96	96	0	1	0	1	4

Notes: Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

(3) If the period of valid data is less than 90%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 – PM_{2.5} Extrapolated Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2015 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2011	2012	2013	2014	2015
SBDC1 Gerrards Cross	Roadside	96	96	15.4	14.7	15.4	14.7	14.7

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

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

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

Note: TG(16) PM_{2.5} can be estimated from PM₁₀ data by x 0.7

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2015

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted ⁽¹⁾
1	37	30	28	25	17	24	29	31	0	39	37	24	29	26
2	40	30	34	32	25	24	30	31	38	38	32	34	32	28
3	40	40	41	37	27	29	27	31	40	43	33	38	35	31
4	43	44	44	45	38	42	52	44	49	34	44	37	43	38
5	43	37	37	30	29	31	33	28	39	42	32	36	35	31
6	30	24	21	19	14	16	19	19	19	32	34	34	22	19
7	48	40	34	32	30	37	39	36	35	43	35	39	37	33
8	41	37	34	29	22	19	27	0	34	40	34	33	29	26
9	33	25	25	25	20	20	22	25	27	27	23	21	24	21
10	23	19	19	17	13	11	14	17	20	21	18	17	17	15
11	24	17	17	15	12	11	13	18	19	17	16	16	16	14
12	36	32	27	24	26	28	30	28	32	32	30	27	29	26
13	45	40	0	39	29	36	34	35	38	43	42	45	35	31
14	40	48	41	33	33	44	44	41	37	26	55	43	40	35

Site ID	NO ₂ Mean Concentrations (µg/m ³)													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted ⁽¹⁾	
	15	33	33	31	27	21	24	28	26	27	37	36			31
16	31	24	23	19	15	16	19	20	23	28	21	24	22	19	
17	48	43	41	33	28	30	28	37	42	37	39	34	36	32	
18	50	42	36	25	30	44	46	42	37	50	49	46	41	36	
19	42	50	38	36	35	42	43	37	38	48	36	46	41	36	
20	46	46	37	34	0	43	41	37	35	49	49	33	41	36	

(1) See Appendix C for details on bias adjustment figure **0.88**

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

2015 Bias adjustment

Checking Precision and Accuracy of Triplicate Tubes

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{g m}^{-3}$	Tube 2 $\mu\text{g m}^{-3}$	Tube 3 $\mu\text{g m}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	14/01/2015	17/02/2015	50.5	42.0	46.5	46	4.2	9	10.5
2	17/02/2015	13/03/2015	41.6	50.2	46.4	46	4.3	9	10.7
3	13/03/2015	15/04/2015	36.4	37.8	36.6	37	0.8	2	2.0
4	15/04/2015	11/05/2015	24.6	35.7	34.0	31	6.0	19	14.9
5	11/05/2015	16/06/2015	30.2	35.4		33	3.7	11	33.3
6	16/06/2015	16/07/2015	44.4	42.1	43.0	43	1.2	3	2.9
7	16/07/2015	14/08/2015	45.9	42.9	40.7	43	2.6	6	6.4
8	14/08/2015	17/09/2015	42.5	37.3	36.7	39	3.2	8	8.0
9	17/09/2015	19/10/2015	37.2	38.3	34.7	37	1.9	5	4.6
10	19/10/2015	17/11/2015	49.2	47.9	49.3	49	0.8	2	2.0
11	17/11/2015	15/12/2015	48.6	35.6	49.3	45	7.7	17	19.1
12	15/12/2015	18/01/2016	46.3	45.6	33.4	42	7.3	17	18.1
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

AEA Energy & Environment
From the AEA group

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
45	89.2	Good	Good
50	99.1	Good	Good
39	98.7	Good	Good
34	98.6	Good	Good
36	99.2	Good	Good
42	99.2	Good	Good
44	99.3	Good	Good
43	99.4	Good	Good
38	98.6	Good	Good
46	99.6	Good	Good
41	99.7	Good	Good
40	99.5	Good	Good

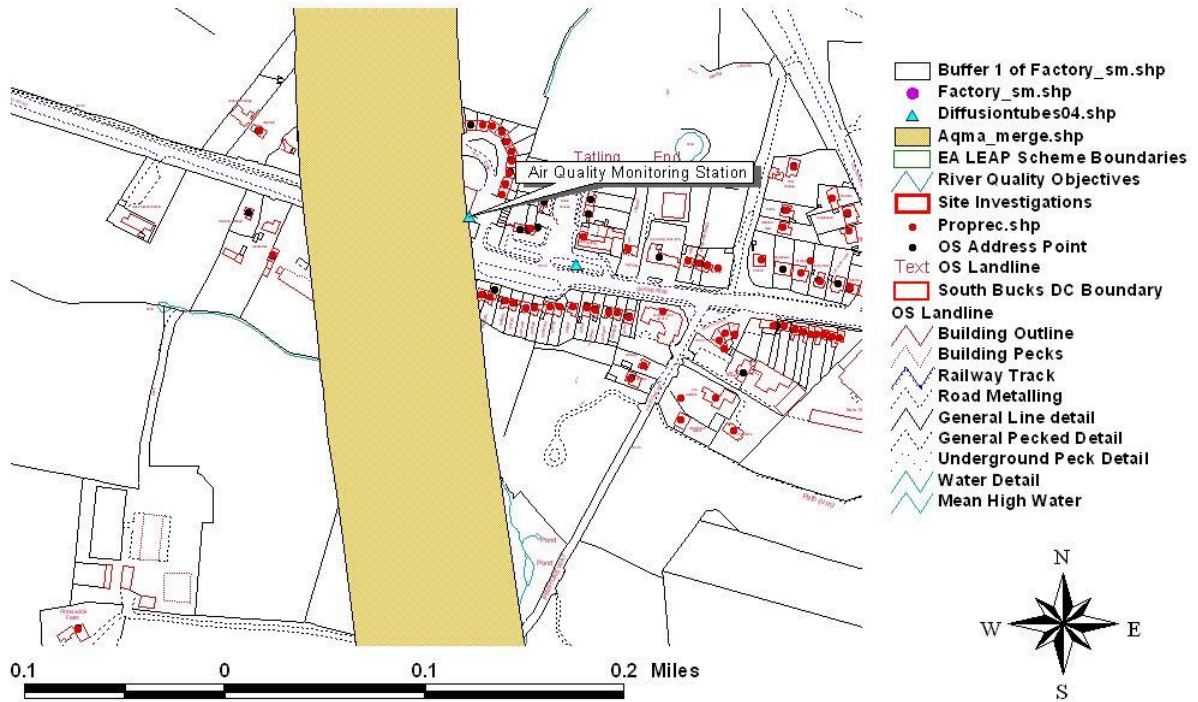
Overall survey --> **Good precision** / **Good Overall DC**
(Check average CV & DC from Accuracy calculations)

<p>Site Name/ ID: <input style="width: 100%;" type="text"/></p> <p>Accuracy (with 95% confidence interval) without periods with CV larger than 20%</p> <p>Bias calculated using 12 periods of data</p> <p>Bias factor A 1.02 (0.97 - 1.06)</p> <p>Bias B -1% (-6% - 3%)</p> <p>Diffusion Tubes Mean: 41 $\mu\text{g m}^{-3}$</p> <p>Mean CV (Precision): 9</p> <p>Automatic Mean: 42 $\mu\text{g m}^{-3}$</p> <p>Data Capture for periods used: 98%</p> <p>Adjusted Tubes Mean: 42 (40 - 43) $\mu\text{g m}^{-3}$</p>	<p>Precision 12 out of 12 periods have a CV smaller than 20%</p> <p>Accuracy (with 95% confidence interval) WITH ALL DATA</p> <p>Bias calculated using 12 periods of data</p> <p>Bias factor A 1.02 (0.97 - 1.06)</p> <p>Bias B -1% (-6% - 3%)</p> <p>Diffusion Tubes Mean: 41 $\mu\text{g m}^{-3}$</p> <p>Mean CV (Precision): 9</p> <p>Automatic Mean: 42 $\mu\text{g m}^{-3}$</p> <p>Data Capture for periods used: 98%</p> <p>Adjusted Tubes Mean: 42 (40 - 43) $\mu\text{g m}^{-3}$</p>	<p>Jaume Targa, for AEA Version 04 - February 2011</p>
--	---	--

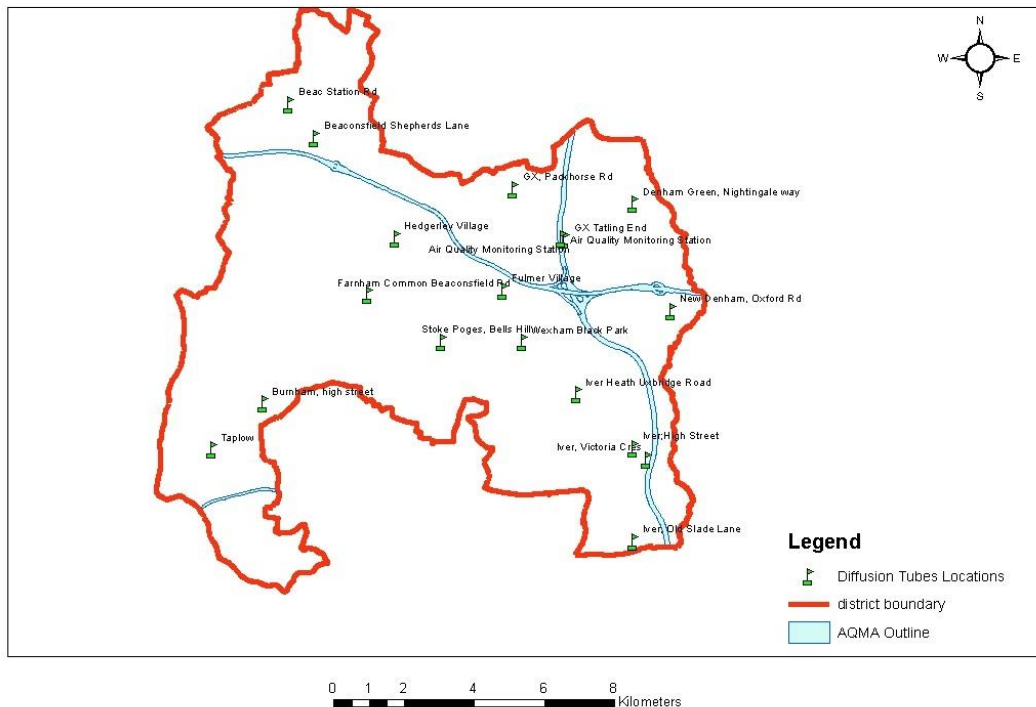
National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 06/16			
<p>Follow the steps below in the correct order to show the results of relevant co-location studies</p> <p>Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods</p> <p>Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet</p> <p>This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.</p> <p>The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.</p> <p>Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.</p>							<p>This spreadsheet will be updated at the end of September 2016</p> <p>www.bv.com</p>			
Step 1:		Step 2:		Step 3:		Step 4:				
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		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 ² shown in blue at the foot of the final column.				
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.		If a year is not shown, we have no data		If you have your own co-location study then see footnote ³ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953				
Analysed By ¹	Method	Year ²	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu\text{g/m}^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu\text{g/m}^3$)	Bias (B)	Tube Precision ³	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2015	UC	Southampton City Council	12	28	29	-3.5%	G	1.04
Gradko	20% TEA in water	2015	R	Wokingham Borough Council	11	36	33	7.9%	G	0.93
Gradko	20% TEA in water	2015	R	Brighton & Hove City Council	9	47	38	24.1%	G	0.81
Gradko	20% TEA in water	2015	R	NOTTINGHAM CITY COUNCIL	12	40	39	4.3%	G	0.96
Gradko	20% TEA in water	2015		Overall Factor (27 studies)					Use	0.88

Bias adjustment figure for Gradko 20% TEA in water 2015: 0.88

Appendix D: Map(s) of Monitoring Locations



South Bucks District Council
 Map of Diffusion Tube 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/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
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
EIA	Environment Impact Assessment

References

- Air Pollution in the UK (2007) AEA on behalf of DEFRA and the Dissolved Administrations
- Air Quality (England) Regulations 2000 (SI 928)
- Air Quality (England) (Amendment) Regulations 2002 (SI 3043)
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)
- South Bucks District Council (2003) Updating and Screening Assessment.
- South Bucks District Council (2004) Progress Report.
- South Bucks District Council (2005) Progress Report.
- South Bucks District Council (2006) Updating and Screening Assessment.
- South Bucks District Council (2008) Progress Report.
- South Bucks District Council (2009) Further Assessment
- South Bucks District Council (2010) Progress Report.
- South Bucks District Council (2011) Progress Report.
- South Bucks District Council (2012) Updating and Screening Assessment.
- South Bucks District Council (2013) Progress Report.
- South Bucks District Council (2014) Progress Report.
- South Bucks District Council (2015) Updating and Screening Assessment.
- Part IV of the Environment Act (1995)
- Relevant Policy and Technical Guidance documents:
 - Technical Guidance LAQM.TG (09)
 - Policy Guidance LAQM.PG (09)
- Department for Transport (2007) Road Statistics: Traffic, Speeds and Congestion. Transport Statistics Bulletin.

Websites:

Department for Transport Matrix Website - <http://www.dft.gov.uk/matrix/>

NAEI Data Warehouse - http://www.naei.org.uk/data_warehouse.php

Review and Assessment Website - <http://www.uwe.ac.uk/aqm/review/>

UK Background Maps - <http://www.airquality.co.uk/archive/laqm/tools.php>