2016 Air Quality Annual Status Report (ASR)

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

August 2016

Local Authority Officer	Kate Simons Simon Ballard
Department	Health Protection and Environmental Management
Address	East Pallant House East Pallant Chichester PO19 1TY
Telephone	01243 534694
E-mail	ksimons@chichester.gov.uk sballard@chichester.gov.uk
Report Reference number	ASR 2016
Date	August 2016

Executive Summary: Air Quality in Our Area

Air Quality in Chichester 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].

While air quality is generally good within Chichester district, there are areas where elevated concentrations of pollutants occur. The main source of air pollution is from road transport particularly on roads in and adjacent to Chichester City. The principal pollutant of concern is nitrogen dioxide (NO_2) which is a by-product of combustion and is toxic by inhalation. Concentrations of NO_2 have stayed relatively stable over the last few years but there are a number of hotspots where exceedances of the national air quality Objectives occur. Air Quality Management Areas (AQMAs) have been declared at three locations as follows:

- Stockbridge roundabout at the junction with the A27 and A286
- Orchard Street, Chichester
- St Pancras, Chichester

See link: http://www.chichester.gov.uk/pollutioncontrolairquality

Our Air Quality Action Plan (AQAP) states our intentions for working towards meeting the air quality objectives within the AQMAs. This document was first drawn up in 2008 and revised in 2015 and can be viewed on the link above. We see air quality as an important public health issue which needs to be considered in related policy and tackled in conjunction with partners who include West Sussex County Council (WSCC) and the Sussex Air Quality Partnership (SAQP).

Since our first AQAP dated 2008, we have won in excess of £290k of grant monies from a variety of sources. We have delivered a number of initiatives including Chichester's first car club, enabled the installation of electric vehicle charging points, provided 140 additional bike parking spaces in the city centre and contributed data to the air-Alert service.

Actions to Improve Air Quality

We have worked with partners to deliver a number of behavioural change programmes over the last year including:

[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

- Funding a 'Bike It' officer to work with 10 schools within the district to encourage active travel to school. Key outcomes (averaged across all the schools) during 2014-15 are as follows[4]:
  - there was an increase from 12% to 30% in regular cycling to schools
  - there was an increase in regular scooting and skating to school from 19% to 32%
  - there was a drop of 15% in pupils usually being driven to school.
- Setting up a programme of cycling initiatives such as guided rides, cycle confidence training and bike maintenance courses to encourage people to cycle, particularly for commuting to work. During 2015 around 50 people accessed these initiatives and some tried more than one activity.

- Implementing the Easit business travel scheme allowing staff discounted rail travel for both business and personal journeys. The scheme encourages travel by rail and also provides discounts for a number of other sustainable modes of transport (such as purchase of bicycles and electric vehicles).

Local Priorities and Challenges

As stated in our AQAP, our priorities for action are as follows:

- Measure, model and report on air quality
- Strengthen partnerships, seek funds, pool resources and exploit synergies
- Encourage low emission technology
- Encourage and foster behavioural change/modal shift
- Be innovative, capitalise on opportunities and celebrate our successes, reduce emissions by 1% over the lifetime of the AQAP.

We are pleased to report that the council has funded a new NO_2 analyser at the Orchard Street monitoring station. We hope to re-start monitoring at this location in August 2016.

We are working to increase the number of electric vehicle re-charging points across the district and have secured £50K from CDC's Cabinet to expand the public facing charge points.

We also have a Cabinet mandate to replace the diesel vehicles within the CDC fleet with electric vehicles where the business case is positive. We are currently working with the Energy Savings Trust to work up the business case.

Funding has been made available to upgrade two sections of path within one of the parks (Jubilee Gardens) in Chichester in order to remove a collision risk and regularise dual-use in this location. It is intended that works will commence on this project during 2016.

We are working with our planning policy team to enable air quality to be given greater importance within land use planning within the Local Plan five year review, in particular, in relation to cumulative impacts.

[4] 2016-17 data are not yet available.

We have received and commented on the Highways England A27Chichester Bypass Improvement Scheme consultation of scheme proposals. The public consultation report will be presented to the Secretary of State for Transport who will make the final decision and make a preferred route announcement. This is expected early in 2017.

The key challenge in delivering our actions is obtaining funding to deliver projects and keeping the policy profile of air quality high within related policy areas such as Highways and land use planning. We continue to work with partner agencies and departments to maximise our traction.

How to Get Involved

The public can get involved by supporting our campaigns for behavioural change (eg joining the Car Club or car sharing and walking, cycling or using public transport wherever possible. Further information can be obtained by emailing: airquality@chichester.gov.uk

The Chichester and District Cycle Forum provides information on local cycling opportunities and campaigns on behalf of cyclists. The Forum is open to the public and further information can be obtained by emailing cycle@chichester.gov.uk

Table of Contents

List of Tables

List of Figures

1 Local Air Quality Management

This report provides an overview of air quality in Chichester District during the period 2015 - 2016. 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 standards and 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 detailing the actions employed by Chichester 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 standard and 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 Chichester District Council can be found in Table 2.1. Further information related to declared AQMAs, including maps of AQMA boundaries are at Appendix 2 (also available online at http://www.chichester.gov.uk/pollutioncontrolairquality)

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
AQMA Stockbridge Roundabout	NO_2 annual mean	Chichester	An area encompassing the Stockbridge Roundabout at the junction of the Chichester bypass (A27) and Stockbridge Road (A286)	CDC AQAP 2008, revised in 2015
AQMA Orchard Street	NO_2 annual mean	Chichester	An area along Orchard Street, Chichester at the eastern end of the street where it meets Northgate	CDC AQAP 2008, revised in 2015
AQMA St Pancras	NO_2 annual mean	Chichester	An area along St Pancras, Chichester between Eastgate Square and New Park Road. Note: St Pancras forms a street canyon in this section.	CDC AQAP 2008, revised in 2015

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

Chichester 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. More detail on these measures can be found in the respective Action Plan. Key completed measures are:

- Promoting travel alternatives: CDC funded a Bike It Officer post from July 2015 – July 2016 (this was originally funded by LSTF funding from 2013-2015). Ten schools within and close to Chichester have received support from the officer to promote cycling and other active travel modes for the journey to and from school. Numerous activities have taken place at the schools and a mass cycle ride and picnic was organised on 20 June 2015 to celebrate cycling in Chichester which attracted over 100 participants. Key outcomes (averaged across all the schools) during 2015-16 are as follows:
  - there was an increase from 12% to 30% in regular cycling to schools
  - there was an increase in regular scooting and skating to school from 19% to 32%
  - there was a drop of 15% in pupils being driven to school.
- Promoting travel alternatives: The Easit business travel scheme was adopted by Chichester District Council in July 2015 allowing staff discounted rail travel for both business and personal journeys. The scheme encourages travel by rail and also provides discounts for a number of other sustainable modes of transport (such as purchase of bicycles and electric vehicles).
- Alternatives to private car use: the Car Club originally set up using Defra funding now has 4 cars. The number of drivers increased from 41 in January 2015 to 72 in December 2015 and utilisation rates of the cars averaged 18% for the year. The Club provider (Co-Wheels) is considering increasing the number of cars in the fleet and CDC is working with WSCC to identify new dedicated (TRO) parking locations for an expanded fleet.

Progress on the following measures has been slower than expected due to:

- Real Time Passenger Information (RTPI) displays at bus shelters have been delayed at Market Avenue, Chichester as the contract has had to be re-tendered. It is hoped that installation should take place in mid-2017. Such displays should make bus travel more informative and attractive to users.

Chichester District Council expects the following measures to be completed over the course of the next reporting year:

- Promoting low emission transport: Chichester District Council intends to replace some of its fleet vehicles with electric vehicles over the next 12 months (where the business case for this kind of vehicle is cost effective). It is intended that a bid to OLEV funding will be made (if funds are released). By replacing diesel vans with electric vans a reduction in local vehicle emissions will result.

- Air quality officers are embedded in an officer group which is developing a Chichester Vision to encourage modal- shift as a key aspiration of the city's development in the next twenty years.

Chichester District Council's priorities for the coming year are:

- To develop an air quality policy and low emission strategy for incorporation into the Local Plan in order to enable the air quality impact of new development to be assessed and for relevant mitigation to be applied.
- To work with Public Health officers to reduce adult mortality attributable to $PM_{2.5}$ emissions (public health outcomes framework indicator 3.1) – information on the impact of air quality on the population has been provided for the Joint Strategic Needs Assessment and regular meetings have been set up with public health colleagues to ensure they are fully briefed on scale of the air quality problems in the district. It is hoped that joint working will enable additional resources to become available for this work stream.

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	Set up Air Quality Working Group	Promoting Travel Alternatives	Other	CDC	June/Dec 2008	Dec 2008	2 meetings per year	N/A	9 meetings held and 1 planned	Ongoing	No meetings held in last 18 months while new LAQM regime being finalised
3	Variable message signing (VMS) on A27	Traffic Management	UTC, Congestion management, traffic reduction	HE	2009	Pilot by 2020	No. of warnings made per year		HE decision awaited	Ongoing	Mobile VMS signs have been trialled during 2012.
4	MOVA traffic signal optimisation	Traffic Management	UTC, Congestion management, traffic reduction	WSCC	2009/10	2010	Reduction in traffic queues within AQMAs		2 new Puffins to replace existing crossings implemented	Completed	Improves emissions by eliminating ghost users and reducing red time

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
5	Speed limit changes – 20 mph as part of school safety zone Blanket 20mph scheme on residential streets	Traffic Management	Reduction of speed limits, 20mph zones	WSCC	2009 2012/13	2012/13 2013/14	Reduction in traffic queues within Orchard St AQMA area Reduced speed on residential streets		Signs installed around schools and on residential streets WSCC contracted officer to promote 20mph and work with schools and community	Completed	Reductions in NO_2 within AQMA area due to smoothing of traffic flow Roads monitored before and after implement-ation and speed reductions achieved on some roads
7	Park and ride schemes in and around City	Alternatives to private vehicle use	Bus based Park & Ride	CDC	Post 2015	Post 2015	Reduce traffic in City centre by 3%		Linked to A27 improve-ments that have not yet been brought forward	Ongoing	Would need agreement by all stakeholders, WSCC, CDC, local residents, HE CDC's parking strategy is under review though awaiting recommend-ations and transport modelling and the outcome of the A27 improvement plan

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
8	School travel plans	Promoting Travel Alternatives	School Travel Plans	WSCC	2008/9	2009/10	% children travelling to school by sustainable means		Bike it project continued for 3rd year at 10 schools in Chichester district 7 schools in district took part in Walk Once a Week (WOW) scheme, part of Living Streets project	Ongoing	Helps reduce emissions during morning rush hour in particular
9	WSCC and CDC travel plans	Promoting Travel Alternatives	Workplace Travel Planning	WSCC/CDC	2010	2011/12	% WSCC and CDC staff travelling by sustainable means		WSCC survey 2015 showed 66% using sustainable modes for travel to work. Grey fleet business mileage was 5.31million miles below 6.0 million miles target Easit scheme introduced at CDC to encourage rail use Cycle to work scheme at CDC	Ongoing	

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
10	Business travel plans	Promoting Travel Alternatives	Workplace Travel Planning	WSCC	2009	Ongoing	Travel Plan implemented within target time period		Over 20 Travel plans submitted since 2009. Travel Plan group set up attended by large organisations to work on joint measures	Ongoing	Developments of certain size required to implement Travel Plan – 2 submitted during 2015
11	Residential travel plans	Promoting Travel Alternatives	Personalised Travel Planning	WSCC	2009	Ongoing	Travel Plan implemented within target time period		Over 20 Travel Plans have been submitted since 2009	Ongoing	Developments of certain size required to implement Travel Plan – 2 submitted during 2015
12	TravelWise/ smarter choices	Public Information	Via Leaflets	WSCC/CDC	2009 onwards	Ongoing	No. of users of WSCC car share database for PO19 area		Steady increase in number of users of database – 125 users for 2015	Ongoing	Previous campaigns have included bus back adverts, refuse vehicle adverts radio adverts
13	Cycle route information	Promoting Travel Alternatives	Promotion of cycling	CDC	2009	Ongoing	No. of maps sold through Tourist Information or other outlets.		5 route leaflets have been produced so far and over 1300 copies have been sold to date. 163 leaflets sold in 2015	Ongoing	Leaflets updated during 2015 to reflect changes of address and re-prints produced
14	Cycle journey planning	Public Information	Via the Internet	WSCC	2010	2011	No. of journeys planned on website		Web link available on WSCC and CDC websites	Ongoing	3576 journeys planned 2015-16

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	Public transport infrastructure	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	WSCC	2010	2011-15	Increase in use of public transport		RTPI displays were installed at University of Chichester and Chichester College during 2015	Ongoing	RTPI planned for shelters during 2016-17
16	Cleaner buses	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	WSCC	2009	Ongoing	%of Euro 5 buses		Stagecoach has 70% of fleet Euro V and has plans to replace 6 older buses during 2016	Ongoing	Promote cleaner buses to the other bus companies
17	Car Clubs	Alternatives to private vehicle use	Car Clubs	CDC	2010	2011	Utilisation rate of cars to be 20%		4 cars now available to book, development worker employed 2014-16 to promote Club, utilisation rate of 18% (average) during 2015	Ongoing	LSTF funding used in 2014-15 to purchase 2 of the cars
18	Licensing requirement for taxis	Promoting Low Emission Transport	Taxi Licensing conditions	CDC	2009/10	2011	No. of Euro 4 vehicles		For vehicles 5 years and over, MOT and fitness test required every 6 months	Ongoing	Standard must be met for newly registered vehicles after 4.4.11

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
19	Cycling and walking initiatives	Promoting Travel Alternatives	Promotion of cycling	CDC/WSCC	2009	2010	% increase in cycling		Cycle Challenge run 2010-14, Bike Week events held each year, guided cycle rides, cycle training and bike maintenance courses held each summer 6.7% inc in cycling between 2008 2013	Ongoing	Supported numerous community events over the years to encourage behavioural change. Over 40 additional bike racks installed during 2014-15 to increase cycle parking in City centre.
20	Cleaner vehicles	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	WSCC/CDC	2010	2011	No. of electric vehicle recharging points		2 recharging points in Chichester, secured funding to install additional charging points during 2016-17		WSCC has purchased one EV and one hybrid. CDC aiming to replace some diesel vehicles during 2016. Part of regional network of fast charging points through Sussex-air project

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
21	Planning policy	Policy Guidance and Development Control	Low Emissions Strategy	CDC	2010/11	Ongoing	No. of planning conditions imposed on planning consultations		Sussex-air has produced Low Emissions Strategy and in discussion with CDC Policy Planners regarding adopting LES approach. Sussex-air is reviewing its guidance and refreshed document due early 2017	Ongoing	Local Plan due to be updated within 5 years – aim to have new policy in place within updated Plan. Surveying peer Sussex authorities with regard to policies in place elsewhere
22	Forecasting, monitoring and public information	Public Information	Via other mechanisms	SAQP	2008	Ongoing	No. of people registered to receive alerts		Over 500 recipients now registered	Ongoing	Health study submitted to NHS determine the benefits of the service with the aim of disseminating service more widely
23	AQ monitoring and traffic monitoring	Traffic Management	UTC, Congestion management, traffic reduction	CDC/WSCC	2008	Ongoing	Reduction in traffic volumes		Traffic flows between 2008 – 2015 reduced by between 2.0 – 4.7 % in AQMA areas	Ongoing	Data for 2015 not complete

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
24	A27 by-pass improve-ments	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	HE	Ongoing	Post 2018	Reduction in congestion		HE have consulted during 2016 on options for improving A27 around Chichester	2019	Decision on final scheme expected early 2017

Please note that additional details on actions that have been completed are available in Progress Report 2014 and Updating and Screening Assessment 2015. Note two of our original measures have been deleted as they are not currently being pursued.

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.

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

- Measure 18 - taxi licensing conditions - since 2011 we have required vehicles that are 5 years old and over to have MOT and fitness tests every 6 months and many of our vehicles are now Euro 4 or Euro 5 standard. As vehicle licensing requirements in London become more stringent, this licensing condition will be updated.
- Measure 16 – cleaner buses – Sussex-air put together a bid team for the Low Carbon Bus Fund. This included Stagecoach, Ricardo and Dennis though the companies were not interested in taking the bid forwards. Fleet managers report that upgrades to the fleet are ongoing in order to introduce cleaner buses.

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.

Chichester District Council undertook automatic (continuous) monitoring at two sites during 2015. Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at https://uk-air.defra.gov.uk/data/

Maps showing the location of the monitoring sites are 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

Chichester District Council undertook non- automatic (passive) monitoring of NO_2 at eleven sites during 2015. Table A.2 in Appendix A shows the details of the sites.

Maps 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 (NO_2)

Table A.3 in Appendix A compares the ratified and 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.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

From Table A.3, there has been a slight increase in the NO_2 annual mean concentration at the Stockbridge monitoring station (from 33 to 34 µg/m^3) however the air quality objective was not exceeded. The results at this location have been broadly similar for the past five years, ranging from 32 - 35 µg/m^3. At three of the diffusion tube locations, the air quality objective of 40 µg/m^3 was exceeded, namely:

- St Pancras, within the St Pancras AQMA
- Claremont Court, within the Stockbridge Roundabout AQMA
- Stockbridge Road south, adjacent to the Stockbridge Roundabout AQMA however this tube is not located at a location of relevant public exposure. The calculated concentration at the nearest receptor is 28.7µg/m^3 which is below the air quality objective (see Appendix C for more details).

The diffusion tube at Rumbold's Hill, Midhurst has been in place for 6 months. The annualised concentration has been calculated as 48µg/m^3 (see Appendix C for more details). Further monitoring is planned for this location in order to determine the trend at this location. This monitoring location is not within an AQMA.

At all of the other diffusion monitoring sites the concentration has either stayed the same as last year or decreased with the exception of the Cleveland Road diffusion tube, where the concentration increased from 16 to 17 µg/m^3. The concentration at this latter location was well below air quality objective of 40 µg/m^3.

From Table A.4 there have been no exceedences of the NO_2 1-hour mean concentration at the Stockbridge monitoring station for the past 5 years.

From the monitoring in 2015, it is not considered necessary to declare any additional AQMAs within the District.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

From Table A.5, the annual mean concentration has reduced over the last 5 years from 25µg/m^3 (2011) to 21µg/m^3 (2015) and is below the air quality objective of 40µg/m^3. In addition, the PM_{10} daily mean concentrations have reduced over the past 5 years from 8 exceedences in 2011 to 4 exceedences in 2015. The air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year has therefore been met for the last 5 years.

3.2.3 Ozone (O_3)

Chichester District Council has been monitoring ozone in the rural village of Lodsworth for over ten years. Ozone concentrations can become elevated when nitrogen dioxide and volatile organic compounds react in the presence of strong sunlight and although it is not a statutory requirement to monitor ozone, CDC has

been monitoring this pollutant in order to provide information to Sussex-air for the air-Alert public information system (see Table 2.2 Measure no. 22).

Table A.7 in Appendix A compares the ratified and adjusted monitored O_3 concentrations and indicates that the number of exceedances of the running 8 hour mean (of 100 µg/m^3 or 50ppb) has decreased from twenty-five in 2011 to seven in 2015. The latest data shows that the Objective was achieved in 2015 (ie there were less than ten exceedances of the running 8 hour mean during the year).

Comparison to the DEFRA banding below shows that in 2015 at Lodsworth there were three days when 'moderate pollution' occurred and no 'high pollution' days, see box below for health messages of DEFRA pollution bands.

Health messages of the DEFRA Pollution Bands

Pollution band and numerical index	Health messages for at-risk groups*
1 – 3 (low)	Enjoy your usual outdoor activities.
4 – 6 (moderate)	Adults and children with lung problems, and adults with heart problems, who experience symptoms, should consider reducing strenuous physical activity, particularly outdoors.
7 – 9 (high)	Adults and children with lung problems, and adults with heart problems, should reduce strenuous physical exertion, particularly outdoors, and particularly if they experience symptoms. People with asthma may find they need to use their reliever inhaler more often. Older people should also reduce physical exertion.
10 (very high)	Adults and children with lung problems, adults with heart problems, and older people, should avoid strenuous physical activity. People with asthma may find they need to use their reliever inhaler more often.
**Adults and children with heart or lung problems are at greater risk of symptoms.*	

.

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)
CI1	Stockbridge	Suburban	X485880	Y103795	NO_2 PM_{10}	N	TEOM	25m	26m	3m
AR1	Lodsworth	Rural	X492396	Y123248	O_3	N	UV	N/A	N/A	2.1m

(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)
09	Hornet	Roadside	486502	104795	NO_2	N	0	1.8	N	3.1
11	Arthur Purchase	Urban Background	486082	105026	NO_2	N	0	6	N	2.7
07	Cleveland Rd	Urban Background	486953	104414	NO_2	N	18	1.8	N	2.8
03	Cabin	Suburban	485880	103794	NO_2	N	25	26	Y	2.7
04	Cabin	Suburban	485880	103794	NO_2	N	25	26	Y	2.7
05	Cabin	Suburban	485880	103794	NO_2	N	25	26	Y	2.7
12	174 Orchard St	Roadside	485914	105185	NO_2	Y	0	2	N	2.65
06	Stockbridge Road South	Roadside	485696	103731	NO_2	N	12	2	N	2.85

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	St Pancras	Roadside	486502	104836	NO_2	Y	0	2	N	3.0
02	Claremont Court	Roadside	485772	103847	NO_2	Y	0	7.5	N	3.0
01	Kings Ave Jct	Roadside	485776	103961	NO_2	N	11	2.25	N	3.0
08	Westhampnett Road	Roadside	487341	105474	NO_2	N	3	1.65	N	2.85
14	Rumbold's Hill Midhurst	Roadside	488561	121479	NO_2	N	0.5	1.5	N	3.4

(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.3 – Annual Mean NO_2 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 ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
CI1	Suburban (Stockbridge)	Automatic	100	100	35	35	32	33	34
09	Hornet	Diffusion tube	100	100	38	**45**	**42**	38	**40**
11	Arthur Purchase	Diffusion tube	100	100	21	25	20	18	18
07	Cleveland Rd	Diffusion tube	100	100	21	25	20	16	17
03	Cabin	Diffusion tube	100	100	36	33	30	33	34
04	Cabin	Diffusion tube	100	100	34	38	33	33	34
05	Cabin	Diffusion tube	100	100	35	24	33	33	34
12	174 Orchard St	Diffusion tube	100	100	**42**	38	38	39	33
06	Stockbridge Road South	Diffusion tube	100	100	**46**	40	**45**	**41**	**41**

Site ID	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
10	St Pancras	Diffusion tube	92	92	**57**	**48**	**53**	**52**	**46**
02	Claremont Court	Diffusion tube	100	100	**41**	37	**42**	**42**	**42**
01	Kings Ave Jct	Diffusion tube	100	100	31	33	30	32	30
08	Westhampnett Road	Diffusion tube	100	100	x	38	36	31	30
14	Rumbold's Hill Midhurst	Diffusion tube	100	50	x	x	x	x	**48**

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.

Figure A.1 showing trends in NO_2 results at Stockbridge and Orchard Street monitoring stations

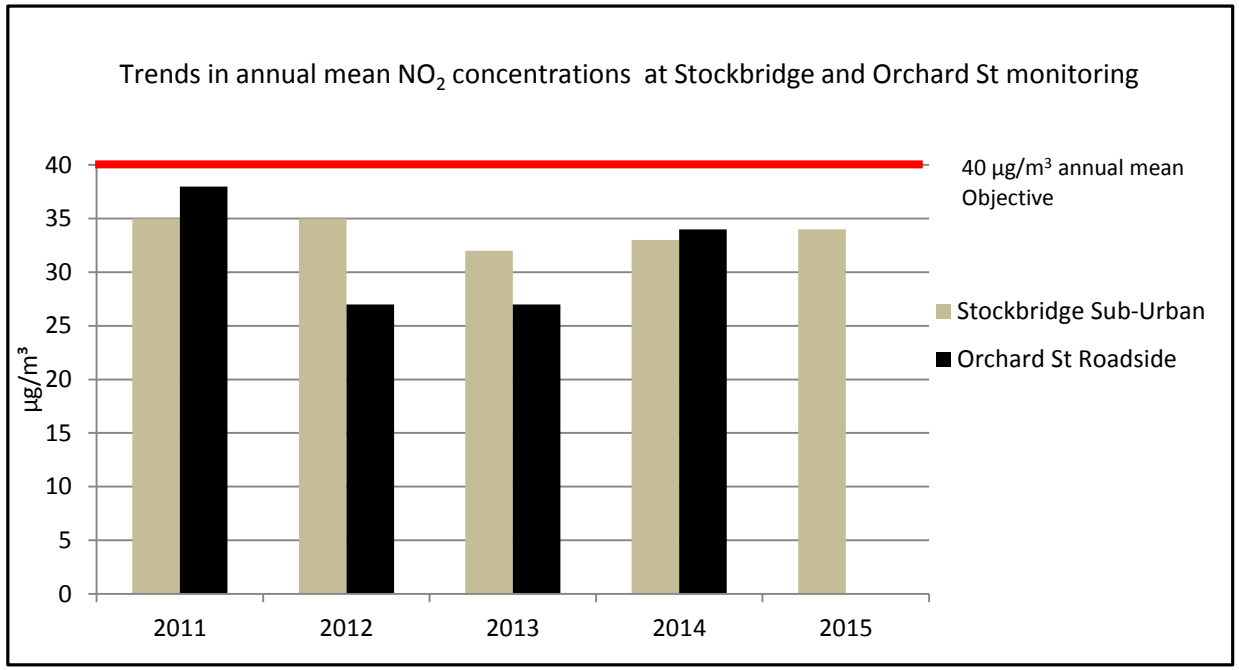


Figure A.2 showing trends in NO_2 diffusion tubes 2012 - 2015

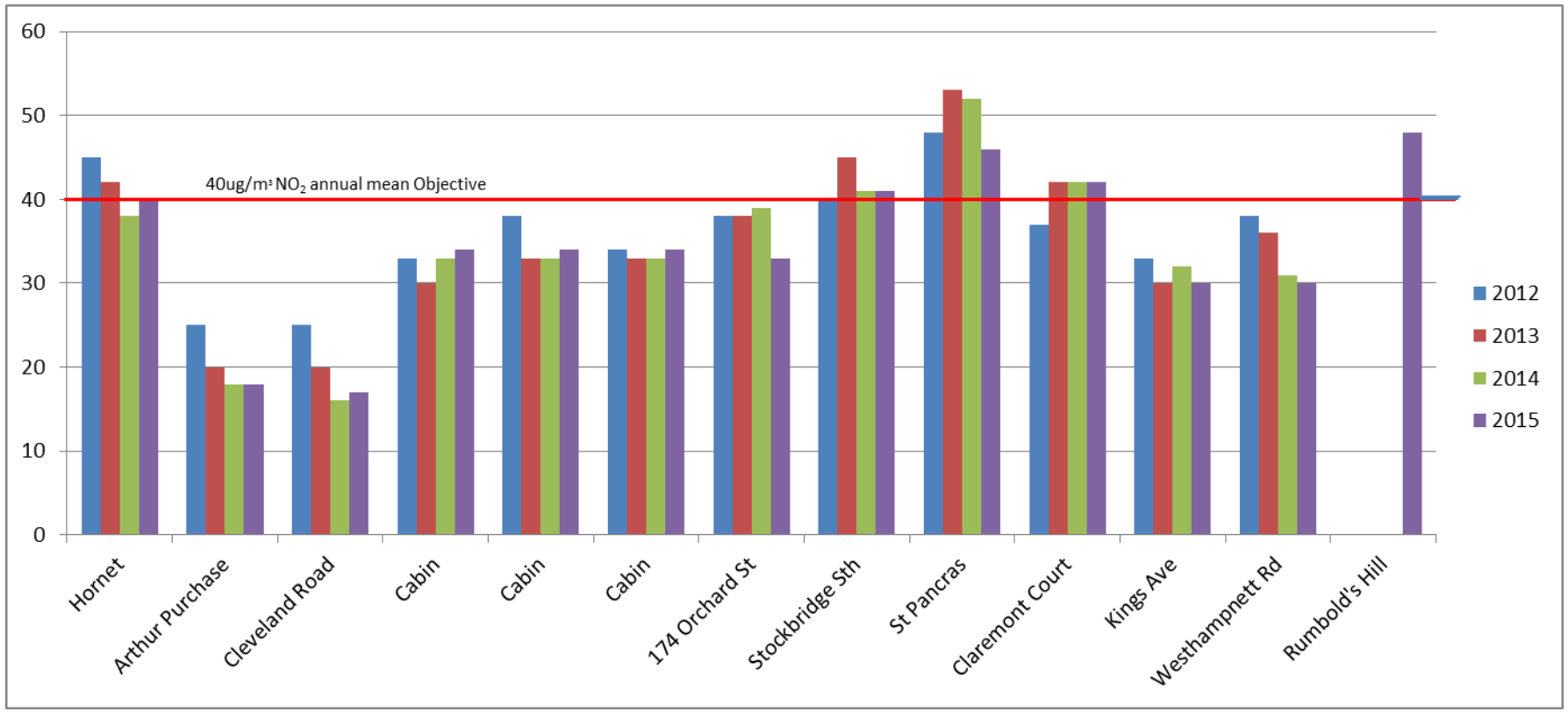


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

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
CI1	Suburban (Stockbridge)	Automatic	100	100	0	0	0	0	0

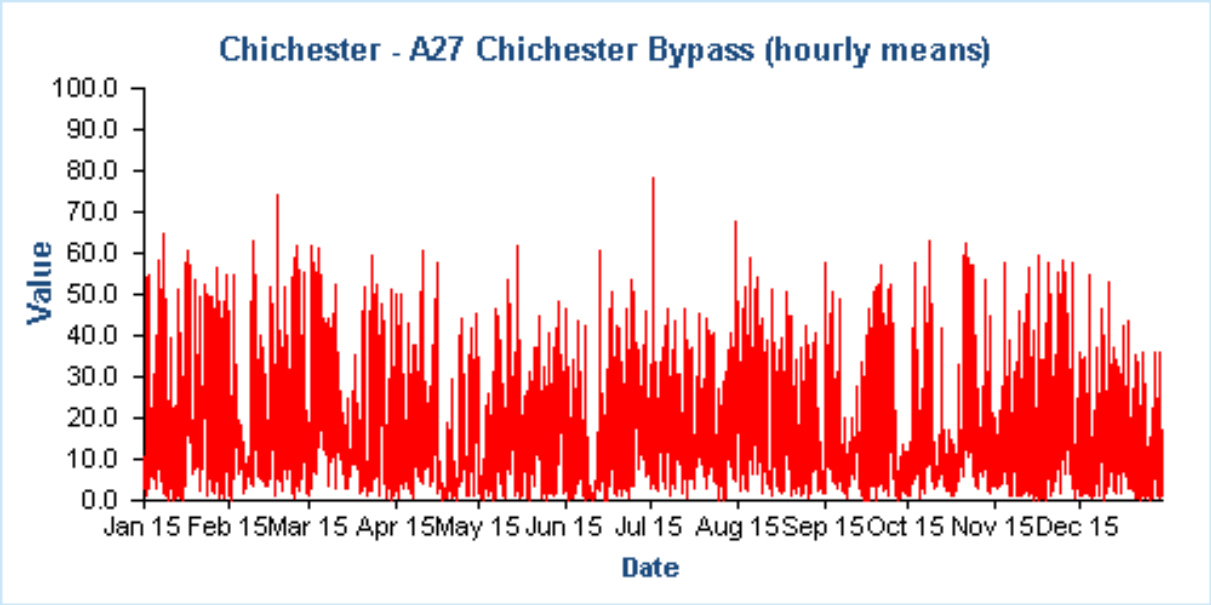
Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(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.

Figure A.3 showing NO_2 hourly mean values (ppb) at Stockbridge monitoring station for 2015



Air Quality Objective for NO_2 – 100ppb hourly mean not to be exceeded more than 18 times per year

Table A.5 – Annual Mean PM_{10} 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
CI1	Suburban (Stockbridge)	99	99	25	22	20	20	21

Notes: Exceedances of the PM_{10} annual mean objective of 40µg/m^3 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.

Figure A.4 showing trends in PM_{10} concentrations 2011 - 2015

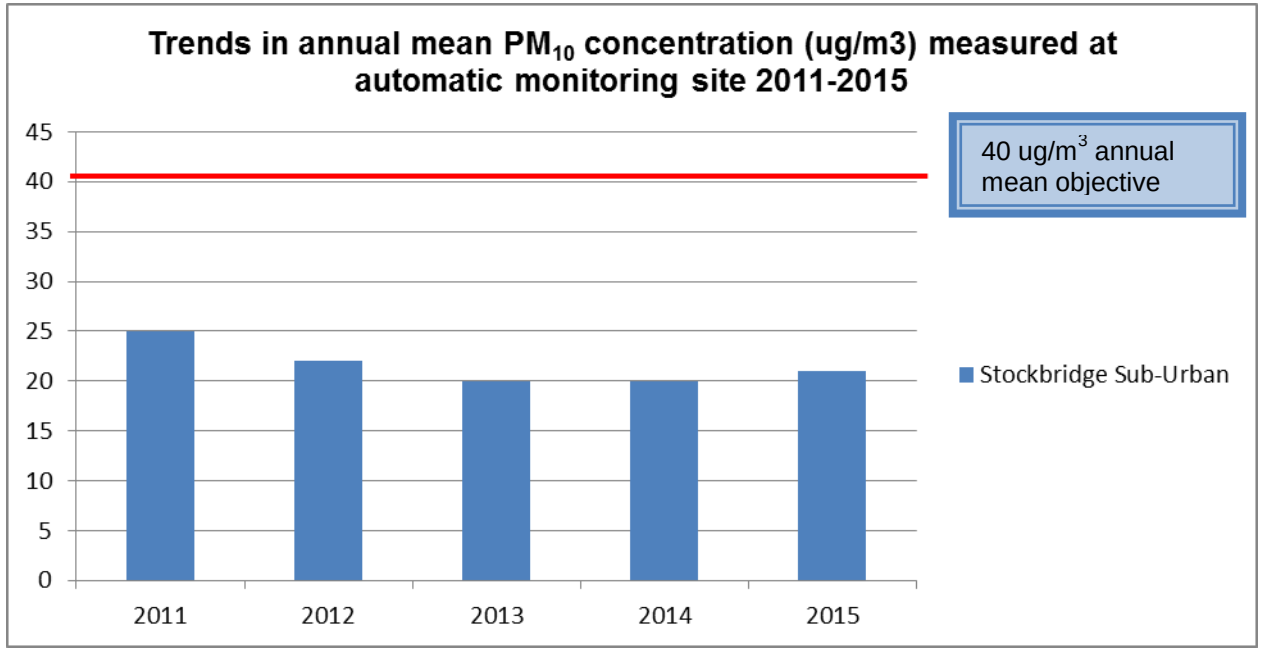


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

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
CI1	Suburban (Stockbridge)	99	99	8	11	1	2	4

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 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.

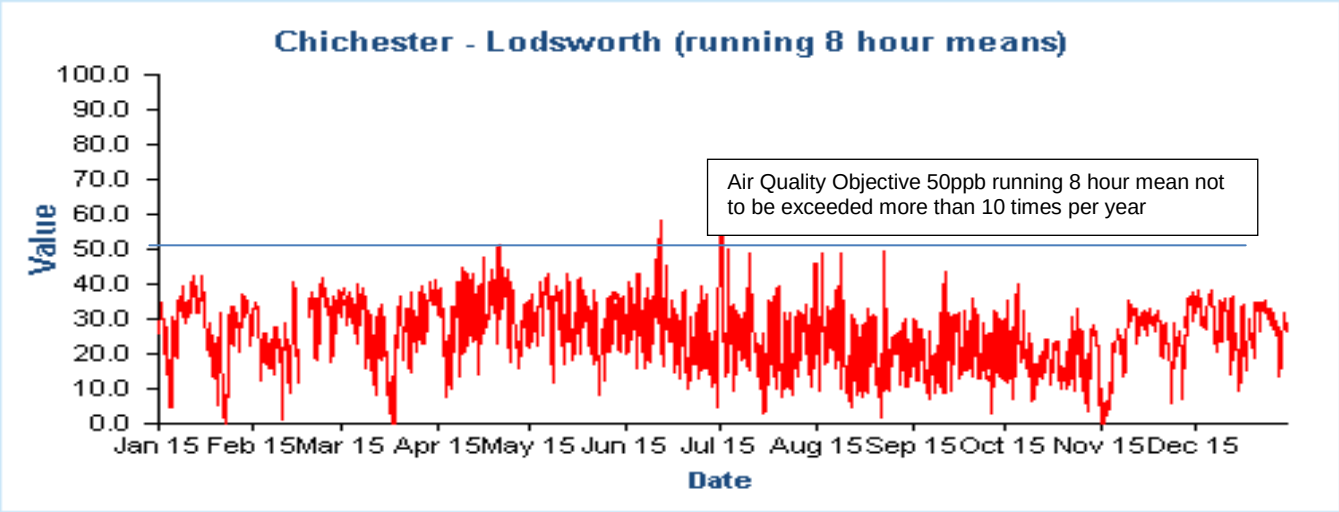
Table A.7 – Ozone (O_3) Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	O_3 - No more than 10 days where maximum rolling 8 hr mean >= 100 µg/m^3				
				2011	2012	2013	2014	2015
AR1	Rural (Lodsworth)	99	99	25	13	25	17	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%).

Figure A.5 showing ozone running 8 hour means at Lodsworth 2015



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 Data	Bias Adjusted (1)
01	30.54	32.36	26.20	28.94	23.37	27.14	26.96	28.43	38.63	24.35	27.81	24.01	28.2	30
02	40.99	37.39	35.52	36.96	40.35	40.35	41.37	41.96	42.45	39.81	37.64	35.86	39.2	**42**
03	36.12	31.39	30.00	26.87	31.65	33.55	36.16	33.92	28.40	27.43	34.60	32.99	31.9	34
04	36.14	29.41	30.12	28.03	33.77	31.82	36.71	33.91	28.52	27.84	33.80	33.08	31.9	34
05	35.28	30.90	29.93	26.98	32.19	34.02	35.82	34.45	28.57	28.5	34.18	32.97	32.0	34
06	42.49	41.08	44.58	40.33	34.25	38.12	33.20	38.25	42.45	42.48	34.92	28.69	38.4	**41**
07	21.46	20.26	18.74	16.07	10.69	12.35	12.264	14.66	17.07	19.58	16.30	11.74	15.9	17
08	36.47	32.08	29.63	5.31	25.90	29.88	27.77	27.00	32.00	30.87	35.21	25.86	28.2	30
09	38.60	38.77	38.56	39.44	29.47	40.10	37.89	41.93	48.05	41.08	32.24	25.30	37.6	**40**
10	46.82	44.98	42.86	48.29	-	0.55	50.07	58.86	47.88	48.26	45.58	46.18	43.7	**46**
11	22.28	21.11	16.13	17.24	12.22	14.42	12.431	15.87	16.15	19.83	18.93	15.40	16.80	18
12	33.35	35.25	30.64	34.03	16.43	26.93	28.875	34.55	33.21	38.36	32.72	31.00	31.3	33
13	-	-	-	-	-	-	49.26	47.42	57.27	53.15	42.53	34.45	47.3	**50**

(1) See Appendix C for details on bias adjustment and annualisation corrections

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

Significant changes to sources

No significant changes noted

Monitoring campaigns in the District

None undertaken

Additional Evidence gathered

None noted

QA/QC of Automatic Monitoring

All sites are visited by an officer for calibration and filter changes on a bi-monthly basis. CDC has a service agreement with a third party who provides site maintenance, auditing, regular inspections and 48-hour callout response if problems are encountered at the sites. Data is downloaded from all sites twice daily by the ERG[5] and is available to download online[6]. CDC has a contract with ERG to calibrate and ratify all real time data collected.

For more information please contact the ERG helpdesk[7].

QA/QC Diffusion Tube Data

Chichester District Council uses Gradko Environmental for supplying and analysing the diffusion tubes. The tube preparation method is 50% TEA/Acetone and ANA UKAS Method GLM 7 and GLM 9. CDC uses a local bias adjustment factor.

Factor from Local Co-location Studies

Three diffusion tubes are co-located with the Stockbridge monitoring station. These are used to calculate a bias-correction for the NO_2 diffusion tubes. The automatic monitoring station's data is quality assured by ERG. The annual average concentrations from the three co-located tubes are compared to the annual average real time data derived concentration for the same period. A factor can then be derived to correct all other diffusion tube data. The 'bias correction' calculation is as per the table below.

Annual mean (automatic monitor) [a,b,c]	= 34 µg/m^3
Annual average mean (NO_2 diffusion tubes) [d]	= 31.9 µg/m^3
Correction factor calculation	= 34/31.9 1.06

[a] 1st January 2015 – 31st December 2015
[b] Real-time data capture for 2015 = 100 %
[c] All data ratified by Environmental Research Group
[d] Diffusion tube data capture for the period Jan - Dec = 100%

[5] The Environmental Research Group (ERG), part of the School of Biomedical and Health Sciences at King's College London, a leading provider of air quality information and research in the UK.
[6] www.sussex-air.net
[7] Contact ERG on 020 7848 4022

QA/QC of Diffusion Tube Monitoring

CDC has confirmed by checking the web site provided that Gradko Environmental uses the Workplace Scheme for Proficiency (WASP) indicator rating for quality control. The result for 2015 was Satisfactory (Z score +/- 2) for 100% of results submitted. For more information please contact Gradko Environmental[8].

Annualising monitoring data for diffusion tube at Midhurst

See Box 7.10 in TG16 for details of method used.

B1 background site data used - location 11 Arthur Purchase site in Chichester.

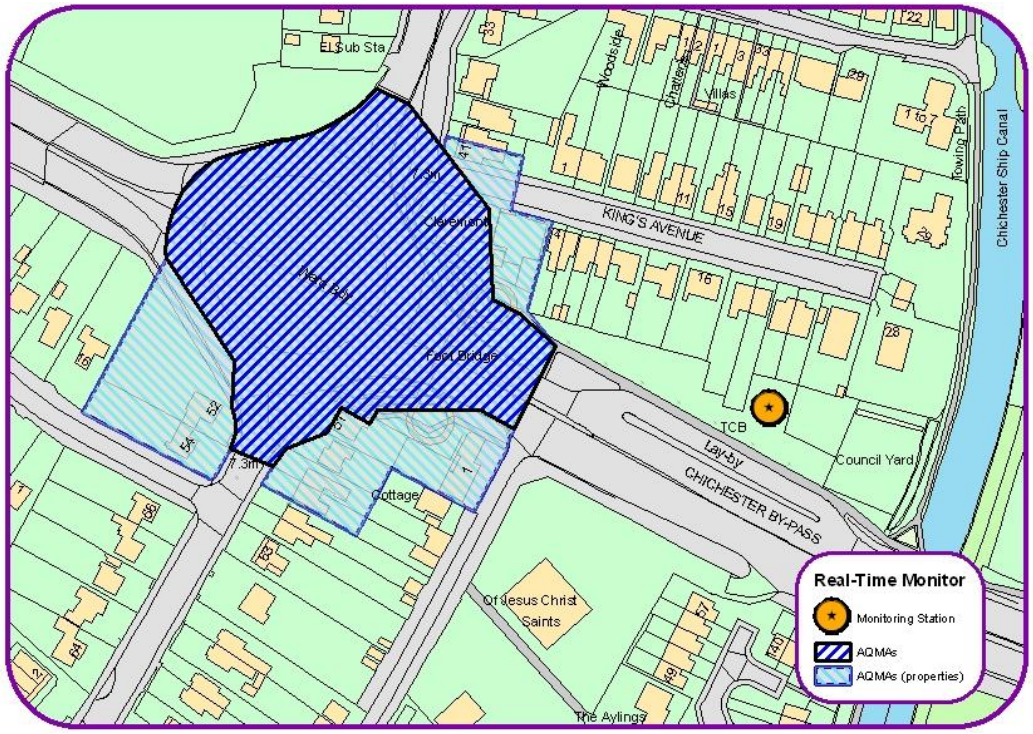
D1 Rumbold's Hill data.

Start date	end date	B1	D1	B1 when D1 available		
Jan	Feb	22.28				
Feb	Mar	21.11				
Mar	Apr	16.13				
Apr	May	17.24				
May	Jun	12.22				
June	Jul	14.42				
July	Aug	12.43	49.26	12.43		
Aug	Sept	15.87	47.42	15.87		
Sept	Oct	16.15	57.27	16.15		
Oct	Nov	19.83	53.15	19.83		
Nov	Dec	18.93	42.53	18.93		
Dec	Jan	15.4	34.45	15.4		
average		16.83417	47.34667	16.435		
		Am	M	Pm		
	ratio Am/Pm = R		1.024288			
	annualisation M x R		47.34667 x 1.0242 = 48.4966			
	annualised average		48.4966			

[8] Contact Gradko on 01962 860331

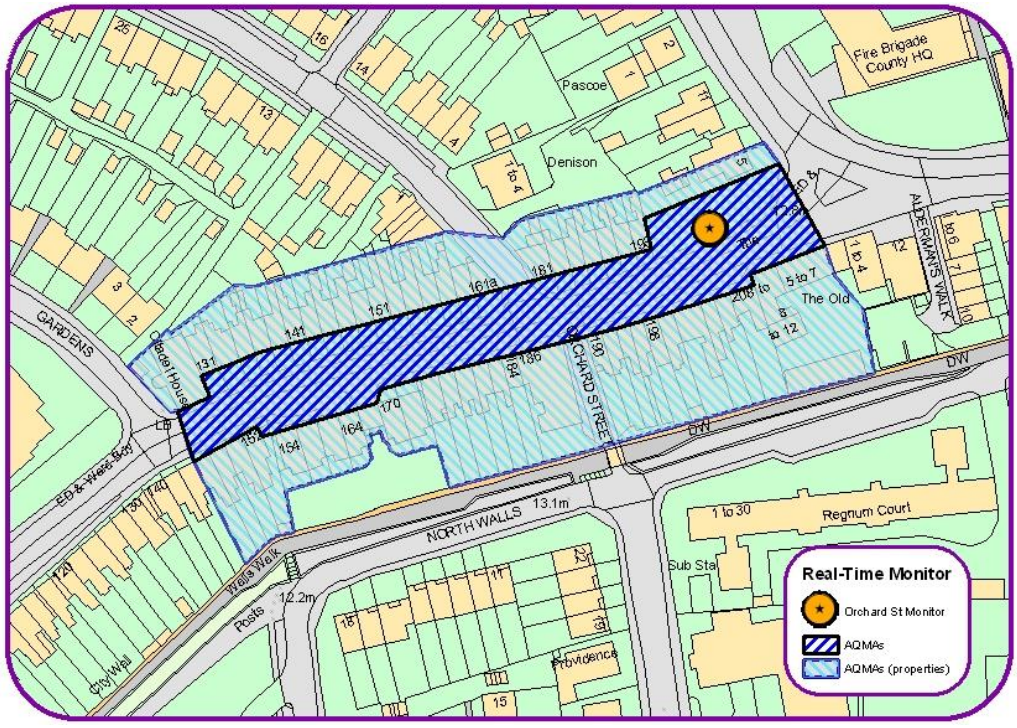
Appendix D: Map(s) of Monitoring Locations

Figure D.1 Stockbridge Roundabout Automatic Monitoring Site



© Crown Copyright and database right 2015. Ordnance Survey 100018803

Figure D.2 Orchard Street Automatic Monitoring Site



© Crown Copyright and database right 2015. Ordnance Survey 100018803.

Figure D.3 Location of Real Time Ozone Monitor at Lodsworth

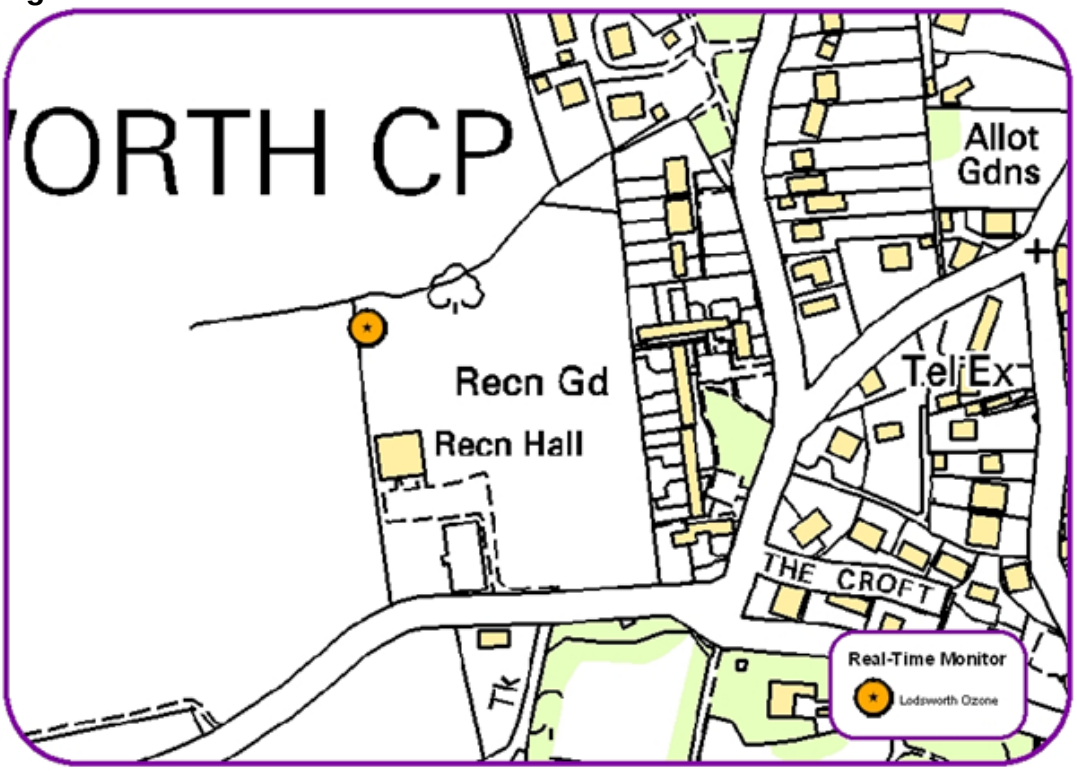


Figure D.4 Map of Non-Automatic Monitoring Sites in Chichester

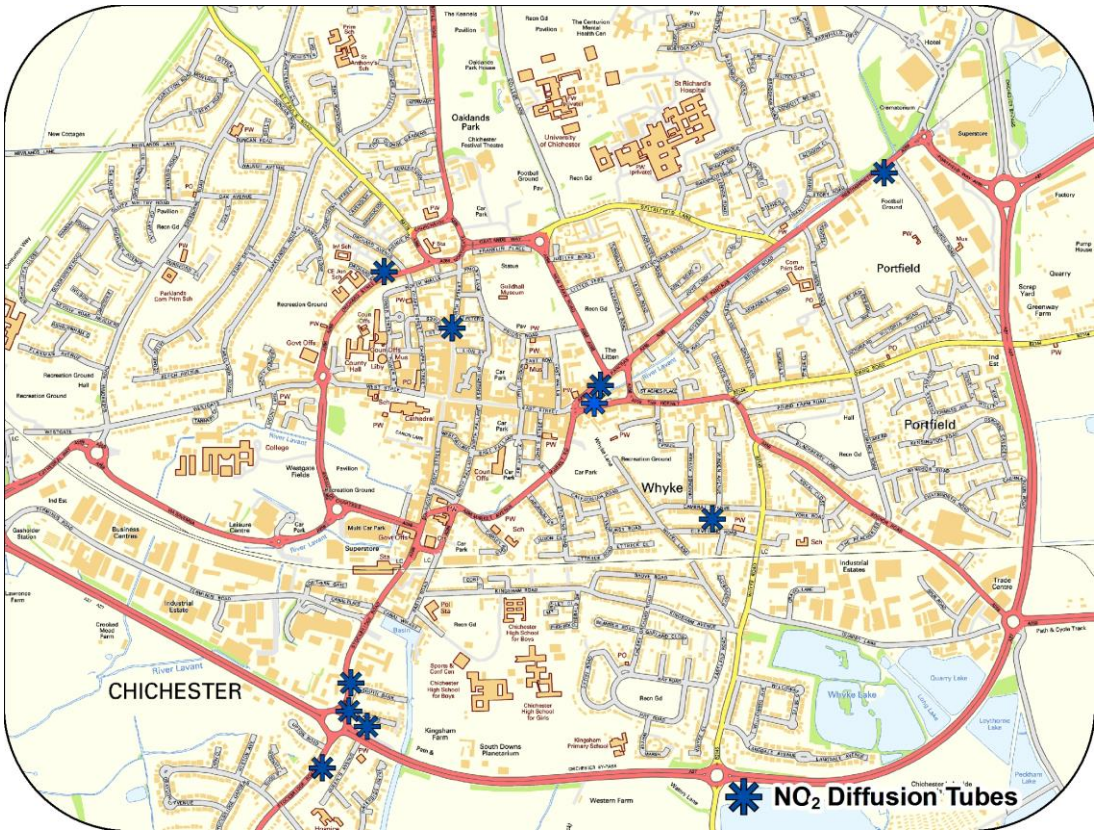


Figure D.5 Map of Non-Automatic Monitoring Sites in Midhurst

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[9]	
	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

[9] 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
CCTV	Closed circuit television
CDC	Chichester District Council
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
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
HE	Highways England
LAQM	Local Air Quality Management
LES	Low Emissions Strategy
LSTF	Local Sustainable Transport Fund
MOVA	
NHS	National Health Service
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OLEV	Office of Low Emission Vehicles
O_3	Ozone

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
RTPI	Real Time Passenger Information
SO_2	Sulphur Dioxide
SAQP	Sussex Air Quality Partnership
UTC	Urban Transport Controls
VMS	Variable message signing
WSCC	West Sussex County Council

References

Towards Better Air Quality
An Air Quality Action Plan for Chichester District
2015 – 2020