2017 Air Quality Annual Status Report (ASR) for South Cambridgeshire District Council

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

(June, 2017)

Local Authority Officer	Soraya Hashemi Marcus Bell
Department	Health and Environmental Services
Address	South Cambridgeshire Hall Cambourne Business Park Cambourne Cambridgeshire CB23 3EA
Telephone	01954 713640
E-mail	air.quality@scambs.gov.uk
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Signed off by	**Position**
Dr Liz Robin	Director of Public Health

Executive Summary: Air Quality in Our Area

This Report constitutes the 2017 Air Quality Annual Status Report (ASR) Report for South Cambridgeshire District Council. The Report includes air quality monitoring data from 2016. It also covers other issues and developments that have occurred in the last twelve months, since the ASR of 2016 that may have an impact on local air quality.

South Cambridgeshire is a rural district undergoing significant growth, particularly associated with new or expanded satellite towns/villages around Cambridge City which the district of South Cambridgeshire encompasses.

The area has good road and rail links with London and the South-East. The M11/A11 and A14 corridors pass through the District to the west/south and north of Cambridge respectively. To date, air quality issues within the District of South Cambridgeshire have been linked directly to the volume of traffic that runs through it, specifically along the A14. The A14 is congested on a regular basis between Bar Hill (to the West of Cambridge) and Milton (to the North-East). This has resulted in the declaration of an Air Quality Management Area for nitrogen dioxide (NO_2) and particulates (PM_{10}) along this stretch. Traffic levels have continued to grow along the A14 through the district so that the road is now almost at saturation. In 2015, a scheme to improve the section of the A14 north of Cambridge was completed, undertaken under the Government's 'Pinch-Point' programme and comprised adding an additional lane in both eastbound and westbound directions between junctions 31 and 32. In addition, wholescale proposed improvements to the A14 between Cambridge and Huntingdon were confirmed by Highways England in 2016 after several years of uncertainty. These works commenced in May 2017 (to be completed by 2020) and should significantly alleviate impacts on local air quality in the management area and possibly allow the revocation of the it, certainly necessitating the re-modelling of it.

Future major developments are to be largely residential and reliant on road-based transport for travel and commuting to the city, London and the surrounding area. The demand for housing, particularly affordable housing, is very high.

The majority of the growth is associated with major developments such as 'Northstowe' a new c.10,000 dwelling settlement being developed to the north west of Cambridge currently under construction. Similar developments on former wartime military bases are also planned for Waterbeach Barracks (c.6,000-10,000 dwellings), followed by Bourn Airfield and also Cambourne West together with several other significant developments on the periphery of Cambridge City ('North West Cambridge', Marshall's 'Wing' site and Trumpington Sporting Village, amongst others.

The majority of these major developments will rely on existing transport infrastructure with additional planned public transport generally limited to buses on existing roads and an additional bus stop on the currently operational guided busway at Northstowe and a new station in Chesterton (completed & operational in May 2017), just north of Cambridge Station on the existing east coast mainline. Possible future public transport infrastructure projects associated with the City Deal for Cambridge include dedicated guided busways from Cambourne West through Bourn as well as Waterbeach Barracks, although a definitive commitment to these scheme has not yet been made. One of these schemes, the Cambourne West busway, is a policy requirement for the Bourn air field development and the Council's air quality staff have provided initial feasibility support for the scheme due to the advantages it may offer over conventional private car transport.

The challenge of maintaining good air quality in the wider district is focussed on minimising impacts from (or to) the new major developments. Most of the new developments, when subject to detailed modelling, do not identify any significant exceedances of national air quality objectives because they are being built in rural background areas where current pollution levels are low. However, the cumulative effect of multiple large concurrent developments is likely to pose a long term risk to air quality in the district even though that may not be immediately apparent when looking at modelled forecasts for individual sites, particularly as many of the developments are at outline or pre-application stage. This is a key challenge for the Council to overcome in ensuring due consideration is given to air quality through the planning process despite a clear and urgent need for new housing.

For new developments, efforts have therefore been focussed to minimise impacts on air quality, even if nationally prescribed limit values are not under threat, through

implementation of actual low emission deliverables achieved through compliance with planning conditions. These measures include electric car charging points, enhanced cycle provision and methods to encourage non-car transport, installation of low emission boilers and sustainable building methods /renewable energy requirements, as well as active ventilation on new buildings in sensitive areas.

The review of the new monitoring data has identified the following:

- The objectives for Nitrogen Dioxide and Particulates were met at all the monitoring locations (three continuous and 27 passive monitoring sites), with good data capture, although the data indicates a general worsening of air quality since 2015. The monitoring data relating to the existing AQMA also achieved relevant objectives.
- The assessment of new sources has not identified any specific sources that have not been considered previously. A detailed assessment of any new sources is not therefore required.

South Cambridgeshire District Council will continue monitoring at all existing sites within the District and implement the measures outlined in its Air Quality Action Plan for the existing AQMA.

The next air quality review and assessment report will be the 2018 ASR. In addition, the council will be reviewing its Air Quality Action Plan and Air Quality Strategy following the provision of an Air Quality Developers Guide which was issued in late 2016. It is acknowledged that greater partnership amongst local authority's, transport planners and public health professionals is vital to implement any significant improvements with regards to air quality particularly associated with impacts from highways, whereby the Council have had a presence in local transport planning groups and will continue to do so where potential benefits can be delivered.

Air Quality in South Cambridgeshire

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].

Within South Cambridgeshire, the absence of heavy industry means that the key pollutants of concern are Nitrogen Dioxide and Particulates associated with automotive transport.

The A14 runs through the district and is a key link from Felixstowe supplying freight to the Midlands, contributing particulates from diesel engines and it is along this road that the Council declared an Air Quality Management Area in 2008 due to emissions of nitrogen dioxide and particulates.

These pollutants have been monitored for several years, with efforts focussed on the A14 route, and have shown recent improvements up until 2015.

Actions to Improve Air Quality in South Cambridgeshire

It is recognised by the Council that implementing measures which will actually deliver improvements or mitigate impacts in relation to air quality are often not tangible and difficult to achieve, particularly on major new developments where local planning policies do not categorically state what measures will be required unless national objectives are threatened. As such, efforts have been made in 2016 to achieve improvements through the use of planning conditions.

As such, the Council has produced a developers guide to specifically state what measures will be required on new developments. This document is aimed at providing a basis and degree of transparency for developers intending to build in South Cambridgeshire. It is the Council's view that by implementing these measures through the planning conditions a minimal impact on air quality will be maintained while the unavoidable need for growth within the district is supported. The draft of the developers guide will be available on the website link and methods by which the document could be given increased 'weight' are currently being considered. This process may include some form of elected member or committee commitment and involvement of the

[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

relevant portfolio holder. Although as the document does need to be flexible, kept up to date and revised regularly, forming a conventional Supplementary Planning Document may not the best way forward. DEFRA has been in touch with the council regarding this approach and a suggestion of ministerial commitments or gesture of support has also been suggested, which the Council welcomed.

Conclusions and Priorities

The overall results from this year's monitoring show a general increasing trend at most monitoring locations, which although quite modest does buck the trend of improving air quality over recent years.

For the coming year, the council will actively move away from a standard of just achieving national limit objectives and will pursue a longer term and deliverable set of outcomes which will result in reduced impacts on local air quality and consequently associated health impact of air quality on public health. This will be achieved through close partnership between the council, Cambridgeshire County Council, Transport Planners, Public Health and Highways England.

Local Engagement and How to get Involved

The Greater Cambridge City Deal is an initiative aimed at providing more sustainable transport options, making it easier for people to travel by public transport, cycle or on foot, reducing traffic and easing congestion. The five City Deal partners are:

- Cambridge City Council
- Cambridgeshire County Council
- South Cambridgeshire District Council
- University of Cambridge
- Greater Cambridge Greater Peterborough Local Enterprise Partnership

The City Deal will bring immediate and long-term benefits to the Cambridge and South Cambridgeshire region, by:

- Delivering projects to improve local transport networks, to reduce traffic congestion and provide more sustainable travel options between key residential and employment areas

- Speeding up planned housing development to deliver 33,500 new and affordable homes
- Working with young people and employers to create more training opportunities, 44,000 new jobs and 420 apprenticeships
- Capitalising on our region's innovation and technological capability to make Cambridge a world-leading Smart City

Local Liaison Forums are being carried out as part of the City Deal and the public can get involved by contacting the City Deal Team here. They can also be followed on Twitter using @gccitydeal.

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1 Local Air Quality Management

This report provides an overview of air quality in South Cambridgeshire District Council during 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 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 Cambridgeshire 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 compliance with the objectives.

A summary of AQMAs declared by South Cambridgeshire District Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available on link.

It is acknowledged that within the appraisal of the 2016 ASR, DEFRA highlighted a potential need to revoke the AQMA based on the recent positive trends of monitoring data to that point. The Council are committed to reviewing the AQMA although it must be taken into account that the AQMA was originally determined after consistent periods of poor air quality and underwent re-modelling in 2007-08. There are a lot of variables to consider within any re-modelling, or potential subsequent revocation. These variables include primarily the ongoing construction of a new A14 route, but also the quantity of HGVs appears to be changing, significant growth has been committed to in the area, limited $PM_{2.5}$ data is available and it is not clear whether 2016 monitoring data (and beyond) will continue to reflect those improving trends, as 2016 itself does not. The AQMA is a valuable policy tool in protecting air quality and the health of people in the district. The Council will not revoke it until a sustained period of better air quality is recorded coupled with clarifications of several of the key variables followed by re-modelling and validation of that modelling process.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration [a]	Now [b]	
AQMA 1 (Revoked)	2007	NO_2 Annual Mean	Bar Hill - Milton	Area Along A14 between Bar Hill and Milton	YES	42 µg/m^3	-	Air Quality Action Plan for Cambridgeshire Growth Areas 2009 (Link)
AQMA 1	2008	NO_2 Annual Mean	Bar Hill - Milton	Area Along A14 between Bar Hill and Milton	YES	42 µg/m^3	23 µg/m^3	Air Quality Action Plan for Cambridgeshire Growth Areas 2009 (Link)
AQMA 1	2008	PM_{10} Daily Mean	Bar Hill - Milton	Area Along A14 between Bar Hill and Milton	YES	52 (no. of days exceedances of 50 µg/m^3)	27 µg/m^3	Air Quality Action Plan for Cambridgeshire Growth Areas 2009 (Link)

☒ South Cambridgeshire District Council confirm the information on UK-Air regarding their AQMA(s) is up to date
a Monitored data from Bar Hill Site
b Monitored data from Impington Site

2.2 Progress and Impact of Measures to address Air Quality in South Cambridgeshire

Defra's appraisal of last year's ASR accepted the report and presented a number of points for the Council to consider in further LAQM efforts/reporting. A summary of the key findings of previous reports is presented within Appendix E.

For the 2016 ASR, Defra identified the recent monitoring data which has recorded no exceedances of national limit values for the annual mean since 2013 and therefore encouraged the commitment to further monitoring and modelling to potentially inform a future revocation of the AQMA. Section 2.1 of this report presents more information on the status of the AQMA and a revised Action Plan will be presented within the next 12 -18 months. Defra also requested further information on the reasoning why there has been a decline in recorded concentrations which is no doubt related to improving engine standards and performance particularly in relation to HGVs along the A14. In addition, it should be noted that the Bar Hill continuous monitor is no longer active and the Impington site was moved in recent years, both factors may suggest an improvement in data when compared to previous data which is over-stated.

Defra advised that a justification for using a local bias adjustment factor should have been included when previous reports had used national adjustment factors. Within this report, national values have again been used.

South Cambridgeshire District Council has taken forward a number of direct measures during the current reporting year of 2017 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 (link). Key completed measures relate to the completion of major highway improvements although it is acknowledged the key driver in these aspects has been other factors rather than air quality. Limitations and corrective measures to mitigate impacts from air quality are outlined within the 'Actions to Improve Air Quality' section above.

In 2017-18, the Council expects to further pursue and formalise its approach to low emission strategies adopted on new developments, re-instate the Bar Hill monitoring site at a position likely to be Lolworth following a funding agreement by Highways

England and continue to support sustainable transport planning and public health initiatives through partnership working with local stakeholders to deliver positive outcomes associated with the City Deal, the Joint Strategic Needs Partnership and associated schemes.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Low Emission Measures	Transport Planning, Infrastructure & Promoting Travel Alternatives	Promotion of cycling/ Sustainable Transport	Developer Contributions	2016-	2016-	To be confirmed – May involve ratio of PPs issued with LES.	NA	PPs now being issued with Low Emission Strategies	2016-	Support from central Gov't would help
2	Guided Bus Way	Transport Planning & Infrastructure	Bus Route Improvements	CCC*	2009-2010	2011	N/A	None	Completed	N/A	
3	A14 Improvement – Junction 31-32 (E/B & W/B)	Traffic Management	Strategic highway improvements	CCC	N/A	2015	N/A	None	Completed Autumn 2015	N/A	
4	A14/M11 Re-alignment	Traffic Management	Strategic highway improvements	CCC/ Highways England	N/A	2016-20	Central Gov't/Highways England Commitment	None	Work to commence 2016/7 (Package 1)	2020	

5	Policy Guidance and Development Control	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	SCDC*	2015	2016	LDF Policy NE/16	None	SPD or Developers Guide for Low Emission Strategy measures	2016	
6	City Deal	Transport Planning & Infrastructure Promoting Travel Alternatives	Bus route improvements & Promotion of cycling/ Sustainable Transport	CCC/ Cambridge City Council	2015-2030	2016-	Connect existing and new residential and employment areas with high quality public transport networks, including new orbital bus routes around Cambridge & comprehensive network of pedestrian and cycle route.	None	Proposed scheme for making bus, cycle and walking journeys more convenient and safer from Northstowe announced.	Tranche 1 schemes by 2019	

*CCC – Cambridgeshire County Council

*SCDC – South Cambridgeshire District Council

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.

South Cambridgeshire District Council undertakes monitoring for $PM_{2.5}$ at one automatic monitoring station, Girton. Comparisons with the Defra background maps data for the East of England indicate that most parts of Cambridge have 'background' levels of $PM_{2.5.}$ The monitored concentrations at Girton site in 2016 is higher than the Defra predicted values confirming the existing hotspots affected by traffic. According to Public Health Outcome Framework, It has been estimated that 4.9% of South Cambridgeshire's population mortality is attributed to air pollution (based on ambient levels of $PM_{2.5}$).

In terms of assessing the data, guidance outlined in the Air Quality Expert's Group, '*Fine Particulate Matter (PM2.5) in the United Kingdom'* (2012) is considered relevant and indicates that an exposure reduction target will be the key driver for UK policy on exposure to PM2.5 based on an Average Exposure Indicator (AEI).

Table 2.3 National Exposure Reduction Targets for $PM_{2.5}$

Exposure reduction target relative to the AEI (average exposure indicator)[1] in 2010[2]		Year by which the exposure reduction target shouldbe met
Initial concentration, µg m^{-3}	**Reduction target, %**	
less than or equal to 8.5	0	2020
more than 8.5 but less than 13	10	
13 to less than 18	15	
18 to less than 22	20	
22 or more	All appropriate measures to achieve 18 µg m^{-3}	

1 The AEI is derived from three-year average urban background measurements (i.e. 2009, 2010, 2011 for 2010) as defined in the EU Ambient Air Quality Directive (2008/50/EC).
2 Where the AEI in the reference year is 8.5 µg m^{-3} or less, the exposure reduction target is zero. The reduction target is also zero in cases where the AEI reaches the level of 8.5 µg m^{-3} at any point of time during the period 2010 to 2020 and is maintained at or below that level.

Source - Air Quality Expert's Group, 'Fine Particulate Matter ($PM_{2.5}$) in the United Kingdom' (2012)

South Cambridgeshire District Council wishes to introduce future measures to address $PM_{2.5}$ as part of the oncoming Air Quality Action Plan review, ensuring that the Public Health perspective is integrated into all relevant policies.

Integration with Public Health

The Cambridgeshire Health and Wellbeing Board requested a Transport and Health Joint Strategic Needs Assessment[4] (JSNA) which includes air pollution. The report noted that there are levels of air pollution in Cambridgeshire that impact health, even though most annual averages may not be over air quality thresholds. The report is available here.

Through the JSNA process, stakeholders identified several options for addressing air pollution in Cambridgeshire:

- Lower emission passenger transport fleet (buses and taxis) and traffic restraint.
- Modal shift from cars to walking and cycling.
- Further investigation into the potential for reducing specific person exposure. While a lower emissions transport fleet and modal shift provide the overall long-term momentum to reduce air pollution, there are measures that may reduce person exposure in the short-term, though the cost effectiveness and practicality of these options needs further investigation. Examples include:
    - Text alerts to vulnerable patient groups.
    - Monitoring measures to improve indoor air quality especially in newer office buildings.
    - Better use of health evidence when assessing the populations exposed in new developments.
    - Further understanding around the seasonal impact of air pollution and potential measures that could reduce this.

[4] Transport and Health Joint Strategic Needs Assessment, 2014

The Public Health team at Cambridgeshire County Council discussed a report detailing current concerns regarding air quality in Cambridgeshire at the March 2017 Health Committee. It was resolved to:

- note and comment on the current air quality issues in Cambridgeshire, local opportunities/initiatives to improve air quality, and the NICE Draft National guidance;
- request that Director of Public Health:
    - draw this report to the attention of the Leader and Chief Executive of the Council and to the Chairmen/women of and Spokes for its Policy and Service Committees with a recommendation that the committees consider the potential impact on air quality as part of their decision making process;
    - draw this report to the attention of the Chairmen/women and Chief Executives of the Greater Cambridge City Deal, the Cambridgeshire and Peterborough Combined Authority, Cambridgeshire's district councils and Cambridge City Council with a recommendation that they consider the potential impact on air quality as part of their decision-making process;
    - encourage the committees and bodies named above to actively bring forward projects which will improve air quality; and
- ask that the Director of Public Health report back to the Health Committee regarding the above within six months.

The Director of Public Health wrote to the Chief Executives of the councils in April 2017 Cambridgeshire.

Alternative modes of transport

The Cambridgeshire County Council Greenways project[5] is aiming to establish a high quality network of routes from South Cambridgeshire into Cambridge from some of the surrounding towns and villages, approximately five to ten miles away. They will

[5] Cambridgeshire County Council Greenways project: link

primarily be commuter cycle paths, but with additional benefits for pedestrians, horse riders, leisure activities and recreation.

The aim is to increase levels of cycling and walking, in order to reduce traffic congestion as the city grows, as well as to improve the health of its population. Some of each route exists already, but parts may need significant improvement or have missing links. Whilst various routes have been recommended in a report commissioned in 2016, no decisions have been made and every route will be chosen following extensive local consultation. The County Council has secured development funding for the project from the Greater Cambridge City Deal, which will enable early consultation with parish councils, landowners, local organisations and members of the public. It is most likely the Greenways will be divided into two groups (to be decided), with consultation commencing on the first six towards the end of 2017, and the second six towards the end of 2018.

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

3.1 Summary of Monitoring Undertaken

South Cambridgeshire District Council operated automatic monitoring stations at 3 different sites within the District in the year 2016. These are Orchard Park (Cambridge), Girton and Impington sites for measuring PM_{10} and NO_2. Girton site also measures $PM_{2.5}$.

The monitoring stations at Girton and Impington are considered to be sites representative of nearby receptors situated alongside the A14, whilst the Orchard Park monitor is located within the grounds of a school. All three monitoring sites with the exception of Girton are located within the existing Air Quality Management Area for NO_2 and PM_{10}.

The data capture for NO_2 and PM_{10} was generally good at all sites but slightly below 90% at Girton site due to technical issues and breakdowns. This was also the case for PM_{10} at Orchard Park and $PM_{2.5}$ at Girton site.

Following the bias adjustment process, results for all diffusion tubes show compliance with the annual mean objective for nitrogen dioxide. However, the current monitoring results show slight increase in NO_2 concertation at most of monitoring locations compared to the results of 2015. This is likely due to the ongoing A14 improvement road works which has resulted in significant increase in local congestions.

South Cambridgeshire District Council has examined the results from monitoring in the district. Concentrations both within the AQMA and outside of it are below the national objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3.1.1 Automatic Monitoring Sites

South Cambridgeshire District Council undertook automatic (continuous) monitoring at three sites during 2016.

- The annual mean objective for both NO_2 and PM_{10} was achieved at all sites. The annual mean objective for $PM_{2.5}$ was also achieved at Girton site.

- For all sites, the PM_{10} daily mean objective i.e. (days where concentrations were calculated to be >50μg/m^3) and NO_2 hourly mean objectives i.e. (hours where concentrations were calculated to be >200μg/m^3) were also achieved.

Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at this link.

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

South Cambridgeshire District Council undertook non-automatic (passive) monitoring of NO_2 at 27 sites during 2016. The NO_2 annual mean objective was achieved at all diffusion tubes. However the results show a slight increase at all locations within the AQMA.

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 bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

The monitoring stations at Girton Road and Impington are considered to be sites representative of nearby receptors situated alongside the A14, whilst the Orchard Park monitor is located within the grounds of a school. All of the monitoring stations with the exception of the Girton monitoring site are located within the existing Air Quality Management Area for NO_2 and PM_{10}.

All continuous and passive NO_2 monitoring sites achieved respective National Annual Mean Objectives.

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 2016 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.

Annual means greater than 60µg/m^3 may indicate that an exceedance of the 1-hour mean objective is also likely. No such exceedances were recorded at any of the monritong sites.

3.2.2 Particulate Matter (PM_{10})

South Cambridgeshire District Council monitored fine particles at all the three different AQ monitoring locations within the district.

The annual and daily mean objectives were achieved at all of the three monitoring sites at Girton, Orchard Park and Impington with good data capture.

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.

3.2.3 Particulate Matter ($PM_{2.5}$)

South Cambridgeshire District Council monitored $PM_{2.5}$ at a continuous monitoring station in Bar Hill prior to the eventual closure of the site in 2012. However, a new monitoring site for $PM_{2.5}$ was commissioned December, 2011 at Girton. The concentrations at both the previous and new site have remained fairly stable throughout the monitoring periods. The highest level recorded was 14µg/m^3 measured in 2013 at the new location. The annual mean concentration in 2016 was 13 µg/m^3.

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years whilst Figure A.5 shows the annual trends in concentrations.

3.2.4 Sulphur Dioxide (SO_2)

South Cambridgeshire Council do not currently monitor sulphur dioxide concentrations as no relevant sources have been identified in previous rounds of updating and screening.

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)
IMP	Impington (A14)	Roadside	543739	261625	NO_x (NO_2) PM_{10}	YES	ET M200E/ ET BAM1020	Y (12m)	N/A	2
ORCH	Orchard Park Primary School (A14)	Urban background	544558	261579	NO_x (NO_2) PM_{10}	YES	ET M200E/ ET BAM1020	Y (1m)	N/A	2
GIRT	Girton	Roadside	542676	260667	NO_x (NO_2) PM_{10}, $PM_{2.5}$	NO	ET M200E/ ET BAM1020	Y (5m)	5	2

Notes:

(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)
DT1	1 Coppice, Histon	Urban Background	544230	262048	NO_2	N	7m	0.5m	N	2
DT2	The Gables, High Street, Histon	Roadside	543770	263678	NO_2	N	5m	1m	N	2
DT3	Hill Farm Cottages, Lolworth	Roadside	536926	264956	NO_2	Y	N	4m	N	2
DT4	White Lion, 96 High St., Sawston	Urban Background	548600	249136	NO_2	N	5m	1m	N	2
DT5	Rhadegund Farm Co. Lolworth	Roadside	538744	263640	NO_2	Y	1m	33m	N	2
DT6	64 High St., Linton	Roadside	556179	246815	NO_2	N	7m	0.5m	N	2
DT7	20 High St.,Tadlow	Roadside	528131	247399	NO_2	N	10m	2m	N	2
DT8	47 High Street, Harston	Urban Background	542554	251002	NO_2	N	5m	1m	N	2
DT9	3 Garner Close, Milton	Urban Background	547452	263175	NO_2	N	5m	1m	N	2
DT10	1A Weavers Field, Girton	Urban Background	542537	261467	NO_2	Y	15m	1m	N	2
DT11	Heath Hse., A505, Thriplow	Urban Background	544034	244585	NO_2	N	10m	1m	N	2
DT12	19 Lonetree Av., Impington	Roadside	544119	261862	NO_2	Y	7m	0.5m	N	2
DT13	1 Brook Close, Histon	Urban Background	543955	263588	NO_2	N	2m	1m	N	2
DT14	22 Water Lane, Histon	Roadside	544050	263306	NO_2	N	2m	0.5m	N	2
DT15	72 Cambridge Rd, Impington	Urban Background	544243	261819	NO_2	Y	7m	0.5m	N	2

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)
DT16	Hackers Fruit Farm, Lolworth	Roadside	539846	262826	NO_2	Y	5m	12m	N	2
DT17	5 Mill Lane, Sawston	Roadside	548545	249366	NO_2	N	15m	1m	N	2
DT18	1 Catchall Farm Cottages	Roadside	540509	262290	NO_2	Y	1m	10m	N	2
DT19	Crafts Way, Bar Hill	Roadside	538472	263675	NO_2	N	15m	1m	N	2
DT20	Chieftain Way, Orchard Park	Roadside	544828	261738	NO_2	Y	1m	0.5m	N	2
DT21	Topper Street, Orchard Park	Roadside	545056	261784	NO_2	Y	1m	0.5m	N	2
DT22	Flack End, Orchard Park	Roadside	545435	261906	NO_2	Y	2m	35m (from A14 WB)	N	2
DT23a	Orchard Park School	Urban Background	544557	261571	NO_2	Y	1m	50m	Y	2
DT23b	Orchard Park School	Urban Background	544557	261571	NO_2	Y	1m	50m	Y	2
DT23c	Orchard Park School	Urban Background	544557	261571	NO_2	Y	1m	50m	Y	2
DT24	Co-op, High Street, Histon	Roadside	543768	263708	NO_2	Y	1.5m	2.6m	N	2
DT25	13 Engledow Drive, Orch. Park	Urban Background	545259	261873	NO_2	Y	5m	4.5m	N	2
DT26	22 Topper Street , Orch. Park	Roadside	545169	261764	NO_2	Y	4.2m	0.2m	N	2
DT27	Church Lane, Little Abington	Urban Background	552961	249251	NO_2	Y	14m	2.0m	N	2

Notes:

(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 2016 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2012	2013	2014	2015	2016
IMP	Roadside	Automatic Monitor	98	98	31	27	23	22	23
ORCH	Urban Background	Automatic Monitor	99	99	21	22	19	18	18
GIRT	Roadside	Automatic Monitor	86	86	27	26	25	24	23
DT1	Urban Background	Diffusion Tube	100	100	19.8	15.3	18.9	17.4	21.3
DT2	Roadside	Diffusion Tube	100	100	33.8	28.2	31.5	30.6	27.8
DT3	Roadside	Diffusion Tube	100	100	36.7	27.5	31.8	29.8	27.6
DT4	Urban Background	Diffusion Tube	100	100	29.2	28	28.3	23.8	26.6
DT5	Roadside	Diffusion Tube	100	100	22	26	21.7	19	20.6
DT6	Roadside	Diffusion Tube	100	100	32.4	28.2	31.1	27.4	27.9
DT7	Roadside	Diffusion Tube	100	100	12.4	14.1	11.9	10.4	11.8
DT8	Urban Background	Diffusion Tube	100	100	25.6	25.7	28	28.4	28.6
DT9	Urban Background	Diffusion Tube	100	100	20.2	19.9	17.3	16.4	17.8
DT10	Urban Background	Diffusion Tube	92	92	29.5	26.8	30.5	26.0	26.2
DT11	Urban Background	Diffusion Tube	100	100	27.2	25.9	28.2	26.1	26.0
DT12	Roadside	Diffusion Tube	100	100	21.8	20.2	21.1	17.9	19.4
DT13	Urban Background	Diffusion Tube	100	100	19.5	19	19.7	17.7	19.2
DT14	Roadside	Diffusion Tube	100	100	29.1	25.2	28.6	24.4	27.0

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2016 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2012	2013	2014	2015	2016
DT15	Urban Background	Diffusion Tube	100	100	23.1	25.1	22.3	20.2	20.3
DT16	Roadside	Diffusion Tube	100	100	**41.5**	**42.9**	38	32.8	37.1
DT17	Roadside	Diffusion Tube	92	92	17.9	17.8	15.1	14.3	16.4
DT18	Roadside	Diffusion Tube	100	100	24.4	26.4	25.4	21.7	24.1
DT19	Roadside	Diffusion Tube	100	100	23.9	23.7	22.9	19.8	24.5
DT20	Roadside	Diffusion Tube	100	100	21.7	21.2	21.9	17.6	23.1
DT21	Roadside	Diffusion Tube	100	100	21.7	22	20.8	18.2	20.5
DT22	Roadside	Diffusion Tube	100	100	25.8	24.8	24.1	20.6	22.4
DT23a	Urban Background	Diffusion Tube	92	92	19.9	19.4	20.4	17.3	17.8
DT23b	Urban Background	Diffusion Tube	92	92	18.9	19.2	19.8	16.8	17.9
DT23c	Urban Background	Diffusion Tube	100	100	21.5	19.6	19.4	17.9	17.4
DT24	Roadside	Diffusion Tube	100	100	22.2	21.1	21.2	18.6	19.7
DT25	Urban Background	Diffusion Tube	100	100	25.9	24.6	24	20.8	22.1
DT26	Roadside	Diffusion Tube	100	100	24	21.6	21.5	20.3	21.0
DT27	Urban Background	Diffusion Tube	100	100	12.7	15.2	12.5	11.3	12.5

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

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

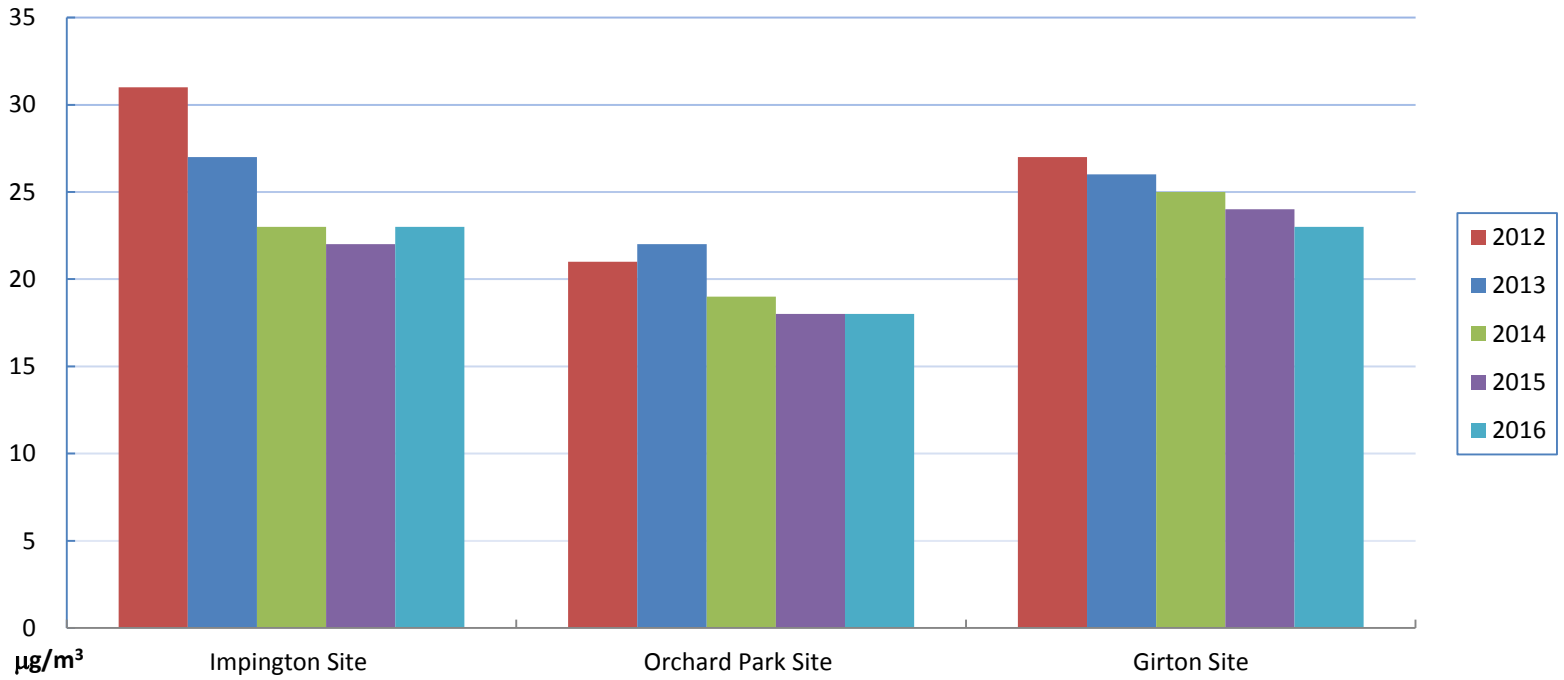
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

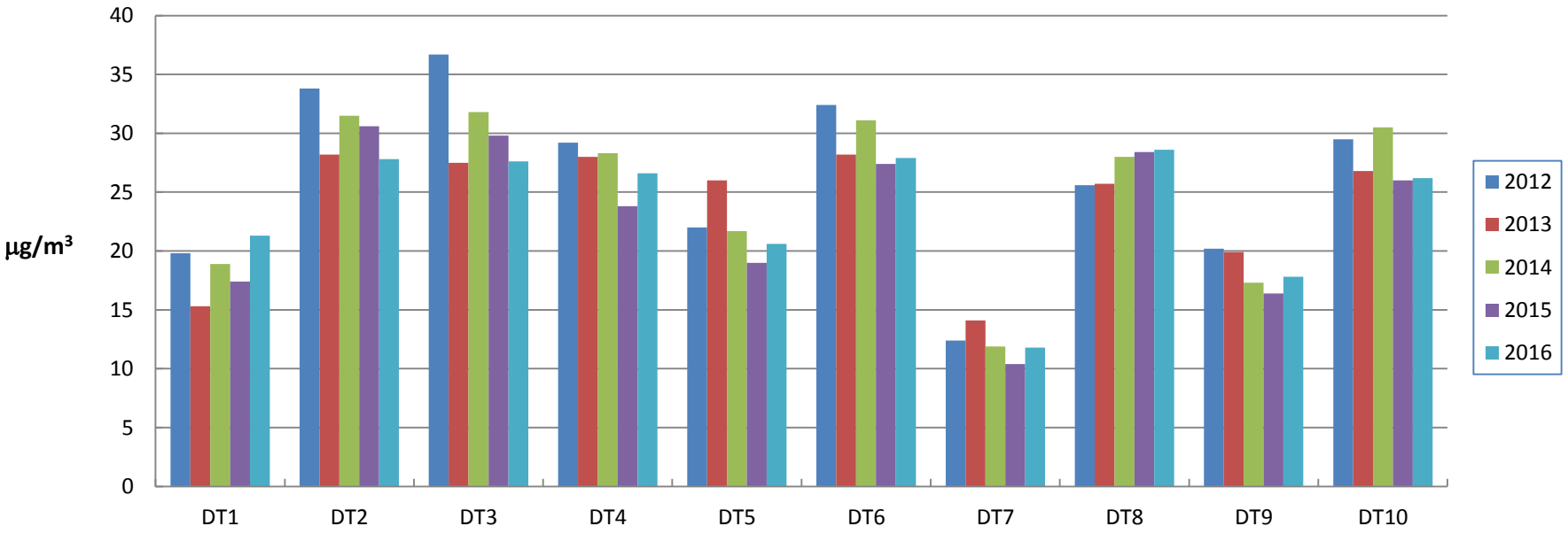
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

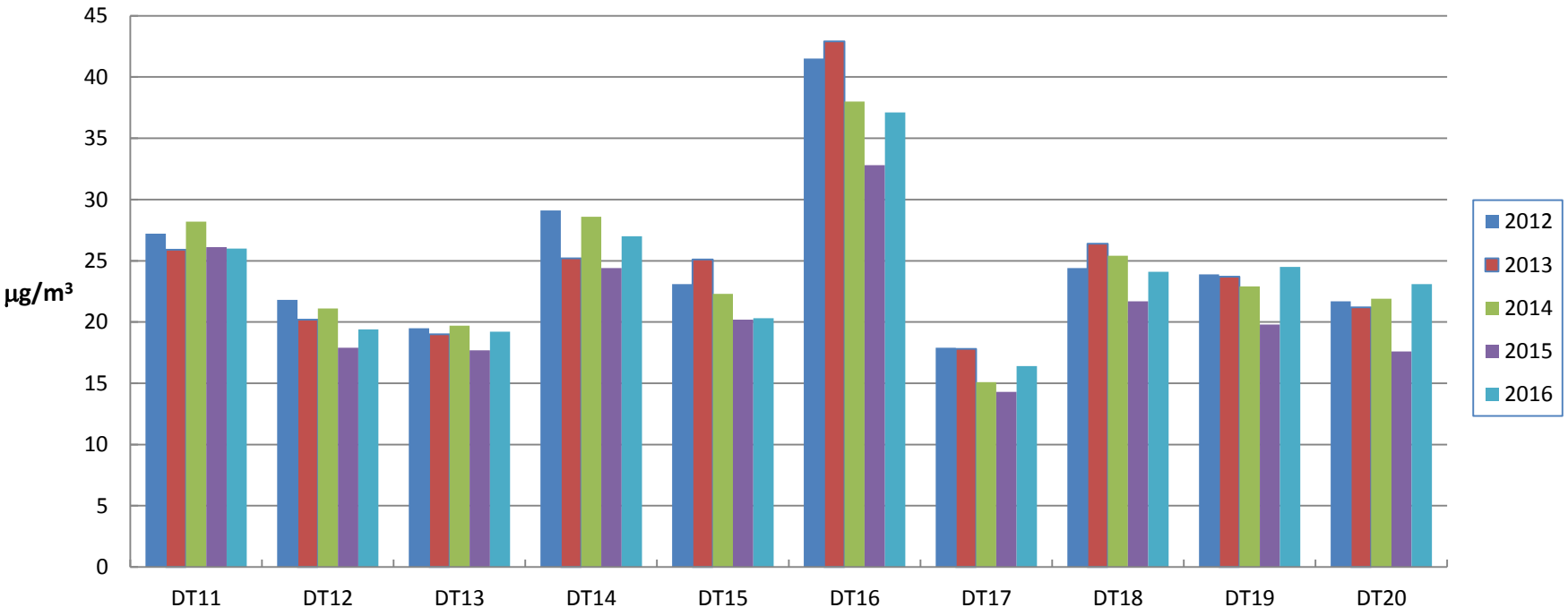
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations at Automatic Monitor Stations and Diffusion Tubes




µg/m³
40
35
30
25
20
15
10
5
0
DT1
DT2
DT3
DT4
DT5
DT6
DT7
DT8
DT9
DT10
2012
2013
2014
2015
2016


45
40
35
30
25
20
15
10
5
0
µg/m³
DT11
DT12
DT13
DT14
DT15
DT16
DT17
DT18
DT19
DT20
2012
2013
2014
2015
2016

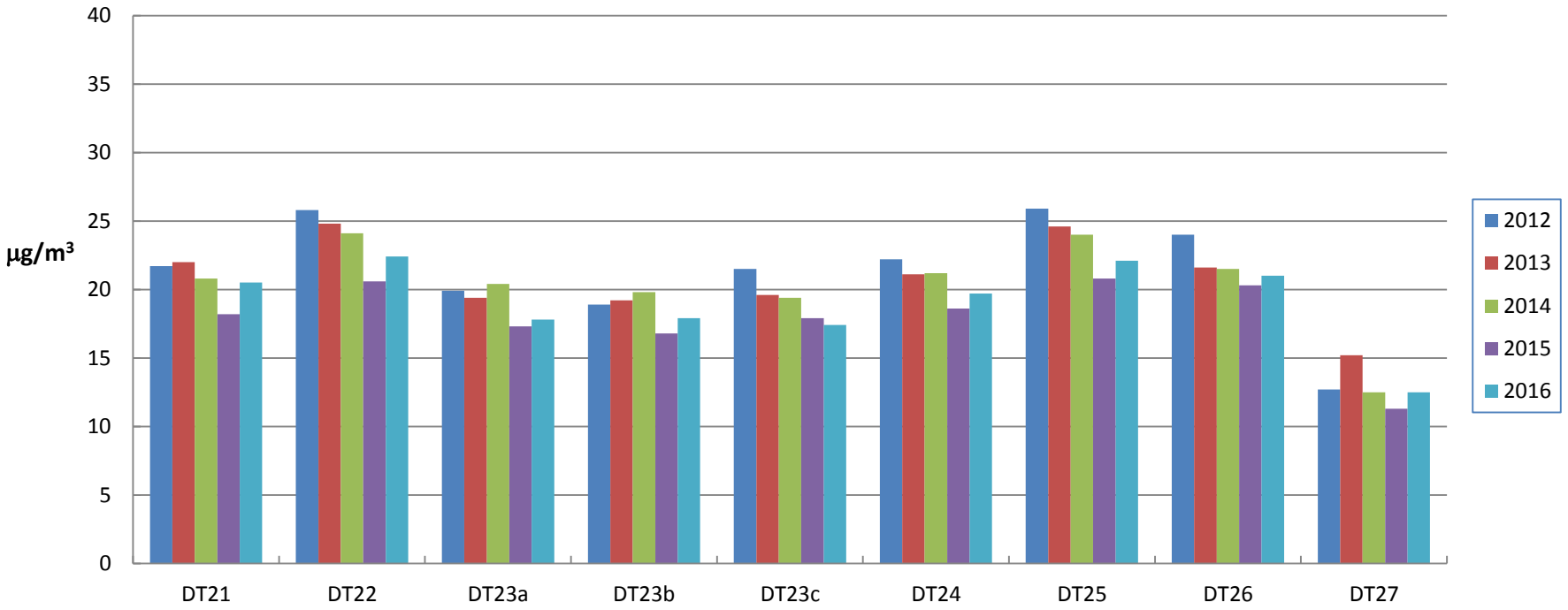

40
35
30
25
20
15
10
5
0
µg/m³
DT21
DT22
DT23a
DT23b
DT23c
DT24
DT25
DT26
DT27
2012
2013
2014
2015
2016

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 2016 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2012	2013	2014	2015	2016
IMP	Roadside	ET M200E (Chemiluminescence)	98	98	0	1	0	0	0
ORCH	Urban Background	ET M200E (Chemiluminescence)	99	99	0	0 (86)	0	0	0
GIRT	Roadside	ET M200E (Chemiluminescence)	86	86	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 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2012	2013	2014	2015	2016
IMP	Roadside	93	93	58	55	22	18	17
ORCH	Urban Background	87	87	21	22	22	16	16
GIRT	Roadside	86	86	26	30	16	11	17

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ 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 Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

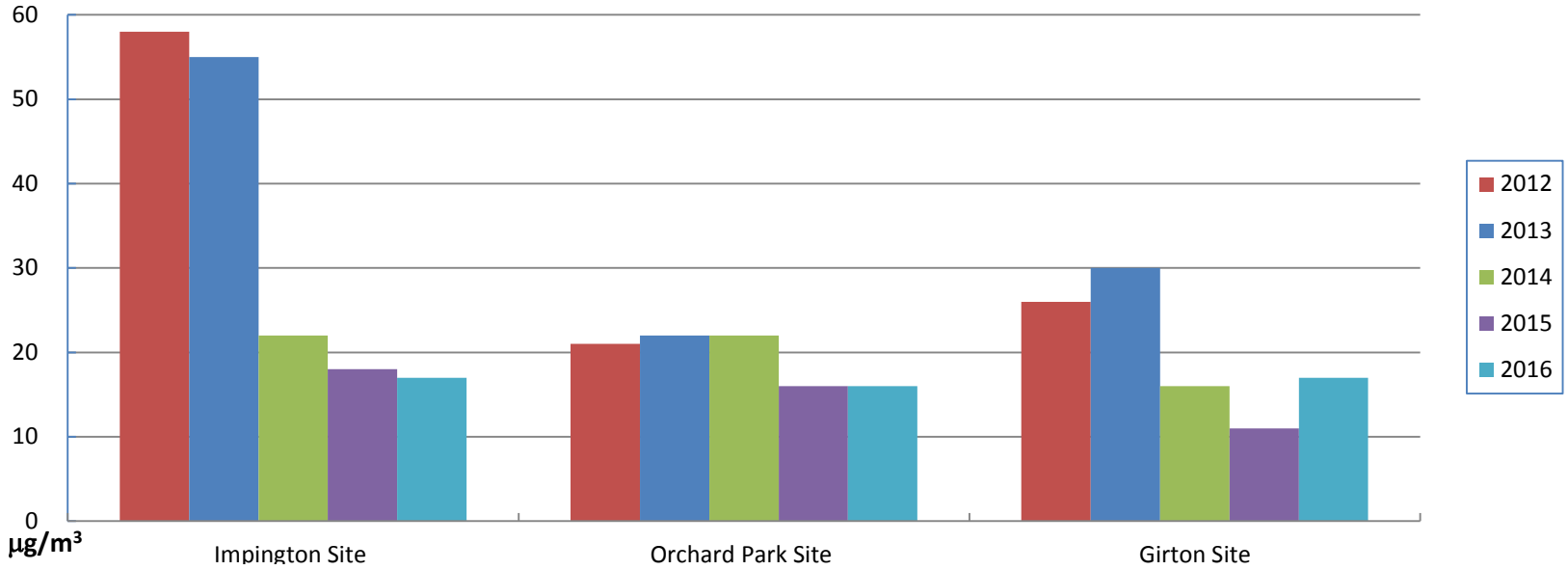


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2012	2013	2014	2015	2016
IMP	Roadside	93	93	**180**	21	4	2	1
ORCH	Urban Background	87	87	4	7	7	1	1
GIRT	Roadside	86	86	16	23	2	1	1

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 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2012	2013	2014	2015	2016
GIRT	Roadside	81	81	13	14	12	11	13

☒ **Annualisation has been conducted where data capture is <75%**

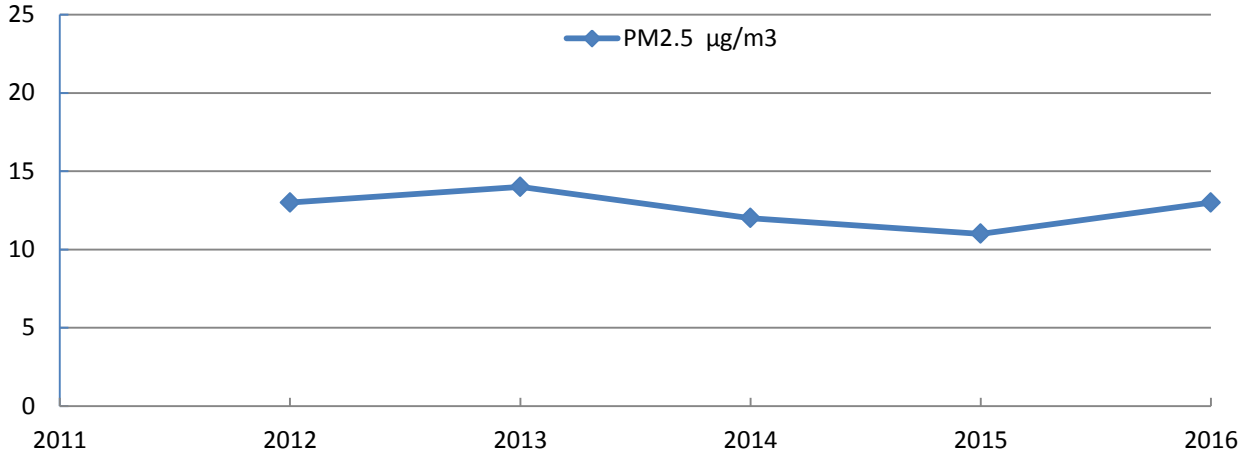
Notes:

(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 Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.3 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2016

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 (0.77) (1)
DT1	30.5	26.5	22.8	17.0	18.6	13.9	17.5	16.5	21.0	**84.2**	30.3	33.7	27.7	21.3
DT2	**52.6**	**42.4**	30.3	32.9	35.6	26.5	30.7	28.1	34.5	30.3	**41.3**	**48.2**	36.1	27.8
DT3	**44.4**	33.6	31.9	35.7	32.7	24.7	**41.1**	30.5	39.8	26.9	**40.7**	**47.5**	35.8	27.6
DT4	**45.7**	23.3	**41.9**	25.8	36.2	26	29.1	26.5	32.6	39.1	34.5	**53.8**	34.5	26.6
DT5	21.4	27	35.4	27.3	35.1	26.1	13	22.8	17.9	36.3	27.4	31.5	26.8	20.6
DT6	**46.8**	**45.1**	**42.3**	35.8	31.4	28.9	18.6	33.3	36.8	30.2	36.4	**48.6**	36.2	27.9
DT7	19.9	24.7	16.5	11.8	9.7	7.2	8.2	11.4	14.4	15.5	14.9	29	15.3	11.8
DT8	**43.3**	**42.2**	39.5	28.6	35.1	27.1	23.7	29.5	33.3	39	**46.9**	**57.6**	37.2	28.6
DT9	35	27.7	25.1	20.8	15.9	11.6	15.6	16	20.5	20.4	29.2	39.9	23.1	17.8
DT10	**47.8**	35.9	30.5	31	**46.6**	12.5	missing	28.9	32.5	23.2	36.1	**48.9**	34.0	26.2
DT11	31.3	34.2	35.8	29.7	29	22	26.9	29	31.9	30.6	**46.7**	**57.5**	33.7	26.0
DT12	31.9	31.3	26.1	21.1	22.6	14.7	17.7	18.2	22.5	21.4	34.9	39.6	25.2	19.4
DT13	35.4	1.6	52.4	20.5	19.8	15.6	14.9	16.6	23.8	23.6	32.3	**43.1**	25.0	19.2
DT14	**49.6**	36.5	**40.2**	32.2	30.1	24.9	28.4	23.6	33.9	28.2	**45.4**	**47.9**	35.1	27.0

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 (0.77) (1)
DT15	38.4	36.7	25.6	22.4	25.1	16.3	19.9	18.4	26.4	24.2	28.3	34.6	26.4	20.3
DT16	36.9	**45.9**	**66.1**	**45**	**69.5**	**48.2**	25.7	**45.4**	39.5	**67.9**	39	**49.1**	**48.2**	37.1
DT17	24.6	**40**	missing	17.6	16.6	12.2	12.3	13	16.1	21.2	26.9	33.3	21.3	16.4
DT18	24.6	30.2	**40.8**	31.1	39.2	31.9	15.5	26.8	25.7	47.3	32.7	30.4	31.4	24.1
DT19	28.7	35	38.7	28.1	30.2	23.2	16.5	23.6	26.6	52.4	36.3	**42.3**	31.8	24.5
DT20	33	31.8	31	27.3	63	15.9	14.9	20.3	22.4	29.5	32.8	38.8	30.1	23.1
DT21	29.1	33.3	30.7	21.3	23.7	16.6	14.9	18.9	22.8	31.3	33.5	**43.1**	26.6	20.5
DT22	37.7	35.4	36.6	27.4	26.5	19.1	15.1	22	22.3	32.5	31.9	**43.2**	29.1	22.4
DT23a	28.5	25.6	28.6	18.2	18.9	14	14.9	missing	17.5	24.8	28.3	34.5	23.1	17.8
DT23b	29.7	28	25.2	19.2	19.4	13.7	14.4	missing	18.5	24.3	29.6	34.3	23.3	17.9
DT23c	28.9	28.3	27.9	18	17.2	12.3	14.5	18.4	20.2	21.5	27.7	35.6	22.5	17.4
DT24	33.6	28.3	28	21.8	24.9	17.5	17.5	18.5	24.6	20.7	32.1	39.5	25.6	19.7
DT25	34.8	33.4	30.5	27.4	26.6	20.4	16.9	23.8	24.7	32.3	34.1	39	28.7	22.1
DT26	36.4	33.9	30.2	20.3	20.6	17.7	18.1	21.9	20.7	28.1	37.3	**42.8**	27.3	21.0
DT27	22.6	19	19.8	11.1	12.1	7.9	10.7	10.8	13.4	15.7	22.8	28.2	16.2	12.5

☒ **National bias adjustment factor used**

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) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

Automatic Monitoring

- QA/QC of automatic monitoring data is carried out by AEA Technology (http://www.aeat.co.uk) now Ricardo – AEA.
- Tri-annual audits of the monitoring stations are carried out by AEA Technology.
- Services of all the three AQ monitoring stations i.e. Impington, Girton and Orchard Park are carried out bi-annually by the equipment suppliers; Enviro - Technology.
- The sites are manually calibrated on a monthly basis by the Local Site Operative. The output from the calibrations is forwarded to AEAT now Ricardo – AEA for QA/QC and ratification purposes.
- South Cambridgeshire District Council is a member of the Calibration Club, operated by AEAT now Ricardo – AEA.
- All NOx analysers are chemiluminescence analysers
- All particulate matter analysers are BAMs. In line with current guidance, BAM data is multiplied by 1.3 to give the gravimetric equivalent.

Non-Automatic Monitoring

- The monitoring of nitrogen dioxide by diffusion tube has been an on-going project since 1995.
- During 2016, NO_2 monitoring was undertaken at 27 sites within the district using passive diffusion tubes. However, the Orchard Park School monitoring site was used as a co-location site with triplicate tubes co-located with the continuous monitor.
- The tubes are supplied and analysed by Environmental Scientifics Group (ESG - formerly Harwell Scientifics), a UKAS accredited laboratory (0322). The tube preparation method is 50% TEA in Acetone and analysis is by desorption with distilled water, with the extract analysed using a segmented flow auto analyser with ultraviolet detection. The exposure periods for the diffusion tubes are those of the UK Nitrogen Dioxide Diffusion Tube Network run by NETCEN which effectively is a four or five week duration. QA/QC procedures are as detailed in the UK NO_2 Diffusion Tube Network Instruction Manual which can be found here.

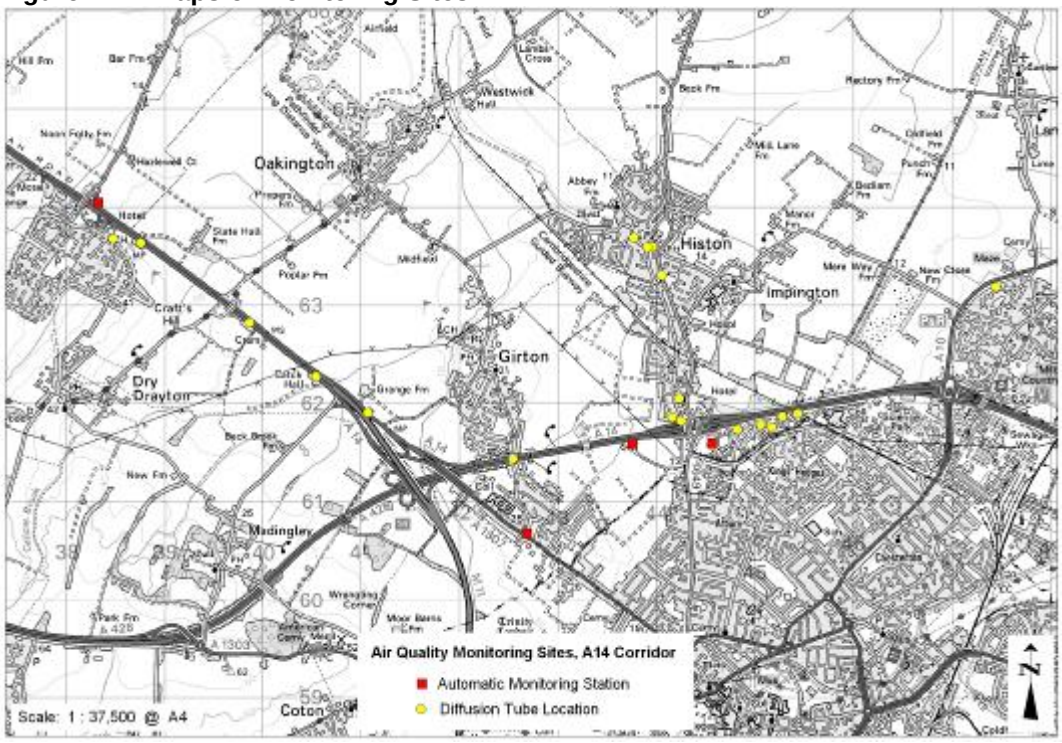
- Data capture for all tube results was sufficient as to not warrant annualisation (i.e. >90%).
- A national bias adjustment factor of 0.77 has been applied to the 2016 diffusion tube results.
- The address of the analysing lab is:

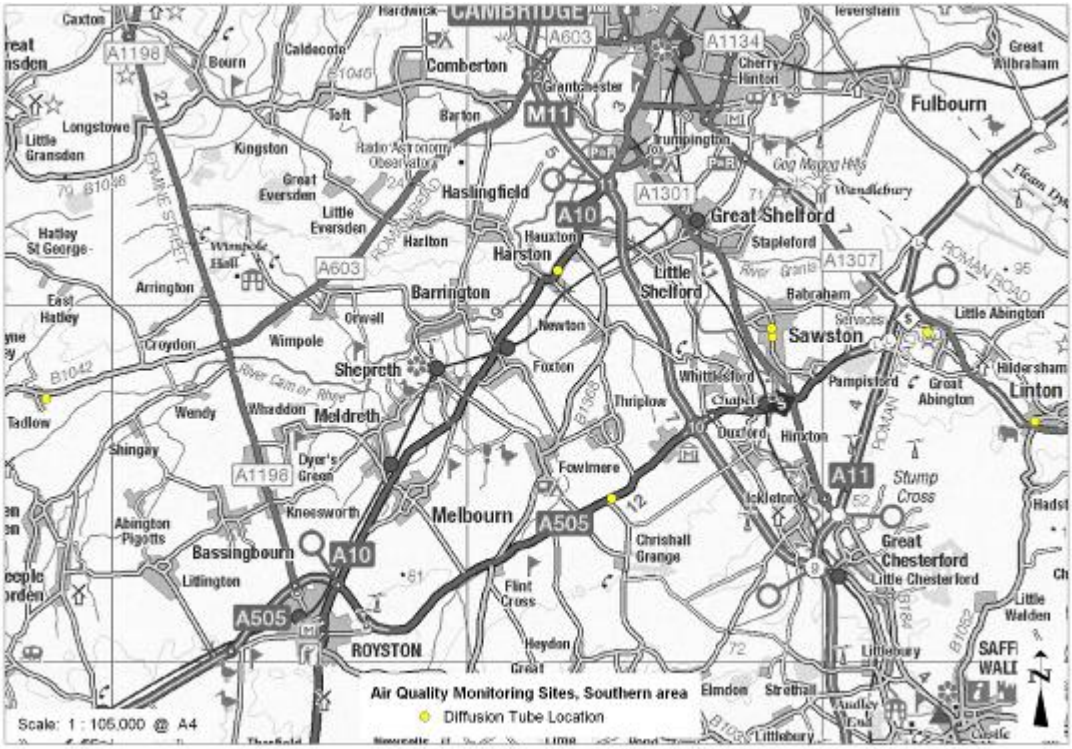
  Environmental Scientifics Group (ESG) Ltd
  12 Moorbrook
  Southmead Industrial Park
  Didcot
  Oxon
  OX11 7HP

- ESG Ltd confirms that the methods and procedures they follow meet the guidelines set out in Defra's "Diffusion Tubes for Ambient Monitoring: Practical Guidance".
- ESG takes part in the WASP Proficiency Scheme. The laboratory performance is rated at the highest level of "good".

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D 1 - Maps of Monitoring Sites





Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[6]	
	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

Table E.3 Summary of previous review and assessment work

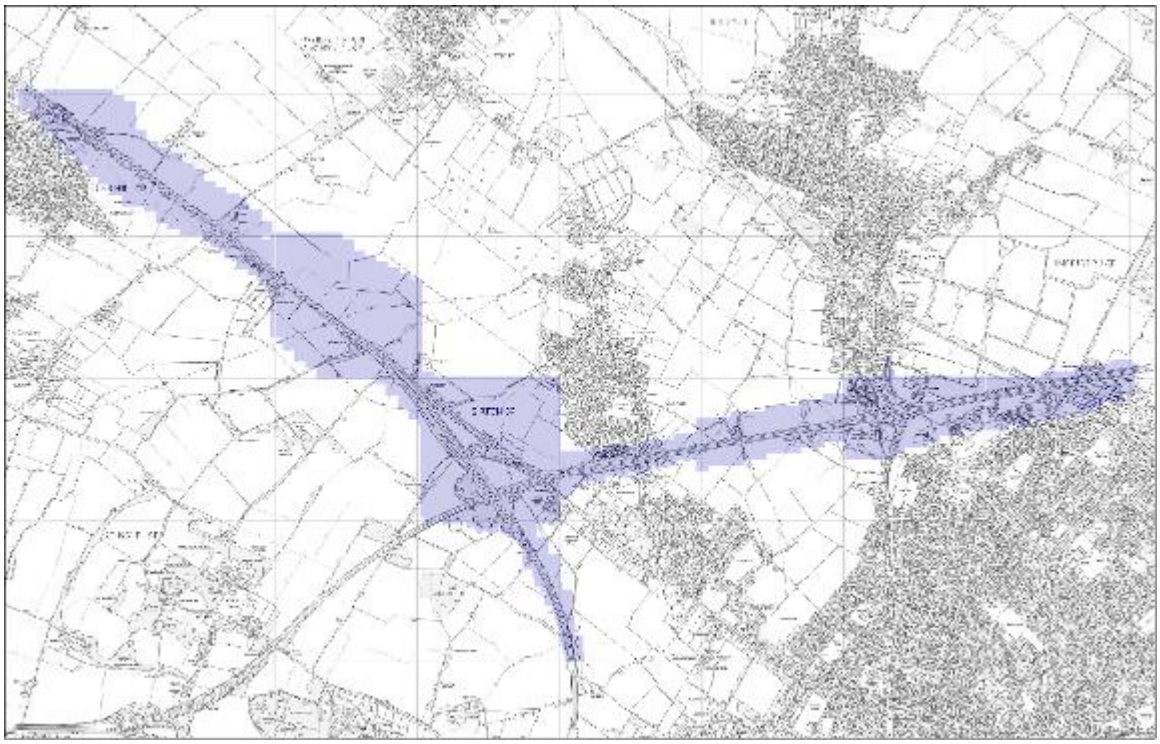
Report	Year	Conclusion
Review and Assessment	1998	The report progress benzene, 1-3 butadiene, lead, carbon monoxide, PM_{10} and nitrogen dioxide to a Stage 2 assessment. The overall conclusion was that all objectives were likely to be met.
Review and Assessment	2000	All objectives likely to be met, however, given the increasing traffic on the A14 and the introduction of new industrial sources, it was concluded that detailed monitoring would be required for nitrogen dioxide, PM_{10} and sulphur dioxide.
Updating and Screening Assessment	2003	Based on monitoring results, it was concluded that all objectives were likely to be met.
Progress Report	2004	Monitoring results were showing exceedances of the annual mean for nitrogen dioxide along a stretch of the A14, therefore a Detailed Assessment was required for NO_2. All other objectives were predicted as likely to be met.
Detailed Assessment of Nitrogen Dioxide Along the A14 Corridor	2006	The annual mean objective for nitrogen dioxide was not likely to be met along the A14 between Bar Hill and Milton; therefore, it was necessary to declare an Air Quality Management Area.
Progress Report	2007	Monitoring results were showing exceedances of the daily mean for PM_{10} along a stretch of the A14, therefore a Detailed Assessment was required for PM_{10}. Monitoring of NO_2 along the A14 continued to show exceedances of the annual mean objective. All other objectives were predicted as likely to be met.
Detailed Assessment of PM_{10} Along the A14	2008	The daily mean objective for PM_{10} was not likely to be met along the A14 between Bar Hill and Milton; therefore, it was

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

Report	Year	Conclusion
Corridor		necessary to declare an Air Quality Management Area.
Progress Report	2008	A Further Assessment of NO_2 and PM_{10} were required. Objectives for all other pollutants were predicted as likely to be met.
Further Assessment of nitrogen dioxide and PM_{10} Along the A14 Corridor	2008	The AQMA for NO_2 and PM_{10} was declared. An Air Quality Action Plan (AQAP) is required and consultation is underway for its development.
Updating and Screening Assessment	2009	Based on the monitoring results from the previous year, it was concluded that levels of NO_2 and PM_{10} along the A14 between Bar Hill and Milton would remain above the national objective. No other significant developments or increases in traffic or industrial emissions were identified.
Air Quality Action Plan	2010	Acceptance of Air Quality Action Plan by Defra. Detailed priority actions to be worked on over the coming years.
Progress Report	2010	Progress made towards improving air quality with improvements to local policy and strategy. No significant local / infrastructure changes.
Progress Report	2011	During 2010, the objectives for nitrogen dioxide were met at all monitoring locations. However, the daily PM_{10} objective was exceeded at the Bar Hill and Impington continuous monitoring stations and the annual mean PM_{10} objective was exceeded at Impington.
Modelling Assessment (not submitted as review and assessment report)	2011	As a result of recent monitoring results and review of the Air Quality Management Area, an air quality assessment was conducted using ADMS-Urban model the air quality along A14. In summary: • The modelling study concluded that there continues to be exceedances of air quality objectives for NO_2 (annual mean) and PM_{10} (daily mean) on both the north and south sides of the A14. • The modelling study shows that, despite current exceedances, all locations will achieve national objectives by 2016. • Depending on future monitoring, it is possible that the AQMA may have to be expanded on the north side of the A14 to incorporate Hill Farm Cottages at Swavesey • If monitoring at all locations on the south side of the A14 continue to indicate that national objectives are being achieved at those locations, the AQMA may be modified so that it only incorporates the north side of the A14 (no exceedances, no need for an AQMA).
Updating and Screening Assessment	2012	No new sources identified for any Detailed Assessment to have been required. However, an NO_2 (annual mean) in excess of the 40 $\mu g/m^3$ objectives was measured at one of the automatic monitoring sites in Bar Hill. There is no exceedance of the NO_2 1-hour mean objective at any of the automatic monitoring stations but an annual mean PM_{10} concentration in excess of the 40 $\mu g/m^3$ objective was measured at the Impington automatic monitoring site. The 50 $\mu g/m^3$ 24-hr mean objective was exceeded 119 times at the same site whilst all the air quality objectives were achieved at other monitoring locations of relevant exposure outside the existing AQMA.
Progress Report	2013	Whilst there are no new sources identified for detailed assessment to be carried out, monitoring data showed exceedances of the daily and annual mean objective for PM_{10} at the Impington monitoring station but this with Nitrogen Dioxide was achieved at the Orchard Park and Girton monitoring stations whilst the NO_2 objectives was also achieved at the Impington site.

Report	Year	Conclusion
Progress Report	2014	There are no new sources identified for detailed assessment to be carried out whilst the daily and annual mean AQ objectives for NO_2 were achieved at Impington, Orchard Park and Girton. It was a similar achievement for the PM_{10} at Girton and Orchard Park but this was exceeded at Impington. Although little attention should be paid to the Impington PM_{10} result due to the low data capture at the site for this year.
Updating and Screening Assessment	2015	The objectives for NO_2 & PM_{10} were met at all the monitoring locations (continuous and passive monitoring). The assessment of new sources did not identify any new sources that have not been considered previously. A detailed assessment of any new sources was not therefore required.
Annual Status Report	2016	The objectives for were met at all the monitoring locations. A detailed assessment of any new sources was not deemed necessary but details regarding enhanced low emission measures were to be outlined within a developers guide to be prepared within 2016.

Figure E 1 Map(s) of AQMA Boundary



The Air Quality Management Area (as pictured above) was initially declared in July 2007 following measured and modelled exceedances of the annual mean objective for nitrogen dioxide. The following year, exceedances of the daily mean objective for PM_{10} were identified at the Bar Hill and Impington continuous monitoring stations. As a result of this, a Detailed Assessment of PM_{10} was carried out. This led to the revocation of the original AQMA and the designation of a 2nd AQMA to include PM_{10}

in July 2008. After discussions with Defra, it was decided that the boundary for the PM_{10} (which was originally slightly smaller than that of the NO_2 AQMA) would be the same as the original boundary for nitrogen dioxide.

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
PM10	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

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