2016 Air Quality Annual Status Report (ASR) for Sandwell Metropolitan Borough Council

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

November 2016

Local Authority Officer	Mary Bottoms / Amanda Clover
Department	Environmental Health
Address	Adult Social Care, Health and Wellbeing Directorate Court House 335-337 High Street West Bromwich West Midlands B70 8LU
Telephone	0121 569 6600
E-mail	EHTS_enquiries@sandwell.gov.uk
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Executive Summary: Air Quality in Our Area

Sandwell Metropolitan Borough Council (SMBC) lies in the heart of the West Midlands, in an area of the UK known as "The Black Country". It is part of the West Midlands Combined Authority (WMCA) sharing full membership with six other authorities; Birmingham, Coventry, Dudley, Solihull, Walsall and Wolverhampton. It is a densely populated area covering approximately 8,600 hectares and approximately 309,000[1] residents.

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

This report presents details on changes in air quality in 2015 and describes measures that Sandwell MBC is currently undertaking to improve air quality now or in the future.

Air Quality in Sandwell

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

[1] 2011 Census

equalities issues, because areas with poor air quality are also often the less affluent areas[2,3].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[4].

Air pollution in Sandwell is an ongoing problem and Sandwell Council declared a borough wide Air Quality Management Area for exceedances of the annual mean Nitrogen Dioxide (NO_2) in 2005. The borough is characterised by large areas of established industry and a complex road network of major arterial roads, including the M5 and M6 motorways, which are amongst the most utilised and congested roads in Europe.

Sandwell MBC maintains an extensive monitoring network and has undertaken 12 months of continuous monitoring at 6 locations and 95 individual diffusion tube locations. In 2015 only 7 of the original 22 exceedance areas continued to exceed the NO_2 objective. However exceedances at these 7 locations are persistent, demonstrating no significant evidence of a downward trend in NO_2 concentrations throughout the previous 5 years.

Sandwell MBC NO_2 Annual Mean Exceedance Areas in 2015	
Area	**Description Of Area**
1	Area between M5, Birmingham Road and Blakeley Hall Road - Oldbury
8	Dudley Road East / Roway Lane (A457), Oldbury
9	Area surrounding the M6/M5, Junctions 7- 8 Great Barr and 1-2 West Bromwich respectively
10	Newton Road / Birmingham Road (A34), Great Barr
11	Bearwood Road, Smethwick
16	All Saints Way / Expressway, West Bromwich
22	Gorsty Hill, Blackheath

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

The following locations which originally exceeded the annual mean NO_2 objective following the declaration of the Air Quality Management Area (AQMA) were compliant with the objectives in 2015:

Area	Areas Compliant with the NO_2 Objective - Description
2	Area to North of the M6 – Yew Tree Estate (Inc. Woodruff Way, Snapdragon Drive and Pimpernel Drive
3	Area to North of M6 Junction 8 – Wilderness Lane and Birmingham Road – Great Barr
4	Area to South of M6 Junction 8 (Inc. Longleat Cl, Ragley Dr and Himley Cl–Great Barr
5	Area to Southeast of M6 Junction 7 (Inc. Scott Rd and Birmingham Rd) - Great Barr
6	Area to Southwest of M6 Junction 7 (Birmingham Road and Hillside Road) – Great Barr
7	Oldbury Ringway / Birmingham Road (A457), Oldbury
12	Oldbury Road / Birmingham Road, Blackheath
13	High Street / Powke Lane, Blackheath
14	Bromford Road (including the Kelvin Way / Brandon Way Junction), West Bromwich
15	Trinity Way / Kenrick Way, West Bromwich
17	All Saints Way / Newton Road, West Bromwich
18	Soho Way / Grove Lane / Cranford Street, Smethwick
19	Horseley Heath, Tipton
20	Sedgley Road East /Dudley Port – Tipton
21	Myvod Road / Wood Green Road – Wednesbury

During 2015 Sandwell Council did not identify any further / new areas of NO_2 exceedance within the borough wide AQMA, however exceedances of the annual mean NO_2 objective remain persistent at a small number of locations. The Council will continue to monitor air quality at key locations to confirm the trends in pollutant concentrations and compliance with published objectives. Monitoring will also inform future revisions of the air quality action plan. Sandwell MBC confirms compliance with the following pollutant objectives: Benzene, 1-3 Butadiene, Sulphur Dioxide, Carbon Monoxide, Particulate Matter (PM_{10}) and Lead. Monitoring for Particulate Matter (PM_{10} and $PM_{2.5}$) will continue to demonstrate whether pollutant concentration continue to decline, as there is currently no acceptable level for particulate matter.

Actions to Improve Air Quality

The principle source of air pollution in Sandwell is a direct result of emissions from the road network (petrol and diesel engines). Exceedances are observed at busy junctions, narrow congested streets and in town centres.

Sandwell MBC published its first air quality action plan (AQAP) in 2009, which focused on a number of key areas:

- Improvements to Urban Traffic Control Systems
- Red routing of major arterial roads through the borough (with associated control of parking to ease congestion) including Bearwood, Blackheath, Great Barr, Oldbury, Smethwick, West Bromwich and Tipton
- Major junction improvements on the A41 Expressway West Bromwich and Burnt Tree Island/Dudley Port in Tipton.
- Major bypass and traffic management works at Blackheath and Cradley Heath
- Investment programmes aimed at easing traffic flows and reducing congestion and improving the efficiency of junctions, signalling and pedestrian crossings in West Bromwich, Bearwood and Blackheath.
- Enhancing conditions for both vehicles and pedestrians using shopping centres and high streets in Bearwood and West Bromwich.
- Promotion of modal shift including walking and cycling.

Since the implementation of the action plan, there was initially a worsening of air quality in 2010/11, but in subsequent years there has been a gradual improvement in NO_2 and Particulate Matter ($PM_{10/2.5}$) concentrations and a reduction in the number of locations which exceed the NO_2 annual mean objective.

At the current time Sandwell MBC acknowledges that the action plan has drawn to the end of its working life, with a significant number of actions now complete or unlikely to be completed due to a range of factors including a lack of evidence for the air quality benefits to support implementation, costs or lack of public/council support.

Sandwell is currently in the process of updating its air quality action plan and is working in partnership with key stakeholders to develop a comprehensive set of

measures with key target outcomes and predicted reduction in pollutant concentrations.

A number of projects have been undertaken to supplement the work of the Air Quality Action Plan and improve the Air Quality in the borough.

- The Low Emissions Towns & Cities Programme (LETCP) is a Defra funded project established in 2011. It is a partnership comprising the seven West Midlands Local Authorities, (Birmingham CC, Coventry CC, Dudley MBC, Sandwell MBC, Solihull MBC, Walsall MBC, Wolverhampton CC) working together to reduce vehicle emissions, through the acceleration of the uptake of cleaner vehicle fuels and technologies. The programme consists of 4 main work streams:

    - The Good Practice Air Quality Planning Guidance – a model approach to integrate air quality considerations into land use planning.
    - The Good Practice Procurement Guidance – how public sector procurement can influence vehicle emissions.
    - The Low Emission Zone Technical Feasibility Study – an investigation into different highway scenarios to determine the suitability for a low emission zone.
    - The West Midlands Low Emission Vehicle Strategy (LEVS) – is currently being finalised and sets out the aims for creating a low emission future. The LEVS will form part of the newly adopted West Midlands Strategic Transport Plan “Movement for Growth”, which will be implemented by the West Midlands Combined Authority (WMCA).
    - All reports produced by the LETCP can be found on the LETCP website: http://cms.walsall.gov.uk/low_emissions_towns_and_cities_programme

- A bespoke Low Emission Strategy technical feasibility study was undertaken at Bearwood Road to determine the best scenario for targeting the high bus emissions which are contributing to the ongoing exceedance of the NO_2 objective. The best strategy would reduce NO_2 concentrations by 15% and

would result in a £57,000 health impact saving. A reduction in particulate matter is also anticipated.

- A small project to install 2 Green Screens / walls at Bearwood Road was completed in 2015. Whilst the air quality improvement from such measures is negligible, the works were part of a much larger scheme to enhance the public realm at this local shopping destination. The screens were an aid to raising awareness of the poor air quality at Bearwood Road and to encourage modal shift.
- Sandwell MBC adopted a new Walking Strategy in September 2015, with the aim of increasing walking uptake, targeting resources and delivering improvements and enhancements to the walking environment, over a five year period.
- Sandwell are currently undertaking a Social Marketing Campaign aimed at reducing the amount of air pollution in selected areas of the borough. The campaign will run for one calendar year June 2016 - June 2017 and will encourage modal shift behavioural change in those that use the car for short journeys, including for work, leisure or the school run. As a secondary objective the project will discourage engine idling and encourage traffic to reroute away from major air pollution hotspots.
- In 2015, following the publication of the LETCP Best Practice Planning Guidance, but prior to full adoption of the Black Country Air Quality Supplementary Planning Document, Sandwell secured planning conditions that require the provision of electric vehicle charging points on 18 developments. These included residential, commercial and industrial developments

Local Priorities and Challenges

The priorities for Sandwell MBC are:

- To improve air quality I order to achieve the national air quality NO_2 annual mean objective across the Borough in the shortest possible timeframe and to maintain and improve PM_{10} and $PM_{2.5}$ concentrations in order to protect human health.
- To develop and publish a new Air Quality Action Plan, which will provide a range of measures to promote alternative and sustainable travel, achieve compliance with the annual mean NO_2 air quality objective and reduce particulate matter concentrations as much as practicably possible. The plan should also reduce transport emissions, reduce emissions associated with new development, raise air quality awareness and work in partnership with key stakeholders to improve air quality.
- To fully participate in the West Midlands Combined Authority to achieve air quality improvements across the region. (The West Midlands Combined Authority (WMCA) replaced the Integrated Transport Authority (ITA) and Centro/Passenger Transport Executive (PTE) from 1st June 2016).
- To continue to monitor for NO_2, PM_{10} and $PM_{2.5}$ to enable the prioritisation of resources and focus attention on the most relevant locations for air quality improvements.
- To implement the Black Country Air Quality SPD and to assess all planning applications in accordance with the guidance to ensure all development is sustainable in terms of air quality.
- To promote the uptake of alternative sustainable travel methods, including cleaner vehicle technologies through a range of measures to be included within the new air quality action plan.
- To work with the West Midlands Combined Authority (WMCA) and relevant stakeholders to deliver measures to improve Air Quality.

How to Get Involved

There is a wide range of information available to encourage the general public to use different modes of travel in order to improve air quality and improve health. For example:-

- Sandwell Council's Travelwise page provides information on making journeys by low carbon and healthy methods of transport, such as cycling, walking, public transport and car sharing. There is also travel related assistance for businesses and schools, and information for people and organisations making planning applications. http://www.sandwell.gov.uk/info/200284/roads_travel_and_parking/1830/travelwise_in_sandwell

- West Midlands Combined Authority (WMCA) has been granted a sustainable transport fund called 'Smart Network, Smart Choices' to increase walking, cycling and public transport within the West Midlands. Further information can be found at: http://centro.org.uk/sustainability/sustainable-travel/ http://centro.org.uk/transport/cycling-and-walking/

- Walking helps to reduce the risk of disease, to lose weight, and to live longer. It can also save money by being the cheapest way of getting from place to place. Sandwell MBC published its updated Walking Strategy in 2015 to promote walking, target resources and deliver improvements and enhancements to the walking environment, over a five year period. Further information can be found at http://www.sandwell.gov.uk/info/200222/healthy_sandwell_healthy_you/3250/sandwell_walking_strategy

- Sandwell Council is currently in the process of updating its air quality action plan, to incorporate new measures to improve air quality within Sandwell. As part of the development of the action plan, a full public consultation will be undertaken in early 2017 (yet to be confirmed). Please visit www.sandwell.gov.uk for further details regarding the consultation dates.

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1 Local Air Quality Management

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

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

In 2003, Sandwell MBC declared 6 individual AQMAs for exceedances of the Annual Mean Nitrogen Dioxide (NO_2) objective, listed as Areas 1 – 6 in Table 2.2. Further Review and Assessment work subsequently identified 10 new areas (Areas 7-16 in Table 2.2) which exceeded the objective. In 2005 the 6 original AQMA declarations were revoked and replaced with a single borough wide declaration for exceedances of the NO_2 annual mean objective, with road traffic the primary source of emissions.

Sandwell MBC's AQMA order and boundary can be viewed online at:

http://www.sandwell.gov.uk/downloads/file/768/air_quality_management_area_designation_order_2005

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Sandwell AQMA Order 2005	NO_2 Annual Mean	Borough wide	Borough wide Designation	Sandwell Air Quality Action Plan 2009 View online at: http://www.sandwell.gov.uk/downloads/file/760/air_quality_action_plan_2009

Since 2005 a further 5 areas have been identified as exceeding the NO_2 annual mean objective and were included in list of exceedance areas (Areas 17-21)

Table 2.2 Locations of Nitrogen Dioxide Annual Mean Exceedance in SMBC.

Sandwell MBC Nitrogen Dioxide Annual Mean Exceedance Areas	
Area	**Description Of Area**
1	Area between M5, Birmingham Road and Blakeley Hall Road - Oldbury
2	Area to North of the M6 – Yew Tree Estate (including Woodruff Way, Snapdragon Drive and Pimpernel Drive
3	Area to North of M6 Junction 8 – Wilderness Lane and Birmingham Road – Great Barr
4	Area to South of M6 Junction 8 (Including Longleat Close, Ragley Drive and Himley Close –Great Barr
5	Area to Southeast of M6 Junction 7 (including Scott Road and Birmingham Road) - Great Barr
6	Area to Southwest of M6 Junction 7 (including Birmingham Road and Hillside Road) – Great Barr
7	Oldbury Ringway / Birmingham Road (A457), Oldbury
8	Dudley Road East / Roway Lane (A457), Oldbury
9	Area surrounding the M6/M5, Junctions 7- 8 Great Barr and 1-2 West Bromwich respectively
10	Newton Road / Birmingham Road (A34), Great Barr
11	Bearwood Road, Smethwick
12	Oldbury Road / Birmingham Road, Blackheath
13	High Street / Powke Lane, Blackheath
14	Bromford Road (including the Kelvin Way / Brandon Way Junction), West Bromwich
15	Trinity Way / Kenrick Way, West Bromwich
16	All Saints Way / Expressway, West Bromwich
17	All Saints Way / Newton Road, West Bromwich
18	Soho Way / Grove Lane / Cranford Street, Smethwick
19	Horseley Heath, Tipton
20	Sedgley Road East /Dudley Port – Tipton
21	Myvod Road / Wood Green Road – Wednesbury
22	Gorsty Hill, Blackheath

Sandwell MBC published its Air Quality Action Plan (AQAP) in September 2009 in order to discharge its obligations under Part IV of the Environment Act 1995. The action plan detailed how the Council intended to improve air quality within the Air

Quality Management Area. The AQAP has been subject to regular review (as part of the LAQM reporting process) however the document is currently at the end of its working life, with a significant number of actions now completed or unlikely due to a range of factors including lack of evidence for the air quality benefits to support implementation, funding, lack of Council / Stakeholder support.

Sandwell is currently in the process of developing a new air quality action plan and is working in partnership with key stakeholders to develop a comprehensive set of measures to include key target outcomes and where appropriate, predicted reductions in pollutant concentrations. A final draft of the document will be completed in the first half of 2017 and will be subject to full public and stakeholder consultation prior to publication in 2017. A full review of the action plan will be included within the 2017 ASR.

The 2009 Action Plan can be found at:

http://www.sandwell.gov.uk/downloads/file/760/air_quality_action_plan_2009

Further details regarding the consultation on Sandwell MBC's new Air Quality Action Plan will be made available at:

http://www.sandwell.gov.uk

2.2 Progress and Impact of Measures to address Air Quality in Sandwell Metropolitan Borough

Sandwell MBC has taken forward a number of measures during 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.3. The table of measures has been taken from the 2009 action plan; however the majority of actions have been completed or are no longer feasible, but have been included for the purposes of completeness. More detail on these measures can be found in their respective Air Quality Action Plan and the West Midlands Combined Authority Strategic Transport Plan "Movement For Growth". Additional measures which are not included within any published documents have also been detailed below for completeness:

Key completed measures are:

- The Black Country Air Quality SPD has been developed in order to clarify the air quality position within the Black Country Core Strategy following the publication of the Low Emission Towns and Cities Best Practice Planning Guidance for the West Midlands. The SPD is scheduled for adoption by Sandwell MBC in October 2016. The principle aim of the SPD is to ensure all new development is sustainable in terms of air quality and where appropriate, secures mitigation measures that should be incorporated into developments. Mitigation requirements range from Electric Vehicle charging points at minor developments to a full Low Emission Strategy (in scale and kind) at Major developments.
- Bearwood Road traffic survey and emission source apportionment study (using ANPR) to investigate vehicle fleet makeup, test LETCP LEZ Feasibility projections for Bearwood Road, and to understand the age and type of heavy duty vehicles (particularly buses) using the street canyon.
- A follow on bespoke Low Emission Strategy technical feasibility study was undertaken at Bearwood Road in order to understand current NO_2 exceedance boundaries and to forecast the air quality impacts and improvements from a range of low emission strategies and scenarios. The primary source of emissions at Bearwood Road is from a significantly aging

bus fleet (Euro III and older) which contribute 57% of nitrogen oxides (NO_x) and 32% of particulate emissions despite only totalling 6% of the vehicle flow. The assessment concluded that the NO_2 objectives would be met if all buses attained Euro VI standard by 2020. A full cost benefit analysis was undertaken resulting in a health impact saving of £57,000 (in present values) in Bearwood Rd alone, with a modelled annual mean NO_2 concentration reduction of 15%. A reduction in PM_{10} and $PM_{2.5}$ would also reduce human health exposure. Findings were used to influence prioritisation of key bus routes and areas in the 'West Midlands Combined Authority Low emission bus strategy' (where buses were known to be a major contributor) for accelerated bus replacement / upgrading.

- Sandwell Council conducted two electric vehicle experience days, where council employees could attend a presentation on owning an electric vehicle, which included a short test drive of an electric car. The event was well attended; however there were no financial incentives offered should employees wish to purchase an electric vehicle.
- A six week electric van trial was conducted within the council. Various staff and departments were able to trial the vehicle to see whether it would be a suitable replacement. Feedback was extremely positive, with many citing how the vehicle's range was sufficient for the working day.
- Sandwell MBC's work based employee car ownership scheme 'Tusker' undertook a promotional month for electric vehicles with incentives for take up of electric vehicles through their salary sacrifice scheme.
- A small project to install 2 Green Screens / walls at Bearwood Road was completed in 2015. Whilst the air quality improvement from such measures is negligible, the works were part of a much larger scheme to enhance the public realm at this local shopping destination. The screens were an aid to raising awareness of the poor air quality at Bearwood Road.
- Sandwell MBC adopted a new Walking Strategy in September 2015, with the aim of increasing walking uptake, targeting resources and delivering improvements and enhancements to the walking environment, over a five year period.

- Sandwell MBC's Public Health department in conjunction with Environmental Health are currently undertaking a Social Marketing Campaign aimed at reducing the amount of air pollution in selected areas of the borough. The campaign will run for one calendar year June 2016- June 2017 and will encourage modal shift behavioural change in those that use the car for short journeys, including for work, leisure or the school run. As a secondary objective the project will discourage engine idling and encourage traffic to reroute away from major air pollution hotspots. The project will include the following:
    - Undertake insight work to determine current transport behaviours, understanding of air pollution/engine idling and alternative transport options and identify motivations and barriers to leaving the car at home.
    - Develop a campaign message and concept to raise awareness of poor air quality and encourage modal shift behavioural change.
    - Implement the campaign.
    - Develop a baseline evaluate framework to determine the success of the campaign.
- In 2015 following the publication of the LETCP Best Practice Planning Guidance, but prior to full adoption of the Black Country Air Quality SPD Sandwell secured planning conditions that require the provision of electric vehicle charging points on 18 developments. These included residential, commercial and industrial developments

Key Outcomes of the above measures:

- Improved air quality sustainability at new developments
- Improved awareness and access to alternative vehicle technologies
- Improved awareness of poor air quality and measures residents can take to improve air quality.
- An improvement in the health and fitness of the residents of Sandwell due to increased walking and cycling and improved air quality.
- Detailed understanding of key emission sources at Bearwood Road and identification of appropriate low emission strategy to secure compliance with air quality objectives.

Sandwell MBC expects the following measures to be completed over the course of the next reporting year:

- Development, consultation and publication of Sandwell MBC's air quality action plan.
- Adoption and full implementation of the Black Country Air Quality SPD.
- The upgrading of traffic signals, road markings and pedestrian routes at Bearwood Road, Smethwick. Bearwood Road suffers from high NO_2 concentrations as a direct result of congestion and a high percentage of bus emissions. The new upgrading works will improve traffic flow, reducing queueing traffic, congestion and improve safety. The works are scheduled for completion by the end of 2016 and will promote walking and cycling at Bearwood Road, a local shopping destination. The measures should reduce levels of NO_2 along Bearwood Rd, currently designated as a street canyon.

Sandwell MBC's priorities for the coming year are:

- Identify new measures to improve air quality at site specific locations and borough wide initiatives, which will benefit the air quality in the region.
- Develop, consult and publish a new air quality action plan with a range of measures including the promotion and uptake of alternative technologies, modal shift, low emission transport, low emission plant, traffic management, transport planning and infrastructure.
- Ensure the Black Country Air Quality SPD is fully adopted and implemented, with appropriate air quality mitigation conditions attached to all relevant planning permissions to ensure all new development is deemed sustainable in terms of air quality.
- Work effectively with the West Midlands Combined Authority and the strategic transport authority to deliver measures to improve Air Quality.
- The publication of the Low Emissions Towns and Cities, Low Emission Vehicle Strategy.
- Identify key areas of exceedance within Sandwell and undertake initial scoping exercise to determine the most appropriate course of action to improve air

quality. The model used at Bearwood Road, will be considered as a template for existing exceedance areas. Where appropriate, a detailed source apportionment study (ANPR) and subsequent low emission strategy feasibility study will be undertaken.

Table 2.3 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
Birmingham Road / Oldbury Ringway (A457) Oldbury											
1	The council will consider the possible relocation of existing residential properties	Sandwell Metropolitan Borough Council (SMBC) Planning / Housing N/A	N/A	N/A	Not Completed	Not Completed – Measure not supported by Council	N/A	No emission reduction achievable, would remove identified receptors	Action not supported by Sandwell Council, no funding available	Unlikely to be completed	
2	Birmingham Road (A457) Oldbury - Red Route treatment including the control of parking to ease congestion.	Sandwell MBC Transportation (LTP Commitment)	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2010	Completed Early 2011	Reduction In Recorded NO_2 and PM_{10} Concentrations	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	N/A	6% Reduction in NO_2 concentrations since 2009. Exceedance of objective remains at this location
Dudley Road East / Roway Lane, Oldbury											
3	Dudley Road East /Roway Lane Oldbury - Red Route treatment including the control of parking to ease congestion.	Sandwell MBC Transportation (LTP Commitment)	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2010	Completed 2011	Reduction In Recorded NO_2 and PM_{10} Concentrations	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	N/A	Approximate 8% Reduction in NO_2 concentrations since 2011. Exceedance of objective remains at junction of Dudley Rd East and Roway Lane

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
M5 J1-J2, Oldbury & West Bromwich & M6 J7-J8/M5, Great Barr & Yew Tree											
4	Improvements to traffic flow on M6 through implementing a programme to reduce incident response times to 20 minutes (from 60 minutes) 24 hours a day, seven days a week	Highways Agency	Traffic Management	UTC, Congestion management, traffic reduction	Completed	Completed 2011	Reduction in Incident Response Time	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations in adjacent locations	Ongoing monitoring to determine potential improvements in NO2 and PM10 Concentration	Completed	Incident Response currently meeting target.
5	An improved system of contingency planning for the motorway network to improve traffic flows	Highways Agency and Sandwell MBC	Traffic Management	UTC, Congestion management, traffic reduction	Completed	Completed - Contingency Planning for Motorway network has been implemented.	Improved planning - Regular review of procedures and policies	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations at adjacent locations	Contingency Planning for Motorway network has been implemented	Completed	Overall marginal improvements in NO_2/PM_{10} concentrations anticipated
6	Evaluate the suitability of active traffic management to improve traffic flows on the M6	Highways Agency (HA)	Traffic Management	UTC, Congestion management, traffic reduction	Completed	Completed 2014	Improved Traffic Flows and Emission Reduction	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations at adjacent locations	Ongoing Active Traffic Management and evaluation of pollutant concentrations	Completed	Overall marginal improvements in NO_2/PM_{10} concentrations anticipated
7	A planned link between the M54 and the M6 / M6 Toll this will relieve congestion on the M6 Junction 8 to 10A.	Highways England	Transport Planning and Infrastructure	Other		June 2013 Spending Review and December 2013 National Infrastructure Plan both confirmed Government's intention to implement project.	Improved Traffic Flows and Emission Reduction	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations at adjacent locations to existing motorway network	Government confirmed intention to the implement project. Public Consultation on 3 route options Dec14-Jan15. Awaiting further confirmation	Unknown	Reduction in pollutant emissions

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
8	Ramp metering of junctions (M5 (J1 + 2) and M6 (J11 +16))	Highways England	Traffic Management	UTC, Congestion management, traffic reduction	Completed	Completed 2009	Improved Traffic Flows and Emission Reduction	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations at adjacent locations to existing motorway network	Ongoing Active Traffic Management and evaluation of pollutant concentrations	Complete	Limited monitoring locations. Reductions in NO_2 range between 1-30%. However monitoring locations primarily affected by local road network. Exceedances remain at a number of locations.
Newton Road / Birmingham Road (A34) Great Barr											
9	Route 51 improvements – improve traffic flows and reduce queue lengths. Includes red route treatment, road improvements, traffic control systems and Bus Service improvements (bus showcase)	SMBC Transportation (LTP commitment)	Traffic Management	UTC, Congestion management, traffic reduction	Completed	2009-2010	Improved Traffic Flows and Emission Reduction	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Completed Continued evaluation of impact on Air Quality	Completed 2010	No meaningful reduction in NO_2 concentrations observed along Newton Road / Birmingham Road.
10	Metro Extension (Phase 2 Varsity North)	CENTRO and Sandwell MBC Transportation	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Currently awaiting a final decision on feasibility	Unknown	New route introduced and increase in patronage.	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Limited Progress	Unknown	

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
Bearwood Road, Smethwick											
11	Bus Showcase - Upgrade bus infrastructure to improve patron experience and patronage.	CENTRO and Sandwell MBC Transportation	Transport Planning and Infrastructure	Bus route improvements	Completed	Completed 2009	Increased bus patronage	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Completed Continued evaluation of impact on Air Quality	Completed 2009	Reductions in NO_2 along Bearwood Rd range between 0.5 - 10%. However significant exceedances remain and there is significant variation year. Direct Improvements associated with this measure are negligible
12	Future Metro Phase 2 - Birmingham West Route along Hagley Road West	CENTRO	Transport Planning and Infrastructure	Public transport improvements -interchanges stations and services	Currently awaiting a final decision on feasibility	Unknown	New route introduced and increase in patronage.	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Limited Progress	Unknown	
13	Red route along Hagley Road	Sandwell MBC Transportation	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2010	Completed 2011	Reduction In Recorded NO_2 and PM_{10} Concentrations	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	N/A	Currently no monitoring undertaken at this location

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
Oldbury Road / Birmingham Road, Blackheath											
14	Blackheath Bypass was completed in 2006, implementation of traffic management scheme to maximise use of the bypass. Potential 40% reduction may be achieved	Sandwell MBC Transportation	Transport Planning and Infrastructure	Other	Completed	Completed 2006	Reduction in vehicles in Town Centre	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	Completed 2006	16% Reduction in NO_2 concentrations since 2006 observed in Town centre.
15	Close roads in Blackheath town centre for "In Town Without my Car Day Encourage alternative travel methods.	Sandwell MBC Transportation	Promoting Travel Alternatives	Other	Suspended	Suspended	N/A	N/A	Suspended	N/A	-
High Street / Powke Lane, Blackheath											
16	Red Route Treatment	Sandwell MBC Transportation	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2011	Completed 2012	Completed Continued evaluation of impact on air quality	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	Completed 2012	5% Reduction in NO_2 concentrations since 2012, however significant exceedances remain at the junction of High St and Powke Lane

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
Bromford Road (including the Kelvin Way / Brandon Way junction), West Bromwich											
17	Red Route Treatment	Sandwell MBC Transportation	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2011	Completed 2012	Completed Continued evaluation of impact on air quality	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	Completed 2012	Negligible improvement on Bromford Rd. A 5% reduction since 2012 observed at the junction of Bromford Rd ad Kelvin Way
Trinity Way / Kenrick Way, West Bromwich											
18	Red Route Treatment	Sandwell MBC Transportation	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2011	Completed 2012	Completed Continued evaluation of impact on air quality	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	Completed 2012	Approximately 8% Reduction in NO_2 concentrations since 2012.
All Saints Way / Expressway, West Bromwich											
19	Junction improvements will provide a vehicle underpass along the line of A41 beneath the existing roundabout. The junction will also have bus priority measures	SMBC Transportation (LTP commitment	Transport Planning and Infrastructure	Other	Completed 2010	Completed 2012	Completed Continued evaluation of impact on air quality	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	Completed 2012	Limited monitoring locations. One location on All Saints Way has recorded a 13% improvement. Whilst monitoring at the junction has recorded a 15% increase in NO_2 since 2012
20	Red Route Treatment	Sandwell MBC Transportation	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2011	Completed 2011	Completed Continued evaluation of impact on air quality	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing Monitoring	Completed 2011	Approximate 12% Reduction in NO_2 2009-2015.

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
Sedgley Road East / Dudley Port, Tipton											
21	Red Route Treatment	Sandwell MBC Transportation	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2011 – Red Route will not be implemented	N/A	N/A	N/A	N/A	Not to be taken forward	N/A
Soho Way/Grove Lane / Cranford Street, Smethwick											
22	Red Route Treatment	Sandwell MBC Transportation	Traffic Management	UTC, Congestion management, traffic reduction	Completed 2011 – Red Route will not be implemented	N/A	N/A	N/A	N/A	Not to be taken forward	N/A
Borough Wide - Reducing Vehicle Emissions											
23	Improve the council fleet by New SMBC vehicles purchased are to Euro 4 standard Monthly fuel reports are produced and regular user group meetings held to try and improve efficiency	Sandwell MBC	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Completed	Ongoing	Improved Vehicle Fleet Makeup	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing - Monthly fuel reports and progress/ improvement meetings	Ongoing	Overall reduction in vehicle emissions
24	Promote Eco-Driving – develop promotional strategy to encourage drivers to drive economically	SMBC Transportation & Environmental Protection	Public Information	Other	Limited Resources	Limited Resources			Limited Progress	Ongoing	Reduction in vehicle emissions

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
25	Develop strategy to encourage drivers not to allow their engines to idle when parked	SMBC Transportation & Environmental Protection	Traffic Management	Anti – Idling Enforcement	Limited Resources	Limited Resources			Limited Progress	Ongoing	Reduction in vehicle emissions
26	Establish a programme of vehicle emission testing	SMBC Transportation & Environmental Protection	Traffic Management	Vehicle Emission Testing	Suspended	Suspended due to lack of funding	-	-	-	-	-
Improving Public Transport to Reduce Traffic Volumes											
27	Showcase route extension and improvements (not all route funding secured)	CENTRO and Sandwell MBC Transportation	Transport Planning and Infrastructure	Bus route improvements	Completed	Completed 2009	Increased bus patronage	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Completed Continued evaluation of impact on Air Quality	Completed 2009	Overall marginal improvements in NO_2/PM_{10} concentrations anticipated
28	Improvements of branding to increase attractiveness of public transport	Travel West Midlands / CENTRO (LTP commitment)	Promoting Travel Alternatives	Other	Ongoing	Ongoing	Increased Public Transport patronage	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing programme of brand improvement and public awareness, including Safer Network, Improved connections Signage and ease of access.	Ongoing	-

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
29	Improving access to information regarding transport options	Sandwell MBC Transportation /CENTRO	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	Ongoing	Ongoing	Increased Public Transport patronage	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing promotion of branding and services available.	Ongoing programme of brand improvement and public awareness, including Safer Network, Improved connections Signage and ease of access.	Ongoing
30	Promote Midland Metro extension (Wednesbury to Brierley Hill)	West Midlands Combined Authority (WMCA), Black Country Executive Joint Committee	Alternatives to private vehicle use	Other	2016	2022/23 Monitor development schedule	WMCA Strategic Transport Plan Monitoring Process Customer Satisfaction, Travel Demand and Modal Share. Performance indicators http://www.wmita.org.uk/strategy-andpublications.aspx Ref. Customer 3 Annual data from Passenger Focus Survey.	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Still in the planning stages to secure funding.	2023/24	The proposed scheme runs for approx seven miles from the existing line at Wednesbury to Great Bridge. Encourage modal shift to a less polluting travel mode. Could cause some congestion depending on route across busy roads

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
31	Future Metro Phase 2 – 5W's. Wednesbury to Walsall Varity North – A34 Birmingham to M6 Junction 7 Birmingham West – Birmingham to Quinton.	West Midlands Combined Authority (WMCA), Black Country Executive Joint Committee	Alternatives to private vehicle use	Other	Suspended	Suspended		Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Project is unlikely to progress, the Combine Authority/Centro are proposing alternative Metro Links	Suspended	Encourage modal shift to a less polluting travel mode. Could cause some congestion depending on route across busy roads
Improving Public Transport to Reduce Traffic Volumes											
32	Increased bus lane enforcement (increase number of cameras on buses for bus lane enforcement)	Travel West Midlands	Traffic Management	Other	Completed	Ongoing	Increased Enforcement Actions	Marginal Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Limited Progress within Sandwell, however there are only a small number of bus lanes Bus Lane Enforcement has been implemented in Birmingham and Wolverhampton in 2013 however this has a limited impact in Sandwell	Ongoing	Marginal improvement in emissions due to improved bus journeys.
Improving the Road Network to Reduce Congestion											
33	Improvement of Urban Traffic Control Systems designed to reduce congestion	West Midlands Combined Authority (WMCA),	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	Ongoing	Reduced Congestion	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing, use of the Urban Traffic Control. Potential opportunity for further expansion	Ongoing	Potential reduction at locations where traffic control systems are in place.

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
34	Burnt Tree Junction improvements	SMBC / Dudley MBC Transportation (LTP priority	Transport Planning and Infrastructure	Other	Complete	Completed 2011	Reduced Congestion, queue length and reduced trip times	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Completed 2011, Ongoing air quality monitoring	Completed	Reduced trip times and queue lengths observed. Marginal improvements in air quality
35	Owen Street crossing	SMBC MBC Transportation	Transport Planning and Infrastructure	Other	Complete	Completed 2012	Reduced Congestion, queue length and reduced trip times	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Completed 2011, Ongoing air quality monitoring	Completed	Reduced trip times, reduction in pollutant concentration on Owen Street
36	Cradley Heath Bypass	SMBC MBC Transportation	Transport Planning and Infrastructure	Other	Complete	Completed 2007	Reduced Congestion, queue length and reduced trip times	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Completed 2007, Ongoing air quality monitoring	Completed	Reduced trip times, 11% Reduction in NO2 concentrations which are significantly below objective.
Using Area Planning Methods to Reduce Traffic Volumes and Exposure											
37	Ensure AQ considerations are included in the new Local Development Framework Ensure policies seek to reduce the need to travel and promote the use of modes other than the car	SMBC / Low Emission Towns and Cities Programme, West Midlands Authorities	Policy Guidance and Development Control	Policy Guidance and Development Control Sustainable Procurement Guidance	Complete	From September 2014 On going	Improve vehicle fleet emission	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Publication of Procurement and Planning Guidance and implementation intended across the West Midlands Metropolitan Authorities in September 2014	On going	Procurement policies to influence a reduction in road transport emissions Guidance published; See http://cms.walsall.gov.uk/low_emissions_towns_and_cities_programme

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
38	Black Country Air Quality Supplementary Planning Document,	SMBC and Black Country Authorities (Dudley, Walsall and Wolverhampton	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Complete	On going	To update the Black Country Core Strategy to allow implementation of the West Midlands Low Emissions Towns and Cities Air Quality Planning Guidance	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Summary of consultation response complete and report to go to Cabinet October 2016	Adoption of the document October 2016, Ongoing implementation	To protect and enhance air quality through development
39	Section 106 – Investigate the practicability of S106 agreements being used to secure monitoring funding and balancing measures in applications where AQ is an issue	SMBC Planning & Environmental Protection	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Complete	Ongoing	Implementation of guidance and appropriate air quality conditions attached to planning permissions.	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	LETCP Planning Guidance / Black Country SPD state all new development will be required to contribute to offsetting emission creep, plus larger contributions if significant new sources are introduced.	Adoption of the document October 2016, Ongoing implementation	To protect and enhance air quality through development
40	AQ guidance Provide guidance in relation to air quality for developers to follow when submitting planning applications	SMBC / Low Emission Towns and Cities Programme, West Midlands Authorities	Policy Guidance and Development Control	Policy Guidance and Development Control Sustainable Procurement Guidance	Complete	From September 2014 On going	Improve vehicle fleet emission	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Publication of Procurement and Planning Guidance and implementation intended across the West Midlands Metropolitan Authorities in September 2014	On going	Procurement policies to influence a reduction in road transport emissions Guidance published; See http://cms.walsall.gov.uk/low_emissions_towns_and_cities_programme

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
41	Support use (reopening) of Stourbridge – Walsall line for rail freight	SMBC / West Midlands Combined Authority (WMCA),	Freight and Delivery Management	Other	2013	Proposed West Midlands Strategic Freight Corridor Stourbridge to Walsall	Metropolitan Freight Strategy will provide the strategic framework to prioritise and coordinate investment in schemes, actions and initiatives which will enhance freight movements by all modes in order to meet LTP3 Key Objectives(now finished), new KPI to be confirmed. Performance indicators http://www.wmita.org.uk/strategy-andpublications.aspx	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	West Midlands Combined Authority (WMCA), are to refresh the Freight Strategy in 2016	April 2019	Objectives – KO1 Supporting Sustainable Economic Growth, KO2 Reducing Carbon Emissions, KO5 Quality of Life and Local Environment http://www.wmita.org.uk/media/1338/freightstrategy.pdf

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
42	Congestion charging – the council will continue to monitor the implications and effectiveness of any congestion charging proposals	SMBC /LETCP / West Midlands Authorities	Promoting Low Emission Transport	Low Emission Zone (LEZ)	Completed	Congestion Charging will not be implemented in Sandwell at the current time.	Implementation of Congestion Charging zones	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	West Midlands Low Emission Zone Feasibility study completed. incorporating a variety of locations and scenarios. / Bearwood Rd LES Feasibility	Unlikely to be implemented	Congestion charging in Sandwell is not considered viable at the current time. Alternative Low Emission Strategies have been identified
Using Area Planning Methods to Reduce Traffic Volumes and Exposure											
43	Development Control – continue to consider air quality issues for new planning applications in line with the agreed planning protocol	SMBC	Policy Guidance and Development Control	Policy Guidance and Development Control Sustainable Procurement Guidance	Complete	Ongoing	Number of planning application with appropriate air quality conditions	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Black Country Air Quality SPD is awaiting final Approval. LETCP Planning Guidance Implemented. All planning applications are considered in relation to both documents.	Adoption of the document Black Country Air Quality SPD October 2016, Ongoing implementation	All planning applications assessed against SPD and Planning Guidance

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
Changing Levels of Travel Demand / Promotion of Alternative Modes of Transport											
44	Promotion of Walking	SMBC	Promoting Travel Alternatives	Promotion of walking	Complete	Complete 2015 / Ongoing	Increased uptake of walking for key journeys. Sandwell Travel surveys	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Sandwell MBC Walking Strategy published in 2015. Sandwell Travelwise website updated to promote alternative travel	Completed documents, with ongoing promotion of walking	Sandwell Travelwise website updated to promote alternative travel http://www.sandwell.gov.uk/info/200284/roads_travel_and_parking/1830/travelwise_in_sandwell
45	Promotion of Cycling	SMBC	Promoting Travel Alternatives	Promotion of Cycling	Completed	Ongoing promotion of cycling	Increased uptake of cycling for key journeys. Sandwell Travel surveys	Reduction in NO_2 and PM_{10} PM2.5 Concentrations	Limited Progress – Document is considered out of date	Ongoing	Sandwell's Cycling strategy is a several years old and would benefit from updating. Ongoing promotion of cycling on Travelwise Websitehttp://www.sandwell.gov.uk/info/200284/roads_travel_and_parking/1830/travelwise_in_sandwell

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
46	Encourage travel plans for employers, schools & hospitals	SMBC Transportation / Travel West Midlands / CENTRO (LTP commitment)	Promoting Travel Alternatives	Travel Planning (School and Workplace)	Completed	Ongoing implementation	Number of travel plans adopted by relevant organisations –including attached to planning applications.	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Sandwell Council Transportation Department has developed a Travel Plan SPD which requires developments above a certain criteria to develop and implement a Travel Plan. This work is ongoing, with the number of travel plans implemented increasing annually.	Ongoing	Travel Plan SPD adopted by Sandwell Council. Considered for all relevant planning applications
Changing Levels of Travel Demand / Promotion of Alternative Modes of Transport											
47	Air Quality information on website Publish AQ action plan on web and develop other service information	Sandwell MBC	Public Information	Information Via the Internet & Twitter	Ongoing	Ongoing	Periodic website review of all air quality pages	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Limited Updating of Webpages undertaken annually. A more detailed update is required.	Ongoing	Information on air quality in Sandwell MBC. Information on annual report and Current Trends http://www.sandwell.gov.uk/info/200274/pollution/485/air_quality

Measure No.	Measure	Lead Authority	EU Category	EU Classification	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
48	Promote car sharing among residents and businesses in the area	Sandwell MBC	Alternatives to private vehicle use	Car and Lift Sharing Schemes	Complete	Ongoing	Increased in total participants using the scheme. .	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Ongoing implementation and promotion of the scheme.	Ongoing	Further publishing of the car share programme, with an increase in the total number of registered users. https://carshareesandwell.liftshare.com/
49	Provide air quality information and promote sustainable transport in schools	Sandwell MBC	Promoting Travel Alternatives	School Travel Plans	Ongoing	Ongoing	Increase in sustainable travel modes in schools	Reduction in NO_2 and PM_{10} $PM_{2.5}$ Concentrations	Limited Progress To Date. School Travel Plans are a key element of the planning process, but limited fund available to promote sustainable transport at schools.	Ongoing	

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.

Based on national estimates[5] (2010) the fraction of mortality attributable to anthropogenic (man-made) $PM_{2.5}$ in Sandwell is 6.9% of all deaths (equal to 198 deaths per annum), which is more than the premature deaths associated with obesity and road accidents combined. Nationally the average across England is 5.1%, thus the current levels of particulate air pollution have a considerable impact on the health of Sandwell residents.

Sandwell MBC Air Quality officers and Public Health specialists are working together to determine the most appropriate way to address the links between Public Health and Air Quality. The importance of $PM_{2.5}$ is reflected by the inclusion of a key indicator of mortality in the Public Health Outcomes Framework.

The primary source of emissions in Sandwell is from road traffic and in particular diesel vehicles. Whilst the majority of measures detailed within this report focus on the reduction of NO_2 concentrations and achieving compliance with the objectives, it is accepted that there is no safe level for particultate matter, including $PM_{2.5}$, therefore all pollutant concentrations must be reduced to meet the health based national air quality objectives and improve health.

Policy Guidance LAQM.PG(16) acknowledges that many local authorities will consider how to address $PM_{2.5}$ alongside other pollutants when developing a range of measures to improve air quality and that few standalone $PM_{2.5}$ measures will be chosen (unless to address a very specific local problem).

[5] Public Health England, 2014, '*Estimating Local Mortality Burdens Associated with Particulate Air Pollution*'

Sandwell MBC is taking the following measures to address $PM_{2.5}$:

- Sandwell MBC currently undertakes $PM_{2.5}$ monitoring at Haden Hill in Cradley Heath. The site is located at an appropriate background location, which allows the comparison with the annual mean $PM_{2.5}$ objective of 25µg/m^3. In 2015, the background $PM_{2.5}$ concentration was 6.7µg/m^3 and has shown a 47% reduction in background $PM_{2.5}$ since 2010. However a degree of caution is required because the monitoring equipment does not meet the Equivalence Criteria when compared to the European Reference Method.
- Sandwell MBC will review its requirements for measuring $PM_{2.5}$ and where appropriate may extend its $PM_{2.5}$ monitoring network in order to improve its understanding of $PM_{2.5}$ across the borough. Key locations for consideration will include roads with significant traffic flows and where relevant receptors are present.
- Sandwell MBC is currently in the process of updating its air quality action plan, which will explicitly include reference to measures that will limit and reduce $PM_{2.5}$ emissions in future years. This will include close partnership working with key stakeholders such as Public Health, Planning and Transportation.
- The LETCP Planning Guidance and the Black Country Air Quality SPD now ensure all new development is sustainable in terms of air quality (Measures 37, 38, 39 and 40 in the action plan review) and secure appropriate mitigation measures ranging from Electric Vehicle charging points at minor developments to a full Low Emission Strategy (in scale and kind) at Major developments. Both documents make reference to $PM_{2.5}$ and with the adoption of low emission mitigation measures, will reduce the impact of $PM_{2.5}$ emissions in future years
- Encouraging modal shift (Measures 23, 24, 30, 31, 41, 44, 45, 46 and 48) such as walking, cycling, public transport and low emission vehicles, will reduce emissions of $PM_{2.5}$ by easing congestion and improving vehicle emissions.
- Reducing traffic congestion through the careful management of road infrastructure, improved traffic and pedestrian signals, speed restrictions and

parking enforcement to reduce obstructions on congested roads (Measures 1 through to 23). By incorporating all of these measures traffic congestion will be reduced and air quality improved by reducing emissions of $PM_{2.5}$.

- Improving public awareness of poor air quality and alternative transport options through travel planning, social marketing, council webpages and improved public transport branding will reduce $PM_{2.5}$ emissions (Measures 25, 28, 29, 46, 47, 48, 49)
- Current environmental legislation regulates the control of emissions of Particulate Matter (including $PM_{2.5}$) from industrial processes. Sandwell MBC and the Environment Agency continue to ensure all sites requiring an Environmental Permit operate within the required limits in order to reduce emissions of particulate matter. However it is acknowledged the increase use of biomass technologies may give rise to increased $PM_{2.5}$ emissions if inappropriate technologies are used or combustion plants are poorly managed.

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

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

Sandwell Metropolitan Borough Council currently maintains a network of six automatic monitoring sites where data is collected continuously. Data from automatic monitoring sites allow the assessment and comparison with both short-term objectives such as the 1-hourly mean for nitrogen dioxide (NO_2) and annual average concentrations.

Details of the six monitoring sites which were in operations in 2015 and the range of pollutants measured including nitrogen dioxide (NO_2), Particulate Matter (PM_{10} and $PM_{2.5}$), Sulphur Dioxide (SO_2) and Ozone (O_3) are presented in Appendix 1 – Table A.1.

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. Sandwell Council does not currently monitor for these pollutants.

Further details of National monitoring results are available online at http://uk-air.defra.gov.uk/data/

A map detailing the approximate location of automatic monitoring sites is provided in Appendix D - Figure D.1.

All monitoring equipment and results are subject to full Quality Assurance and Quality Control (QA/QC) procedures. Further details relating to the QA/QC procedures are detailed in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Sandwell MBC undertook non-automatic (passive) Diffusion Tube monitoring of NO_2 at 95 sites during the 2015 calendar year. Table A.2 in Appendix A shows the details of the sites. The table also includes the details of decommissioned diffusion tube monitoring sites, to provide a broader picture of annual mean nitrogen dioxide concentrations.

An overview map showing the general location of the monitoring sites is provided in Figure D.2, 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.

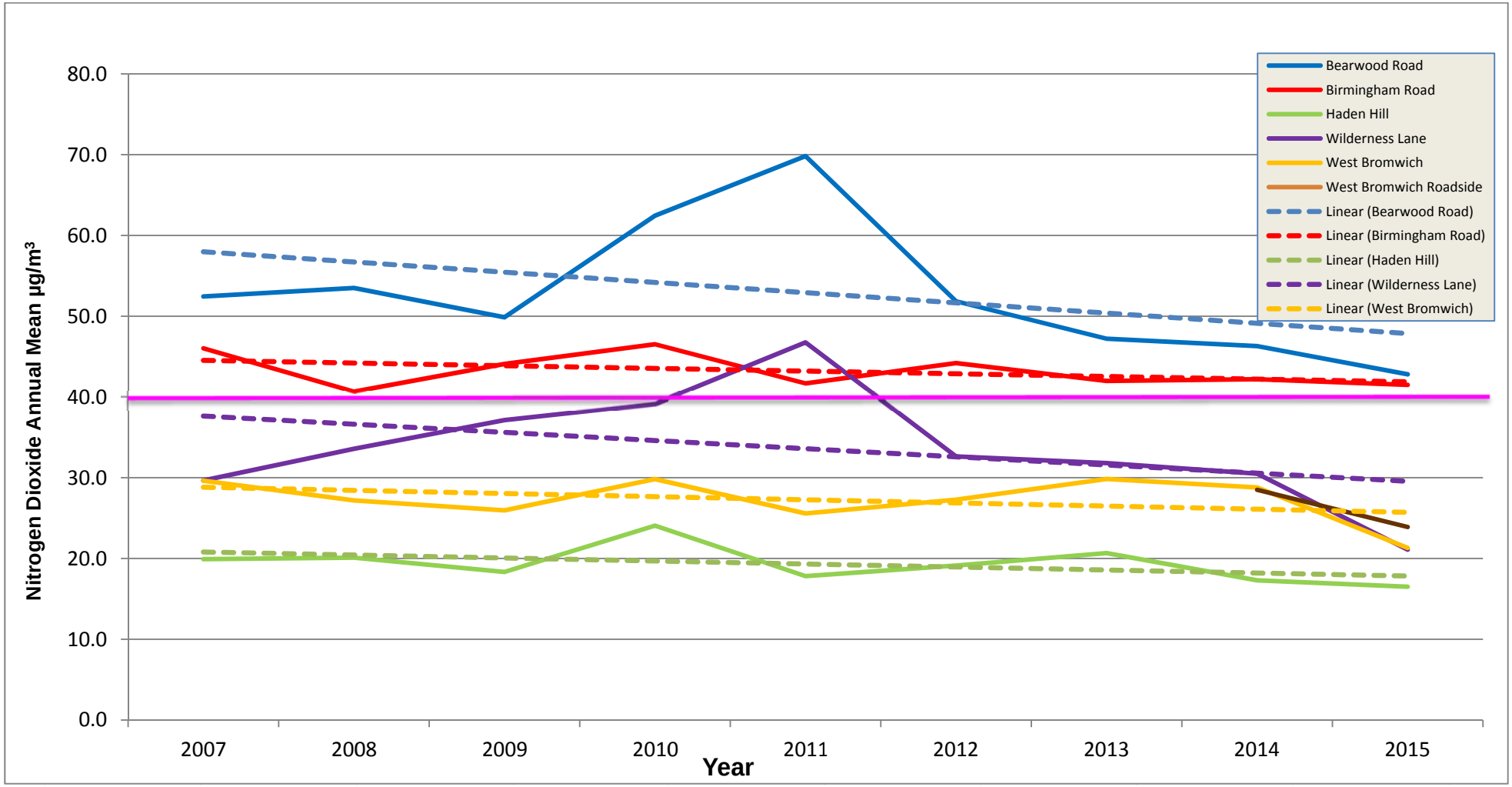
3.2.1 Nitrogen Dioxide (NO_2)

Automatic monitoring for NO_2 was undertaken at six automatic monitoring stations (West Bromwich, Birmingham Road, Bearwood Road OPSIS, Wilderness Lane Great Barr, Haden Hill and West Bromwich Roadside). 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.

All locations are representative of public exposure and the results have been ratified using protocols detailed in LAQM.TG (16).Table A. 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.

Table A.5 in Appendix A compares the ratified and adjusted NO_2 diffusion tube results and compares concentrations for the past 5 years with the air quality objective of 40µg/m^3

Figure 3.1 - Trends in Annual Mean Nitrogen Dioxide Concentrations at Automatic Monitoring Sites



Interpretation of Nitrogen Dioxide Results

- Data capture is > 90% at four of the six automatic stations. Data capture was extremely low at West Bromwich and Wilderness Lane Great Barr due to technical issues. The data has been annualised, to ensure they are representative of a full calendar year; further details are presented in Appendix C.
- A new monitoring station was established at Chronehills Linkway, West Bromwich in 2014 and is known as 'West Bromwich Roadside'. The site was installed due to the redevelopment of the town centre and construction of a large retail development. Results are only available for the period 2014-2015; however the annual mean NO2 concentration is significantly below the objective and demonstrate compliance.
- Bearwood Road and Birmingham Road sites continue to record exceedances of the 40µg/m^3 NO_2 annual mean objective. Although both sites demonstrate a marginal downward trend in NO_2 concentrations.
- The two background locations West Bromwich and Haden Hill both recorded reductions in overall NO_2 concentrations when compared to 2013 and 2014 results.
- 2015 results demonstrate NO_2 concentrations are not reducing consistently over time. Year on year variation have resulted in increases and decreases in concentrations across a range of locations and demonstrates the impact variability in traffic and climatic conditions have on pollutant concentrations.
- Long term trends (over 5 years or more) in diffusion tube monitoring demonstrate gradual improvements in annual mean NO_2 concentrations at the majority of sites and the widespread compliance with the annual mean objective. However at a small number of worst case locations, concentrations consistently exceed the objective, with concentrations remaining static or increasing in 2015.
- A total of 18 diffusion tube sites (19%) exceeded the NO_2 annual mean objective in 2015. There has been year on year fluctuations in the total

number of locations which exceed the objective, although overall there appears to be a downward trend in the total number of exceedances.

Table 3.1 Total number and Percentage of Diffusion Tube Monitoring Sites Which Exceed the NO_2 Annual Mean Objective

Year	2009	2010	2011	2012	2013	2014	2015
Number of Site that Exceed	48	88	25	43	32	29	18
Percentage of total sites that exceed NO_2 objective	44.9%	66.2%	17.1%	29.5%	28.6%	20.3%	19%

- Four key areas, Birmingham Road Oldbury (BE, BF, BG and GA), Bearwood Road/Hagley Road Smethwick (OB, OC, OD, ON and C10D), Blackheath (C12A, C12D) and Newton Road Great Barr (ZQ and ZR), continue to demonstrate significant exceedances of the annual mean NO_2 objective.
- One new area at Mallin Street, Smethwick has shown an exceedance (45.5µg/m^3) of objective in 2015. In previous years the concentrations have been close to exceeding the objective, further monitoring is required. The results for 2016 will be scrutinised and where exceedances continue the site will be included in the map of exceedance areas.
- Two locations in West Bromwich (C1A – Grafton Road and EF - Bromford Lane) demonstrated exceedances in 2015, having not recorded exceedances since 2010. Further monitoring will continue to determine if these are ongoing exceedances.
- Table A.4, Appendix A demonstrates there were no exceedances of the hourly NO_2 objective at the 6 automatic monitoring stations. The 99.8th percentiles for each monitoring station are significantly below the hourly objective of 200µg/m^3.

Trend analysis demonstrates NO_2 concentrations have remained relatively static between 2009 and 2015 at West Bromwich, Haden Hill, Wilderness Lane and Birmingham Road. Bearwood Road has shown an overall downward trend throughout the same period, but it should be noted in 2010/2011 there were significant increases in annual mean NO_2 at this location.

Continued exceedances of the NO_2 annual mean objective have been observed within Sandwell; one new area at Mallin Street Smethwick recording an exceedance of the objective. At the current time Sandwell MBC will retain its borough wide Air Quality Management Area for exceedances of the annual mean NO_2 Objective.

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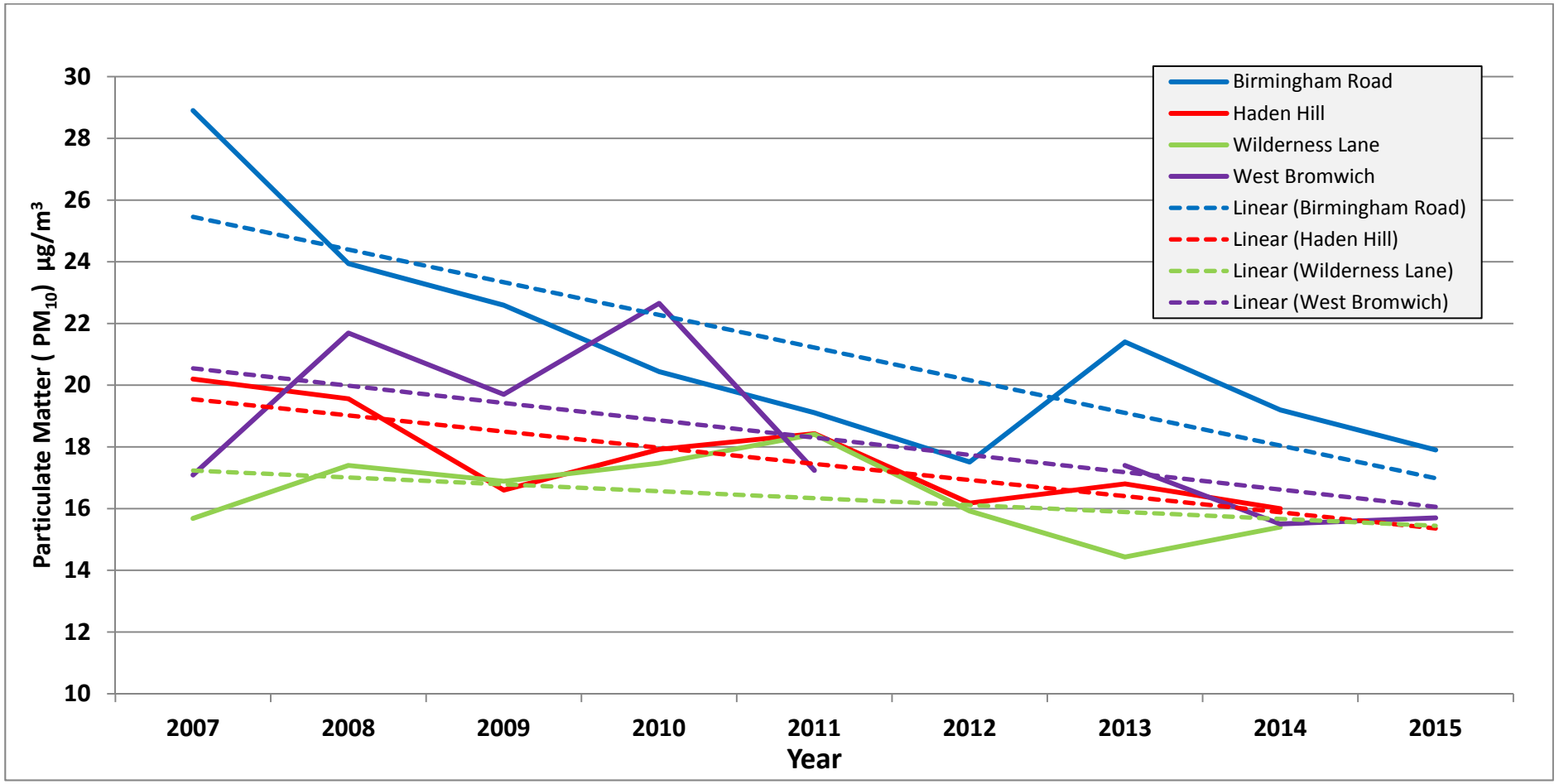
3.2.2 Particulate Matter (PM_{10})

Table A. 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.7 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.

Figure 3.2 - Trends in Annual Mean PM_{10} Concentrations at Automatic Monitoring Sites

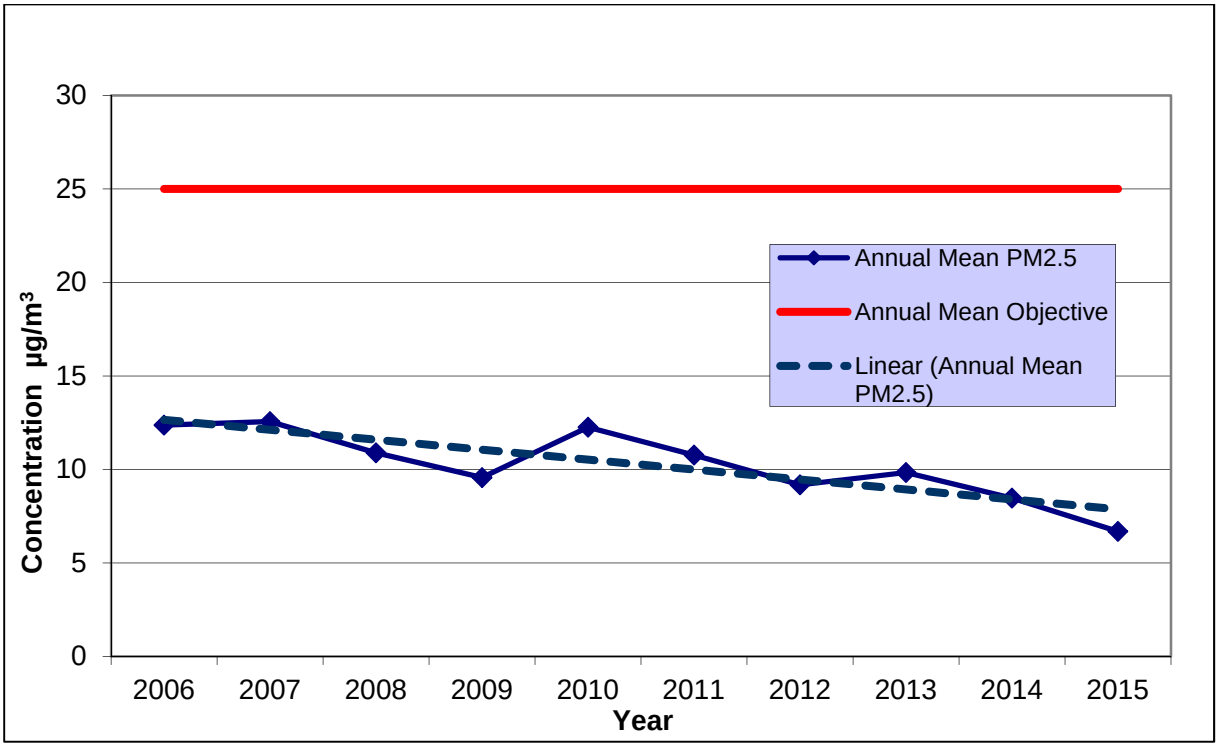


- All PM_{10} annual mean concentrations are significantly below the national air quality objective of 40µg/m^3 in 2015.
- Data collection at West Bromwich was below 75%; therefore the results have been annualised in accordance with LAQM TG(16). Further details are provided in Appendix C
- Due to unforeseen technical issues, no data was collected at Wilderness Lane Great Barr and Haden Hill in 2015.
- West Bromwich and Birmingham Road demonstrated a downward trend in PM_{10} concentrations between 2007-2015, although a slight increase in PM_{10} concentration was recorded at Birmingham in 2015. The 2015 result is highly likely to be a result of year on year variation rather than a change in local traffic conditions.
- The total number of 24 hour exceedances at all 4 monitoring sites is significantly below the maximum 35 exceedances per year.
- The total number of 24 hour exceedances and 90^{th} percentiles have remained relatively static over the 5 year period 2010-2015,

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

Figure 3.3 Trends in Annual Mean $PM_{2.5}$ concentrations at Haden Hill Automatic Station 2007-2015



Trend analysis confirms there has been a gradual reduction in the annual mean $PM_{2.5}$ concentration between 2007 and 2015; however year on year concentrations are variable, with 2010, 2011 and 2013 demonstrating an increase compared to the previous years.

All authority areas are required to achieve a 15% reduction in annual mean $PM_{2.5}$ concentration between 2010 and 2020. To date there has been an approximate 46% reduction at Haden Hill background location between 2010 and 2015 (inclusive); however this figure is likely to represent a best case scenario. The annual mean concentration in 2010 was significantly higher than in previous and subsequent years, which resulted in a larger reduction during the following 5 year period and in reality the percentage reduction is likely to be smaller.

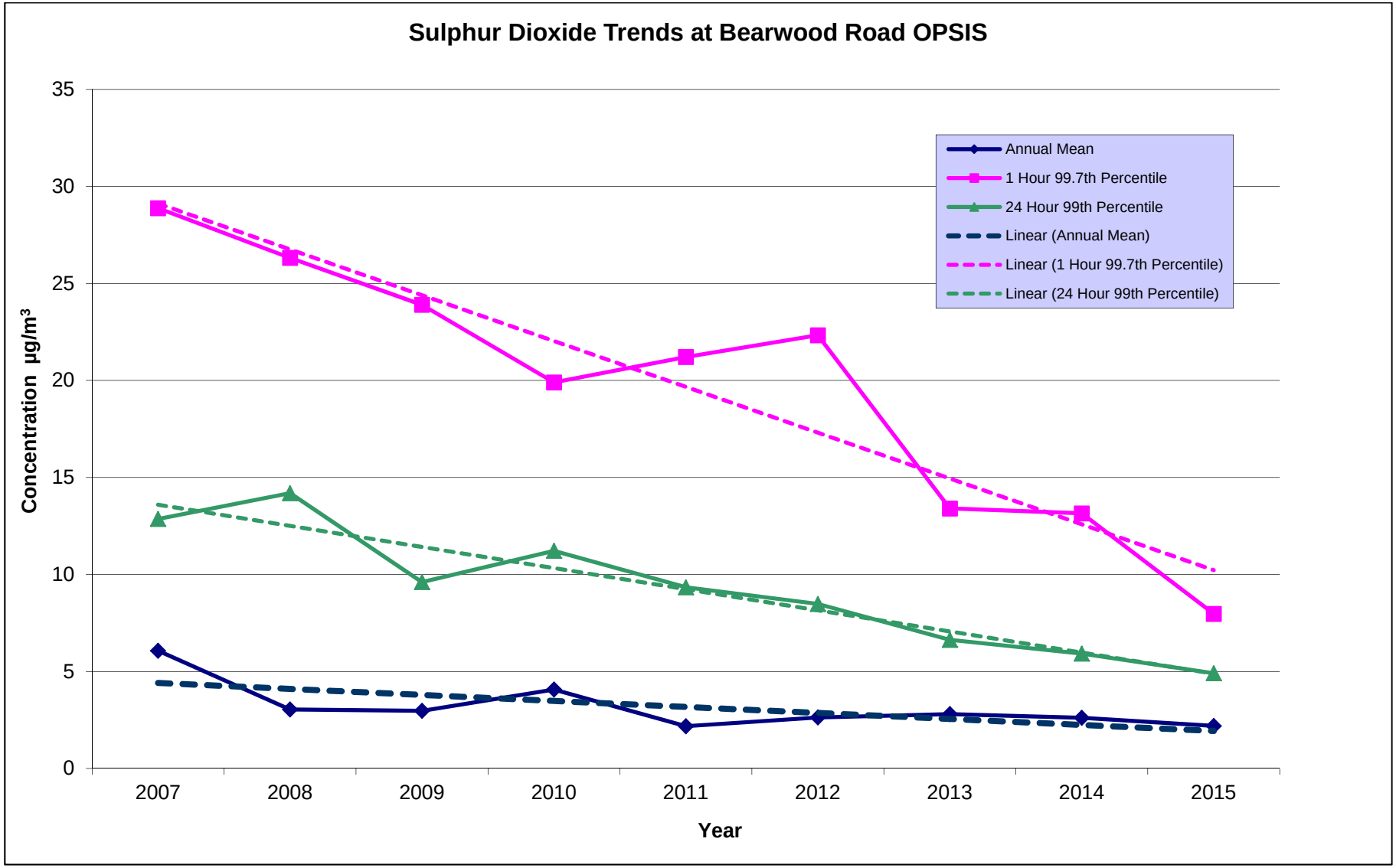
3.2.4 Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) monitoring is currently undertaken at Bearwood Road OPSIS. The OPSIS is located at a roadside location and is an indicative monitoring method providing hourly data, therefore the 15 minute mean is unavailable. Bearwood Road monitoring station is located in areas of relevant public exposure, where people are likely to spend an average of 15 minutes or more.

Table A.9 in Appendix A compares the ratified continuous monitored SO_2 concentrations for year 2015 with the air quality objectives for SO_2.

Figure 3.4 depicts the trends in SO_2 concentrations during the period 2007-2015. Overall there has been a slight downward trend in annual mean and 99.7^{th} / 99^{th} percentiles throughout the period.

Figure 3.4 Trends in SO_2 Concentration at Bearwood Road



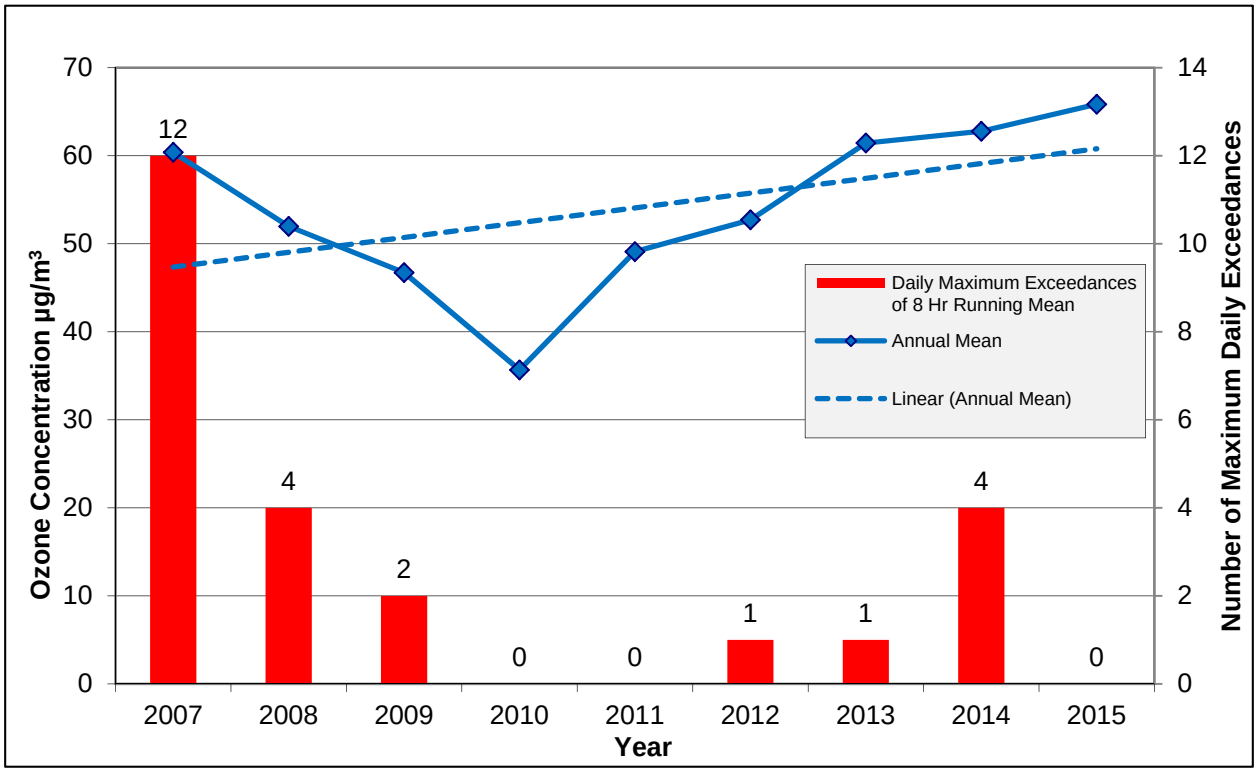
3.2.5 Ozone (O_3)

Local Authorities do not have a responsibility to meet the objectives for Ozone as it is identified as a 'trans boundary' pollutant which can drift across countries. It is therefore not included within the National Air Quality Objectives. The World Health Organisation has set an Air Quality Objective for Ozone at 100µg/m^3, where the daily maximum of the 8-hour running mean should not be exceeded more than 10 times per annum.

Ozone is monitored at two locations within Sandwell; West Bromwich and Bearwood Road OPSIS. Bearwood Rd OPSIS is an indicative, non-standardised monitoring method; therefore results should be viewed with caution.

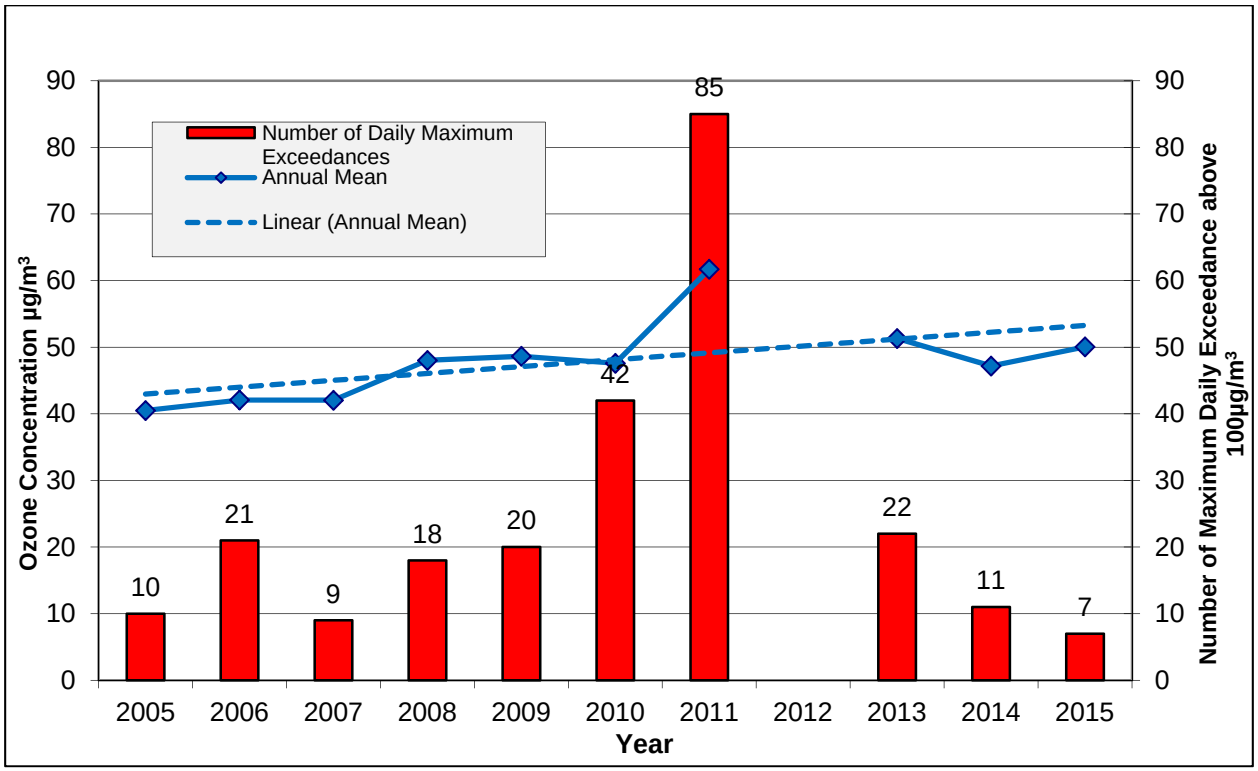
Data capture at both monitoring locations is good in 2015. The trends in annual mean concentrations and number of maximum daily exceedances are presented in Figures 3.5 and 3.6 for Bearwood Road and West Bromwich stations respectively.

Figure 3.5 Trends in Annual Mean Ozone concentrations and Number of Daily Maximum Exceedances at Bearwood Rd 2007-2015.



Ozone concentrations at Bearwood Road have been variable throughout the period 2007-2015; however the overall trend in annual mean concentration has shown a gradual increase. The number of maximum daily exceedances has reduced steadily throughout the same period.

Figure 3.6 Trends in Annual Mean Ozone concentrations and Number of Daily Maximum Exceedances at West Bromwich 2007-2015.



Ozone levels at West Bromwich have demonstrated a gradual increase in the annual mean concentrations and a gradual increase in the number of maximum daily exceedances up to and including 2011, however there has been a reduction in the number of maximum daily exceedances between 2013 and 2015.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Inlet Height (m)	Worst case Exposure Represented
		X	Y							
West Bromwich	Urban Background	400187	291601	NO_2	Yes	Chemiluminescence	35	21m	2.5m	No
West Bromwich	Urban Background	400187	291601	SO_2	Yes	Chemiluminescence	35	21m	2.5m	No
West Bromwich	Urban Background	400187	291601	PM_{10}	Yes	TEOM FDMS	35	21m	2.5m	No
West Bromwich	Urban Background	400187	291601	O_3	Yes	Chemiluminescence	35	21m	2.5m	No
Birmingham Rd (Oldbury)	Roadside	399857	289392	NO_2	Yes	Chemiluminescence	8	5m	2.5m	Yes
Birmingham Rd (Oldbury)	Roadside	399857	289392	PM_{10}	Yes	TEOM FDMS	8	5m	2.5m	Yes
Wilderness Lane (Great Barr)	Roadside	403956	294855	NO_2	Yes	Chemiluminescence	147	11m	2.8m	No
Wilderness Lane (Great Barr)	Roadside	403956	294855	PM_{10}	Yes	TEOM FDMS	147	11m	2.8m	No
Haden Hill	Urban Background	395755	285493	NO_2	Yes	Chemiluminescence	105	119m	2.5m	No

Site Name	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Inlet Height (m)	Worst case Exposure Represented
		X	Y							
Haden Hill	Urban Background	395755	285493	PM_{10}	Yes	TEOM	105	119m	2.5m	No
Haden Hill	Urban Background	395755	285493	$PM_{2.5}$	Yes	TEOM	105	119m	2.5m	No
Bearwood Road OPSIS	Kerbside *(Transept crosses road approx. 5m from road each end)*	402181 286360 *(Northern Point of OPSIS – Source)*	402223 286097 *(Southern Point of OPSIS – Receiver)*	NO_2, SO_2, O_3	Yes	Differential Optical Absorption Spectroscopy	5	8m or less (Varies across transept)	5.5m	Yes
West Bromwich Roadside	Roadside	400521	291541	NO_2	Yes	Chemiluminescence	11	7m	1.6m	Yes

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

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

Diffusion tube monitoring sites which were decommissioned prior to May 2014 are presented in Blue. All diffusion tubes were prepared in 50% Triethanolamine in Acetone, with the exception of tubes GD, HH2, LD, SB, which were prepared in 20% Triethanolamine in Water and are highlighted in bold.

Area	Site ID	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
			X	Y						
Great Barr	KA	Urban Background	403387	294587	NO_2	Yes	No	Y (0m)	15m	Y
	KB	Urban Background	403492	294678	NO_2	Yes	No	Y (0m)	15m	Y
	KD	Urban Background	403690	294703	NO_2	Yes	No	Y (0.3m)	9.4m	Y
	KE	Roadside	403794	294693	NO_2	Yes	No	Y (0m)	12.6m	Y
	QE	Roadside	403934	294934	NO_2	Yes	No	N	1.8m	Y
	SA	Urban Background	403953	294855	NO_2	Yes	Yes	N	5.1m	N
	SB	**Urban Background**	**403953**	**294855**	**NO_2**	**Yes**	**Yes**	**N**	**5.1m**	**N**
	XE	Urban Background	404439	294846	NO_2	Yes	No	Y (4.3m)	16.3m	Y
	YC	Urban Background	404104	294950	NO_2	Yes	No	Y (0m)	10.3m	N
	ZA	Roadside	404617	294931	NO_2	Yes	No	N	0.3m	Y
	ZC	Roadside	404505	294821	NO_2	Yes	No	Y (3m)	1.9m	Y
	ZK	Roadside	404622	294291	NO_2	Yes	No	Y (0m)	17.2m	Y
	ZN	Roadside	404474	294659	NO_2	Yes	No	Y (0m)	16.8m	Y
	ZO	Roadside	404555	294219	NO_2	Yes	No	N	2.9m	Y
	ZP	Roadside	404292	294180	NO_2	Yes	No	Y (0m)	3.2m	Y
	ZQ	Roadside	404547	294188	NO_2	Yes	No	Y (0m)	8.5m	Y
	ZR	Roadside	404475	294181	NO_2	Yes	No	Y (0m)	5.9m	Y

Area	Site ID	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
			X	Y						
Yew Tree	WA	Roadside	401917	295329	NO_2	Yes	No	Y (8m)	0.2m	Y
	WB	Urban Background	402152	295064	NO_2	Yes	No	N	1.6m	N
	WF	Urban Background	402119	295273	NO_2	Yes	No	Y (8m)	0.2m	Y
Oldbury	BA	Roadside	399689	289431	NO_2	Yes	No	Y (7.7m)	7.8m	Y
	BB	Roadside	399751	289398	NO_2	Yes	No	Y (25.6m)	0.5m	Y
	BC	Roadside	399949	289367	NO_2	Yes	No	Y (0m)	5.9m	Y
	BD	Roadside	399971	289369	NO_2	Yes	No	Y (0m)	5.8m	Y
	BDQ	Roadside	400015	289366	NO_2	Yes	No	Y (0m)	8.6m	Y
	BE	Roadside	399924	289351	NO_2	Yes	No	Y (2.5m)	0.8m	Y
	BF	Roadside	399809	289406	NO_2	Yes	No	Y (0m)	5.8m	Y
	BG	Roadside	399720	289429	NO_2	Yes	No	Y(0m)	5.6m	Y
	BO	Roadside	400078	289391	NO_2	Yes	No	Y (0m)	6.2m	Y
	BP	Roadside	400171	289435	NO_2	Yes	No	Y (0m)	6.8m	Y
	BR	Roadside	399821	289402	NO_2	Yes	No	Y (0m)	5.9m	Y
	BS	Urban Background	399854	289408	NO_2	Yes	No	Y (8.6m)	16.3m	Y
	GA	Roadside	399858	289391	NO_2	Yes	Yes	Y (8.2m)	5.4m	Y
	GB	Roadside	399858	289391	NO_2	Yes	Yes	Y (8.2m)	5.4m	Y
	GC	Roadside	399858	289391	NO_2	Yes	Yes	Y (8.2m)	5.4m	Y
	GD	**Roadside**	**399858**	**289391**	**NO_2**	**Yes**	**Yes**	**Y (8.2m)**	**5.4m**	**Y**
	S3N	Urban Background	399296	289503	NO_2	Yes	No	Y (0m)	13.4m	N
	S5N	Urban Background	399462	289478	NO_2	Yes	No	Y (0m)	2.9m	Y
	TA	Roadside	395954	290643	NO_2	Yes	No	Y (0m)	5.4m	Y

Area	Site ID	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
			X	Y						
	C5A	Roadside	399297	290133	NO_2	Yes	No	Y (0m)	2.1m	Y
	C5D	Roadside	399200	290021	NO_2	Yes	No	Y (8.3m)	0.7m	Y
	C5E	Roadside	399155	289974	NO_2	Yes	No	Y (2.9m)	1.9m	Y
	C6A	Roadside	398941	289326	NO_2	Yes	No	Y (0m)	17.2m	Y
	C6D	Roadside	399004	289307	NO_2	Yes	No	Y (9.9)	15.3m	Y
	C6E	Kerbside	399191	289336	NO_2	Yes	No	Y (13.8m)	0.48m	Y
	C7A	Roadside	398137	290229	NO_2	Yes	No	Y (1.5m)	0.6m	Y
	C7D	Kerbside	398173	290205	NO_2	Yes	No	Y (11.3m)	1.6m	Y
	C7E	Roadside	398042	290285	NO_2	Yes	No	Y (0m)	9.5m	Y
	C7F	Kerbside	397616	290542	NO_2	Yes	No	Y (4.7m)	0.3m	Y
	C7H	Roadside	398279	290115	NO_2	Yes	No	Y (0m)	4.4m	Y
	C7I	Roadside	398359	290049	NO_2	Yes	No	Y (0m)	4.6m	Y
	C13D	Roadside	396425	291481	NO_2	Yes	No	Y (4.1m)	2.4m	Y
	C13E	Roadside	396346	291476	NO_2	Yes	No	Y (0.9m)	7.3m	Y
Smethwick	OA	Roadside	402233	286142	NO_2	Yes	No	Y (0m)	2.9m	Y
	OB	Roadside	402210	286162	NO_2	Yes	No	Y (0m)	5.5m	Y
	OC	Roadside	402221	286193	NO_2	Yes	No	Y (0m)	3.2m	Y
	OD	Roadside	402194	286235	NO_2	Yes	No	Y (0m)	5.2m	Y
	OE	Roadside	402207	286253	NO_2	Yes	No	Y (0m)	4.0m	Y
	OF	Roadside	402176	286294	NO_2	Yes	No	N	0.1m	Y
	OG	Roadside	402225	286115	NO_2	Yes	No	N	1.6m	Y
	OH	Roadside	402208	286196	NO_2	Yes	No	N	0.1m	Y

Area	Site ID	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
			X	Y						
	OI	Roadside	402194	286292	NO_2	Yes	No	N	0.1m	Y
	OJ	Roadside	402167	286357	NO_2	Yes	No	N	0.1m	Y
	OP4	Roadside	402222	286098	NO_2	Yes	No	N	5.5m	Y
	C9A	Roadside	402148	286561	NO_2	Yes	No	Y (0m)	2.6m	Y
	C9D	Kerbside	402136	286665	NO_2	Yes	No	N	0.6m	Y
	C10A	Roadside	402258	286053	NO_2	Yes	No	Y (0m)	4.0m	Y
	C10D	Kerbside	402283	286061	NO_2	Yes	No	N	1.0m	Y
	N2A	Roadside	403269	288512	NO_2	Yes	No	N	0.8m	Y
	N2B	Kerbside	403224	288467	NO_2	Yes	No	N	0.2m	Y
	JA	Roadside	403198	287675	NO_2	Yes	No	Y (4.3m)	0.8m	Y
	JB	Roadside	403322	287728	NO_2	Yes	No	Y (8.9m)	2.7m	Y
	MA	Roadside	400700	289359	NO_2	Yes	No	Y (1.8m)	2.0m	Y
	MB	Roadside	400711	289302	NO_2	Yes	No	Y (0m)	4.0m	Y
	MC	Roadside	400748	289150	NO_2	Yes	No	Y (1.6m)	0.7m	Y
	MD	Roadside	400773	289131	NO_2	Yes	No	Y (0m)	12.0m	Y
Blackheath	C11A	Roadside	397456	286434	NO_2	Yes	No	Y (0m)	4.9m	Y
	C11D	Kerbside	397462	286385	NO_2	Yes	No	Y (1.3m)	0.5m	Y
	C11E	Kerbside	397484	286414	NO_2	Yes	No	Y (4.5m)	0.1m	Y
	C12A	Roadside	396899	286439	NO_2	Yes	No	Y (0m)	2.5m	Y
	C12D	Kerbside	396873	286454	NO_2	Yes	No	N	0.1m	Y
	C12E	Roadside	396780	286465	NO_2	Yes	No	Y (0m)	3.5m	Y
	UA	Roadside	398146	287639	NO_2	Yes	No	N	2.0m	Y

Area	Site ID	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
			X	Y						
	UB	Roadside	398208	287749	NO_2	Yes	No	Y (7.4m)	1.2m	Y
	UC	Roadside	398170	287746	NO_2	Yes	No	Y (7.7m	0.2m	Y
	C15A	Roadside	396867	285536	NO_2	Yes	No	Y	2.0m	Y
M5 J1 – J2	RA	Roadside	401561	290074	NO_2	Yes	No	N	1.1m	Y
	S7N	Urban Background	397996	287880	NO_2	Yes	No	N	36.1m	N
West Bromwich	HA	Roadside	400383	291307	NO_2	Yes	No	N	0.3m	Y
	LA	Urban Background	400394	291415	NO_2	Yes	Yes	N	26.1m	N
	LB	Urban Background	400394	291415	NO_2	Yes	Yes	N	26.1m	N
	LC	Urban Background	400394	291415	NO_2	Yes	Yes	N	26.1m	N
	LD	**Urban Background**	**400394**	**291415**	**NO_2**	**Yes**	**Yes**	**N**	**26.1m**	**N**
	SU	Roadside	400521	291526	NO_2	Yes	No	Y (0m)	7.8m	Y
	C1A	Roadside	400668	291726	NO_2	Yes	No	N	0.3m	Y
	C1D	Roadside	400651	291982	NO_2	Yes	No	N	2.0m	Y
	C2A	Roadside	401112	293014	NO_2	Yes	No	Y (0m)	9.8m	Y
	C2E	Roadside	401032	292862	NO_2	Yes	No	Y (0m)	4.9m	Y
	C4A	Roadside	400684	290097	NO_2	Yes	No	Y (0m)	9m	Y
	C4D	Roadside	400657	290090	NO_2	Yes	No	N	0.3m	Y
	C4E	Roadside	400736	290111	NO_2	Yes	No	N	1.8m	Y
	PS1A	Roadside	400504	291239	NO_2	Yes	No	Y (0m)	6.2m	Y
	PS1B	Roadside	400504	291239	NO_2	Yes	No	Y (0m)	6.2m	Y
	PS2A	Roadside	400525	291251	NO_2	Yes	No	Y (0m)	9.6m	Y
	PS2B	Roadside	400525	291251	NO_2	Yes	No	Y (0m)	9.6m	Y

Area	Site ID	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
			X	Y						
	N1A	Roadside	399647	290356	NO_2	Yes	No	N	2.1m	Y
	N1B	Kerbside	399615	290358	NO_2	Yes	No	N	0.9m	Y
	EA	Roadside	400925	291308	NO_2	Yes	No	Y(4.8m)	0.8m	Y
	EB	Roadside	400865	291196	NO_2	Yes	No	Y(6.9m)	2.3m	Y
	EC	Roadside	400889	291048	NO_2	Yes	No	Y(7.3m)	10.5m	Y
	ED	Roadside	400368	291123	NO_2	Yes	No	Y(4.0m)	4.5m	Y
	EE	Roadside	400266	291129	NO_2	Yes	No	Y(0m)	3.5m	Y
	EF	Roadside	400085	290797	NO_2	Yes	No	Y(5.2m)	5.5m	Y
	EG	Roadside	399800	290558	NO_2	Yes	No	Y(0m)	4.4m	Y
	EH	Roadside	400666	290458	NO_2	Yes	No	Y(0m)	7.9m	Y
	EI	Roadside	400632	290227	NO_2	Yes	No	Y(0m)	9.1m	Y
Wednesbury	AC	Roadside	399723	296148	NO_2	Yes	No	Y (6.1m)	2.1m	Y
	AD	Roadside	399629	296099	NO_2	Yes	No	Y (5.75m)	1.9m	Y
	AE	Roadside	399646	296015	NO_2	Yes	No	Y (11.2m)	1.8m	Y
	AF	Roadside	399684	296035	NO_2	Yes	No	Y (1.1m)	1.7m	Y
	WW/WW 2	Urban Background	400550	296043	NO_2	Yes	No	Y (0m)	6.5m	Y
	WW3	Roadside	400600	296041	NO_2	Yes	No	Y (0m)	9.1m	Y
	WW4	Roadside	400519	296095	NO_2	Yes	No	Y (4.8m)	1.6m	Y
Tipton	C14A	Roadside	397387	293917	NO_2	Yes	No	N	0.6m	Y
	C14D	Roadside	397353	293930	NO_2	Yes	No	Y (26.0m)	2.4m	Y
	OS2	Roadside	395728	292514	NO_2	Yes	No	Y (0m)	13.7m	Y

Area	Site ID	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
			X	Y						
	DP1	Roadside	397324	292253	NO_2	Yes	No	Y (1.3m)	3.2m	Y
	DP3	Roadside	397350	292199	NO_2	Yes	No	Y (5.8m)	0.8m	Y
	DP4	Roadside	397071	292103	NO_2	Yes	No	Y (7.1m)	1.5m	Y
	DP5	Roadside	396959	291993	NO_2	Yes	No	Y (2.5m)	0.1m	Y
	TE	Roadside	395057	293073	NO_2	Yes	No	Y (8.0m)	2.75m	Y
	TF	Roadside	395021	395021	NO_2	Yes	No	Y(6.4m)	0.6m	Y
	TG	Roadside	394967	292595	NO_2	Yes	No	Y (5.7m)	2.2m	Y
	TH	Roadside	394880	292576	NO_2	Yes	No	Y (5.3m)	1.7m	Y
	TI	Roadside	394849	292425	NO_2	Yes	No	Y (6.9m	2.2m	Y
	VA	Roadside	397639	292465	NO_2	Yes	No	Y (0m)	3.1m	Y
	VB	Roadside	397686	292483	NO_2	Yes	No	Y (2.9m)	0.3m	Y
	VC	Roadside	397706	292520	NO_2	Yes	No	Y (0m)	2.4m	Y
	VD	Roadside	397,625	292,564	NO_2	Yes	No	Y (5.3m)	2.0m	Y
Cradley Heath	CH2	Roadside	394310	285895	NO_2	Yes	No	N	3.0m	Y
	CH3	Roadside	394537	286032	NO_2	Yes	No	Y (0m)	2.3m	Y
	CH4	Kerbside	394696	286148	NO_2	Yes	No	N	0.9m	Y
	HH1	Urban Background	395755	285493	NO_2	Yes	Yes	N	87m	N
	HH2	**Urban Background**	**395755**	**285493**	**NO_2**	**Yes**	**Yes**	**N**	**87m**	**N**

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

Table A.3 – Annual Mean NO_2 Monitoring Results

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

Site ID	Location	Site Type	Located within an AQMA	Valid Data Capture 2015 %	Annual Mean NO_2 Concentration µg/m^3					
					2010	2011	2012	2013	2014	2015
West Bromwich	Highfields, West Bromwich	Urban Background	Y	21.2%	29.8	25.6	26.6[3]	29.8	28.8	21.3 (23.2)[5]
Birmingham Road	Birmingham Rd, Oldbury	Roadside	Y	96.2%	**46.5**	**41.7**	**44.2**	**42.0**	**42.2**	**41.5**
Wilderness Lane	Great Barr	Roadside	Y	27.0%	39.2	**46.8**	32.6	31.8	30.5	21.1 (28.4)[5]
Haden Hill	Haden Hill Park, Cradley Heath	Urban Background	Y	96.0%	24.1	17.8	19.1	20.7	17.3	16.5
Bearwood Road OPSIS[1]	Bearwood Rd, Smethwick	Roadside	Y	99.3%	**62.4**[2]	**69.8**[2]	**51.9**	**47.2**	**46.3**	**42.8**
West Bromwich Roadside	Chronehills Linkway, West Bromwich	Roadside	Y	90.0%	-	-	-	-	28.49 (*30.6*)[4]	23.9

[1] OPSIS is an indicative monitoring method only.
[2] Potential exceedance of the hourly objective as annual mean in > 60µg/m^3, however hourly results demonstrate compliance
[3] West Bromwich Station was relocated to Highfields West Bromwich from Lombard Street West Bromwich. Both sites are classified as Urban Background and are approximately 280m apart. Further details are presented in Sandwell MBC 2013 Progress Report.
[4] West Bromwich Roadside Commenced Monitoring 25 August 2014. Result Annualised from 4 months data as described in Box 3.2 in LAQM TG.09 using data from AURN Background sites Birmingham Tyburn Road and Acocks Green (Short Term mean is presented in brackets)
[5] Data capture <75%, bias adjusted annual mean concentration has been annualised following the procedure described in Technical Guidance LAQM.TG16 Box 7.9 using ratified data from AURN background sites Birmingham Tyburn Road and Acocks Green, Coventry Allesley and Leamington Spa. Short term mean is presented in brackets.

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

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.**

Site ID	Location	Site Type	Located within an AQMA	Valid Data Capture 2015 %	Number of Exceedances of Hourly Mean (200 µg/m^3)					
					2010	2011	2012	2013	2014	2015
West Bromwich	Highfields, West Bromwich	Urban Background	Y	21.2%	2	0	0 (110.97)[2]	0 (104.3)[2]	0 (115.5)[2]	0 (90.6)[2]
Birmingham Road	Oldbury	Roadside	Y	96.2%	1	3	0	0	1 (131.1)[2]	0
Wilderness Lane	Great Barr	Roadside	Y	27.0%	0	0	0	0	0	0 (82.7)[2]
Haden Hill	Haden Hill Park, Cradley Heath	Urban Background	Y	96.0%	0	0	0	0	0	0
Bearwood Road OPSIS	Bearwood Rd, Smethwick	Roadside	Y	99.3%	**28**[1]	1	4	1	4	0
West Bromwich Roadside	Chronehills Linkway, West Bromwich	Roadside	Y	90.0%	-	-	-	-	0 (111.6)[2]	0

[1] 25 exceedances recorded 6th – 7th December during temperature inversion. The UK was subject to a Cold Weather Cycle
[2] Data Capture less than 90%, 99.8th percentile of the hourly means in presented in brackets

Table A.5 – Annual Mean NO_2 Diffusion Tube Monitoring Results

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

Location	Site ID	Site Type	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [1]				
			2011 (Bias Adjustment Factor =0.93)	2012 (Bias Adjustment Factor = 1.02)	2013 (Bias Adjustment Factor = Weighted average of 1.01 and 0.81)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = Weighted average of 0.79 and 0.96)
Great Barr	KA	UB	27.3	30.4	33.2	27.9	-
	KB	UB	27.5	31.0	31.2	29.9	-
	KD	UB	30.3	36.7[1]	34.7	31.6	28.7
	KE	R	29.0	**41.0**[1]	32.1	29.8	27.8
	QE	R	27.4	30.5	26.0	31.2	36.1
	SA	UB	32.4	33.9	29.8	28.6	30.8
	SB	UB	37.4	33.9	32.6	38.0	-
	XE	UB	26.9	33.6[1]	32.9[1]	32.9	27.3
	YC	UB	27.6	29.8[1]	25.0	27.5	-
	ZA	R	32.7	36.8[1]	36.1[1]	35.7	29.7
	ZC	R	34.4	37.7[1]	32.2[1]	25.7	26.8
	ZK	R	31.6	38.3[1]	32.4[1]	29.4	28.5
	ZN	R	28.4	32.2[1]	30.3[1]	32.1	-
	ZO	R	36.5	36.3	35.4[1]	32.6	31.9
	ZP	R	33.6	35.8	33.6[1]	34.6	33.8
	ZQ	R	**41.9**	**47.1**	**46.6**	**49.5**	**44.3**
	ZR	R	**45.5**	**47.8**	**44.2**	**45.8**	**44.3**
Yew Tree	WA	R	38.0	38.3	34.0	31.2	35.5
	WB	UB	34.0	30.9[1]	31.5	33.9	30.1
	WF	UB	33.2	32.7	33.1	30.8	32.5
Oldbury	BA	R	36.5	**41.1**	38.6	38.6	37.1
	BB	R	32.2	37.2	36.6	33.3	-

Location	Site ID	Site Type	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [1]				
			2011 (Bias Adjustment Factor =0.93)	2012 (Bias Adjustment Factor = 1.02)	2013 (Bias Adjustment Factor = Weighted average of 1.01 and 0.81)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = Weighted average of 0.79 and 0.96)
	BC	R	38.1	**43.4**	38.9	37.1	-
	BD	R	33.4	37.6	36.3	38.1	38.8
	BDQ	R	33.0	38.9	36.8	39.1	36.1
	BE	R	**45.5**	**52.3**	**49.2**	**51.2**	**46.0**
	BF	R	39.6	**46.7**	**40.2**	**42.2**	**41.2**
	BG	R	36.5	**40.6**	**40.0**	**42.0**	**42.4**
	BO	R	34.7	**40.2**	37.8	37.8	38.1
	BP	R	37.3	**41.6**	37.6	39.9	39.0
	BR	R	38.6	**44.0**	38.9	38.6	37.1
	BS	UB	38.9	**47.1**	**40.8**	**44.4**	**40.7**
	GA	R	38.6	**45.9**	**42.4**	**44.8**	**42.4**
	GB	R	38.5	**46.0**	**45.4**	**43.3**	**40.3**
	GC	R	39.5	**46.0**	**41.6**	**45.0**	**41.7**
	GD	R	**40.0**	**44.2**	**45.1**	**47.1**	**-**
	S3N	UB	23.0	28.0[1]	29.3	35.2	-
	S5N	UB	28.1	33.1[1]	35.4[1]	37.1	-
	TA	R	24.5	33.7	31.2	30.2	31.7
	C5A	R	38.5	39.9	**40.0**[1]	**40.4**	33.1
	C5D	R	36.2	**42.3**	**40.1**	35.5	34.9
	C5E	R	39.6	**45.9**[1]	28.4[1]	30.7	37.2
	C6A	R	30.8	**43.1**	36.4	32.9	34.5
	C6D	R	33.1	34.2	30.8	35.7	-
	C6E	K	30.3	36.7	35.5	35.5	32.3
	C7A	R	**45.8**	39.1[1]	29.3	35.6	32.9
	C7D	K	35.5	39.4	35.7	32.2	36.0

Location	Site ID	Site Type	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [1]				
			2011 (Bias Adjustment Factor =0.93)	2012 (Bias Adjustment Factor = 1.02)	2013 (Bias Adjustment Factor = Weighted average of 1.01 and 0.81)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = Weighted average of 0.79 and 0.96)
	C7E	R	31.5	**43.8**	38.6	**40.5**	38.2
	C7F	K	**41.4**	39.3[1]	38.4[1]	35.6	34.1
	C7H	R	34.4	37.5	25.8	34.3	21.6
	C7I	R	28.9	33.6	26.8	25.7	-
	C13D	R	34.9	**44.8**[1]	30.0	30.0	33.8
	C13E	R	29.9	33.2	31.0[1]	37.7	-
Bearwood	OA	R	33.8	39.4	**40.9**	37.3	29.4
	OB	R	38.3	**46.9**	**47.4**	**43.4**	38.5
	OC	R	34.7	37.9	**40.6**	**40.4**	31.9
	OD	R	39.1	**43.1**	**44.5**[1]	**41.8**	**40.4**
	OE	R	30.5	35.8	35.5	34.9	34.0
	OF	R	30.7	38.3	37.4	37.0	-
	OG	R	35.1	38.7[1]	**40.0**	33.7	31.1
	OH	R	37.3	**44.5**	**41.3**	**40.0**	34.8
	OI	R	32.9	35.1	37.5	39.2	33.4
	OJ	R	**42.1**	36.1[1]	**41.1**	**44.0**	**43.8**
	OP4	R	34.1	39.6	35.9	37.6	36.8
	C9A	R	**41.2**	**42.2**	37.2	36.3	36.0
	C9D	K	32.4	35.1	**41.4**	39.0	35.1
	C10A	R	**42.9**	**47.5**	**46.8**	**45.6**	**42.1**
	C10D	K	**49.8**	**59.7**	**60.8**	**49.0**	**48.0**
	N2A	R	**43.0**	24.3	27.7	30.5	25.9
	N2B	K	27.8	31.7	33.4	30.7	-
	JA	R	30.6	38.5	31.8[1]	29.4	-
	JB	R	31.5	33.8[1]	32.8	31.0	-

Location	Site ID	Site Type	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [1]				
			2011 (Bias Adjustment Factor =0.93)	2012 (Bias Adjustment Factor = 1.02)	2013 (Bias Adjustment Factor = Weighted average of 1.01 and 0.81)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = Weighted average of 0.79 and 0.96)
	MA	R	34.0	39.1	39.4	**40.7**	**45.5**
	MB	R	33.9	36.4	35.0	38.0	-
	MC	R	**43.2**	**43.5**[1]	**44.2**	**40.1**	37.3
	MD	R	22.3	26.3	25.3	28.6	-
Blackheath	C11A	R	33.7	39.3	34.7[1]	37.3	31.9
	C11D	K	**40.9**	**40.5**	32.5[1]	35.8	39.3
	C11E	K	36.4	**43.1**	35.0[1]	34.2	34.2
	C12A	R	**51.2**	**52.8**[1]	**49.3**	**50.3**	**49.7**
	C12D	K	**47.1**	**53.4**[1]	**44.2**	**42.7**	39.7
	C12E	R	**41.3**	**40.9**[1]	39.2	35.2	37.3
	UA	R	**41.8**	**43.2**[1]	**41.3**[1]	32.6	32.7
	UB	R	35.5	39.9[1]	**40.0**[1]	33.3	34.0
	UC	R	34.2	**40.5**[1]	**42.3**	37.6	34.4
	C15A	R	**46.9**	38.7[1]	**49.2**[1]	**41.4**	**43.0**
M5 J1 - J2	RA	R	**40.2**	**40.77**	38.8	38.5	36.1
	S7N	UB	24.5	23.88	24.2	29.7	-
West Bromwich	HA	R	30.0	34.25	33.6	33.1	30.2
	LA	UB	21.7	24.65	27.4	26.1	26.0
	LB	UB	23.3	24.93	26.7	25.9	22.4
	LC	UB	22.1	25.73	28.1	26.3	26.5
	LD	UB	27.3	24.82	27.1	27.0	-
	SU	R	22.8	27.2	27.4	28.6	27.9
	C1A	R	34.0	35.1	30.9	31.3	**40.5**
	C1D	R	**40.1**	**48.5**[1]	**45.5**	**42.9**	39.3
	C2A	R	31.8	34.04[1]	32.1	29.3	34.6

Location	Site ID	Site Type	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [1]				
			2011 (Bias Adjustment Factor =0.93)	2012 (Bias Adjustment Factor = 1.02)	2013 (Bias Adjustment Factor = Weighted average of 1.01 and 0.81)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = Weighted average of 0.79 and 0.96)
	C2E	R	30.8	35.3	33.4	35.4	33.7
	C4A	R	**40.7**	38.3	37.8	39.2	36.0
	C4D	R	**40.5**	**48.3**	**42.8**	**40.4**	39.1
	C4E	R	37.0	39.0[1]	39.5	**40.6**	38.0
	PS1A	R	34.1	37.8	35.1	33.9	34.6
	PS1B	R	35.1	39.3	33.9	33.7	-
	PS2A	R	34.3	37.3	32.7	36.4	-
	PS2B	R	35.0	38.8	31.2[1]	36.7	-
	N1A	R	35.2	39.9	35.5[1]	35.8	39.7
	N1B	K	38.2	38.7	34.6[1]	39.0	34.1
	EA	R	31.2	39.9[1]	29.2	29.7	32.7
	EB	R	31.4	36.2	32.5	29.4	23.7
	EC	R	28.1	33.3	31.1	33.5	-
	ED	R	38.0	**40.8**	36.8	32.8	31.6
	EE	R	30.5	37.2	**40.3**	**41.8**	35.6
	EF	R	32.5	37.8	36.2[1]	34.4	**41.3**
	EG	R	30.0	36.5	33.2	29.9	-
	EH	R	25.7	27.0	29.5[1]	26.5	-
	EI	R	29.0	33.3	32.5	30.6	-
Wednesbury	AC	R	24.8	28.7	28.5[1]	**40.9**	25.7
	AD	R	**50.7**	**44.3**	39.8[1]	34.3	30.6
	AE	R	**44.0**	**44.4**	36.4[1]	33.0	37.3
	AF	R	**42.6**	**40.0**	**40.7**[1]	32.2	-
	WW/WW2	UB	24.5	28.6	27.8	28.5	-
	WW3	R	23.9	20.7[1]	27.1	27.9	-

Location	Site ID	Site Type	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [1]				
			2011 (Bias Adjustment Factor =0.93)	2012 (Bias Adjustment Factor = 1.02)	2013 (Bias Adjustment Factor = Weighted average of 1.01 and 0.81)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = Weighted average of 0.79 and 0.96)
	WW4	R	22.1	25.6	27.2	29.5	-
	C14A	R	30.3	35.5[1]	37.1	31.8	32.6
	C14D	R	33.6	36.3	34.6	34.3	-
Tipton	OS2	R	16.0	19.9	20.2	19.0	-
	DP1	R	36.8	**40.5**	38.9[1]	33.7	33.3
	DP3	R	26.9	27.6[1]	27.1	23.6	-
	DP4	R	35.2	35.4[1]	35.2[1]	33.5	30.6
	DP5	R	32.7	36.8[1]	35.2	32.9	-
	TE	R	28.5	33.7	33.5	25.6	-
	TF	R	18.9	27.94	29.9	31.4	-
	TG	R	21.4	34.4[1]	20.1[1]	24.6	-
	TI	R	28.6	39.2[1]	24.9[1]	26.0	-
	VA	R	25.7	29.0	28.8	39.4	-
	VB	R	27.4	29.8	30.5	30.9	-
	VC	R	29.9	33.1	34.3	33.5	-
	VD	R	39.8	**42.7**	**42.1**[1]	35.0	32.4
Cradley Heath	CH2	R	27.5	30.2	28.2	30.0	-
	CH3	R	27.8	32.4	29.1	32.7	-
	CH4	K	24.3	24.8	24.4	27.4	-
	HH1	UB	17.3	18.2	17.5	17.7	15.1
	HH2	UB	18.2	19.8[1]	18.0	17.6	-

Table A.6 – Annual Mean PM_{10} Monitoring Results

Notes: Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold.**

Site ID	Location	Site Type	Within AQMA?	Valid Data Capture 2015%	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m^3)				
						2011	2012	2013	2014	2015
West Bromwich	Highfields, West Bromwich	Urban Background	No	22.8%	Y	17.2	9.0[1]	17.4 (17.5)[3,6]	15.5	15.7 (19.7)[4,5]
Birmingham Road	Oldbury	Roadside	No	80.8%	Y	19.1	17.5	21.4	19.2	17.9
Wilderness Lane	Great Barr	Roadside	No	0%	Y	18.4	15.9	14.4	15.4 (15.7)[3,8]	No Data
Haden Hill	Haden Hill Park, Cradley Heath	Urban Background	No	0%	N	18.4[2]	16.0[2]	16.8 (19.1)[2,3,7]	16.0 (15.7)[2,3,9]	No Data

[1]. Exceptionally low data capture for 2012 due to station relocation. Result not acceptable for comparison with annual mean objective or with previous years monitoring.
[2]. Results corrected using King's College London Volatile Correction Model as described in Box 3.4 in LAQM TG.09 and geographically specific spreadsheet downloaded from www.volatile-correction-model.info/default.aspx
[3]. Data Capture <75% of full calendar year. Short term mean has been annualised " as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), Two monitoring sites Birmingham Tyburn Road and Nottingham Centre which both form part of the AURN have been used for annualisation.(Short term mean is presented in bracket)
[4]. Data capture <75%, bias adjusted annual mean concentration has been annualised following the procedure described in Technical Guidance LAQM.TG16 Box 7.9 using ratified data from AURN background sites Birmingham Tyburn Road and Leamington Spa. Short term mean is presented in brackets.
[5].2015 Short Term Adjustment Factor for West Bromwich – Ra: 0.80
[6]. 2013 Short Term Adjustment Factor for West Bromwich - Ra: 0.99
[7]. 2013 Short Term Adjustment Factor for Haden Hill - Ra: 0.88
[8]. 2014 Short Term Adjustment Factor for Wilderness Lane Great Barr – Ra: 0.99
[9]. 2014 Short Term Adjustment Factor for Haden Hill - Ra: 1.01

Table A.7 – 24-Hour Mean PM_{10} Monitoring Results

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.**

Site ID	Location	Site Type	Within AQMA	Valid Data Capture 2015 %	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m^3				
						2011	2012	2013	2014	2015
West Bromwich	Highfields, West Bromwich	Urban Background	No	22.8%	Yes	10	N/A[3]	8 (32.9)[1]	5 (26.4)[1]	10 (29.6)[1]
Birmingham Road	Oldbury	Roadside	No	80.8%	Yes	13	8	9 (35.8)[1]	7 (34.6)[1]	4 (36.2)[1]
Wilderness Lane	Great Barr	Roadside	No	0%	Yes	9	6 (30.2)[1]	5 (25.9)[1]	6 (30.4)[1]	No Data
Haden Hill	Haden Hill Park, Cradley Heath	Urban Background	No	0%	No	7[2]	4[2]	4 (29)[1,2]	2 (27.4)[1,2]	No Data

[1]. Data capture for full calendar year is less than 90%, 90.4th percentile of 24-hour mean is provided in brackets.

[2]. Results corrected using King's College London Volatile Correction Model, a geographically specific spreadsheet downloaded from www.volatile-correction-model.info/default.aspx

[3]. Low data capture – No reliable monitoring results for comparison with the 24 Hour Mean Objective

Table A.8 – $PM_{2.5}$ Monitoring Results

Site ID	Location	Data Capture 2015 %	Annual Mean µg/m^3					
			2010	2011	2012	2013	2014	2015
Haden Hill	Haden Hill Park Cradley Heath	88.2%	12.2	10.8	9.2	9.8	8.5	6.7

1. Monitoring analyser is not deemed equivalent to the European Reference Method.

Table A.9 – SO_2 Monitoring Results

Notes: Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

Site ID	Location	Site Type	Within AQMA	Data Capture 2015 %	Number of SO_2 Exceedances (percentile in bracket µg/m^3)		
					15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
West Bromwich	Highfields West Bromwich	Urban Background	No	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Bearwood OPSIS[2]	Bearwood Road	Roadside	No	99.6%	N/A	0 (8.0)[3]	0 (4.7)[4]

1. No data capture, analyser offline
2. OPSIS is an indicative monitoring technique providing hourly concentrations only.
3. 99.7th percentile is given in brackets
4. 99th percentile is given in brackets

Table A.10 – Ozone (O_3) Monitoring Results

Site ID	Location	Data Capture 2015%	Annual mean O_3 concentrations ($\mu g/m^3$)				
			2011	2012	2013	2014	2015
West Bromwich	Highfields West Bromwich	67.6%	61.7	N/A[2]	51.3	47.2	50.0
Bearwood Road OPSIS[1]	Bearwood Rd	99.2%	49.1	82.7	61.4	62.8	65.8

1. Bearwood Road OPSIS is an indicative analyser and the results should be viewed with caution.
2. No data capture due to station relocation to Highfields and ongoing technical issues.
3. Low Data Capture - Annual mean result presented, however this has not been annualised.

Table A.11 – Ozone (O_3) Exceedances of the Maximum Daily 8 Hour Running Mean

Site ID	Location	Data Capture 2015%	Number of Daily Maximum O_3 Exceedances based on 8-Hour Running Mean				
			2011	2012	2013	2014	2015
West Bromwich	Lombard Street West Bromwich	67.6%	85	N/A[2]	22	11	0
Bearwood Rd OPSIS[1]	Bearwood Road	99.2%	0	1	1	0	0

1. Bearwood Road OPSIS is an indicative analyser and the results should be viewed with caution.
2. No data capture due to station relocation to Highfields and ongoing technical issues.

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 ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (1)	Distance Corrected to Relevant Receptor
AD	**40.3**	37.2	36.6	28.7	19.4	19.9	24.8	25.3	31.5	35.8		28.3	29.8	25.7	25.3[3,4]
AE	31.6	**50.7**	**45.0**	**40.2**	25.2	22.0		28.4	34.8	**44.6**	37.7	30.4	35.5	30.6	29.4[3]
AF	**57.3**	**44.6**	**55.1**	**46.4**	35.4	33.7	**41.8**	**41.7**	**43.5**		**42.7**	38.0	**43.7**	37.3	36.2[3]
BA	**49.3**	**64.3**	**55.3**	**48.6**	37.9	32.5	**47.8**	35.9	35.8	**45.2**	36.2	33.9	**43.6**	37.0	33.6[3,4]
BD	**51.4**	**67.3**	**62.9**		36.5	37.2	35.5	**44.5**	**43.6**	**50.5**	31.0	29.7	**44.5**	38.3	-
BDQ	**46.8**	**62.1**	**53.3**	**45.5**	34.9	39		19.9	38.5	**46.9**	**42.7**	32.3	**42.0**	36.1	-
BE	**52.6**	**72.2**	**67.5**	**58.2**	39.9	**42.7**	**56.8**	**52.5**	**52.9**	**66.7**	**41.7**	**40.2**	**53.7**	**46.0**	**43.8**[3]
BF	**55.5**	**70.0**	**59.5**	**45.4**	**44.4**	**28.8**	**52.4**	**43.7**	**44.3**	**51.6**	**43.3**	39.4	**48.2**	**41.2**	-
BG	**46.8**	**64.1**	**57.1**	**51.0**	**45.4**	**43.0**	**77.7**	**45.0**	**43.8**	**53.3**	37.3	33.8	**49.9**	**42.4**	-
BO	**43.6**	**55.4**	**53.6**	**43.4**	**44.7**	**42.5**	**46.4**	**40.8**	**42.7**	**49.1**	31.3		**44.9**	38.1	-
BP	**46.7**	**53.6**	**56.8**	**47.9**	**42.4**	39.9	**43.0**	**41.9**	**43.7**	**57.2**		30.1	**45.7**	39.0	-
BR	**50.1**	**62.7**	**56.4**	**47.0**	**41.0**	**41.2**	39.5	37.3	**41.9**	**49.9**	24.6	31.6	**43.6**	37.1	-
BS	**58.1**	**68.6**	**58.4**	**41.2**	**42.4**	32.9	**45.9**	**44.8**	38.6	**52.6**	**49.8**	37.5	**47.6**	**40.8**	**-**

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (1)	Distance Corrected to Relevant Receptor
C10A	**57.4**	**60.6**	**63.4**	**45.4**	**44.5**	**51.0**	**52.6**	**47.3**	**47.6**	**49.8**	39.5	33.9	**49.4**	**42.1**	-
C10D	**89.1**	**67.7**	**77.3**	**59.4**	**59.8**	32.7	36.4	33.1	**62.0**	**64.1**	**52.5**	**40.3**	**56.2**	**48.0**	38.2[3]
C11A	38.2	**42.3**	**51.8**	33.2	29.7	35.8		35.1	38.8	38.9	34.9	29.4	37.1	31.9	-
C11D	**55.7**	**58.8**	**56.2**	**44.1**	37.9	38.2	**41.0**	**44.8**		**47.4**	**44.7**	37.2	**46.0**	39.3	35.6[3]
C11E	**48.4**	**57.0**				26.5	37.0	33.3	**40.7**	**41.8**	38.5	30.3	39.3	34.2	31.8[3]
C12A	**67.4**	**63.4**	**59.8**	**60.8**		**61.4**	**57.0**	**54.1**	**54.8**		**54.2**	**49.8**	**58.3**	**49.7**	-
C12D	**59.4**	**66.5**	**63.5**	**44.1**	35.8	39.2	34.5	**40.2**	**52.6**	**50.8**	39.7	30.5	**46.4**	39.7	31.1[3]
C12E	**53.4**	**60.3**	**51.4**	**46.4**	36.2	36.2		**40.0**	**48.6**	**46.4**	33.0	25.1	**43.4**	37.3	-
C13D	**47.2**	**50.2**	**48.1**	37.9	32.9		29.4			39.5	37.6	34.8	39.7	33.8	32.8[3]
C14A	**40.7**	**50.8**	**40.9**	33.0	28.3			27.9	37.8	**41.8**	**42.4**	34.7	37.8	32.6	31.3[3]
C15A	**66.1**	**67.0**	**62.4**	**52.5**	**42**	39.1	**41.5**	**50.2**	**46.5**	**53.4**		35.6	**50.6**	**43.0**	**42.0[3]**
C1A	**58.7**	**72.5**	**72.3**	**48.5**	**45.4**	**48.3**	**53.0**	30.5	31.5	35.7	**41.8**	38.0	**48.0**	**40.5**	**43.6[3]**
C1D	**67.3**	**43.4**	**47.9**	31.8	32.5	24.6	31.8	39.3	**49.0**	**59.4**	**54.0**	**59.6**	**45.0**	39.3	38.1[3]
C2A	**43.9**	**47.9**	**46.6**			29.6		35.3	**41.3**	**45.0**	37.5	31.8	39.9	34.6	-
C2E	**48.4**	**49.9**	**40.7**	39.0	29.8	29.0	37.2	38.5	38.2	**45.4**	37.8	35.5	39.1	33.7	-
C4A	**43.3**	**68.4**	**52.2**	38.5	**47.1**	**41.6**	**43.3**	15.8	**37.6**	39.5	**43.0**	39.4	**42.5**	36.0	-

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 (1)	Distance Corrected to Relevant Receptor
C4D	**56.3**	**51.2**	**53.8**	**40.4**	34.4	28.0		39.6	**45.7**	**47.2**	**50.7**	**52.6**	**45.4**	39.2	32.8[3]
C4E	**57.5**	**61.2**	**60.5**	**45.4**	30.9	32.1	**45.8**	38.6	**40.7**	**47.1**	**44.1**	**30.0**	**44.5**	38.0	34.5[3]
C5A	**58.6**	**65.4**	**48.3**	**48.9**	26.4	27.1	30.1	31.3	34.8	38.6	30.2	27.7	39.0	33.1	-
C5D	**55.0**	**52.4**	26.3	**42.9**	28.5	33.7	**40.1**	**40.0**	**43.6**	**50.3**	37.5	35.4	**40.5**	34.9	31.4[3]
C5E	**45.4**	**49.3**	**45.8**	33.6	**42.3**	**43.5**	**47.5**	39.8	**45.4**	**47.0**	**40.4**	39.1	**43.2**	37.2	34.9[3]
C6A	**45.2**	**54.1**	**41.9**	36.4	**41.8**	39.3	**43.9**	**41.0**	34.9	**40.4**	34.0	32.1	**40.4**	34.5	-
C6E	36.2	**41.0**	**48.0**	39.6	33.9	35.4	37.0	35.9	37.8	**42.3**	33.9	**30.6**	37.6	32.3	32.2[3]
C7A	**46.4**	**49**	39.4	33.9	34	27.6	**40.8**	33.0	37.5	**42.4**			38.4	32.9	-
C7D	**43.3**	**45.1**	**46.7**	**42.7**	31.9	32.6	34.7	34.2	**54.3**	**50.8**	**46.2**	**36.8**	**41.6**	36.0	33.8[3]
C7E	**57.6**	**67.8**	**62.9**	**52.1**	**43.8**	**43**	**50.1**	17.2	37.5	**43.1**	35.6	**33.0**	**45.3**	38.2	-
C7F	**49.2**	**55.4**		32.7	32	33.1	38.16	**41.0**	**44.7**	**40.4**	30.4		39.7	34.1	29.8[3]
C7H	34.3	36.5	28.4	24.5	16.9	15.4		21.9	22.8	29.0	24.3	**21.9**	25.1	21.6	-
C9A	**54.0**	**61.2**	**51.8**	**48.7**	39.9	**40.0**	38.1	**45.9**	35.3	38.5	25.4	**29.7**	**42.4**	36.0	-
C9D	**46.3**	**43.2**	**43.4**		28.7	29.2	28.4	**59.7**	**48.1**	**54.8**	35.8	**30.4**	**40.7**	35.1	29.1[3]
DP1	**42.4**	**50.1**	**51.1**	39.4	31.9	34.7	38.9	34.4		**42.8**		**29.9**	39.6	33.3	32.4[3]
DP4	**47.5**	**44.9**	**42.9**	33.6	36.7		28.2	36.7			34.9	**23.0**	36.5	30.6	28.8[3]

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)	Distance Corrected to Relevant Receptor
EA	**56.4**	**61.1**	**65.1**	27.8	27.9	22.2	26	27.5	35.3	39.8	35.0	**35.8**	38.3	32.7	30.4[3]
EB	30.3	**47.2**	**40.5**	29.2	24.0	22.0	24.8	20.6	29.4	35.4		**8.5**	28.4	23.8	21.1[3,4]
ED	**40.3**	**47.1**	**45.4**	33.9	30.6	34.6	38.4	32.7	35.4	**45.6**	32.0	**26.9**	36.9	31.6	29.6[3]
EE	**49.6**	**51.0**	**42.5**	**45.2**	**33.3**	**39.8**	**49.2**		**35.4**	**39.0**	**39.7**	**37.4**	**42.0**	**35.6**	-
EF	**66.6**	**56.3**						**33.9**	**32.4**		**32.4**	**31.5**	**42.2**	39.3 (**41.3**)[2]	34.2[3]
GA	**50.6**	**63.8**	**66.7**	**48.6**	**42.7**	**39.2**	**62.5**	**43.5**	**39.7**	**51.7**	**49.4**	**38.0**	**49.7**	**42.4**	-
GB	**60.2**	**65.2**	**60.0**	**39.1**	**42.7**	**35.2**	**49.6**	**40.6**	**39.4**	**51.0**	**48.2**	**35.2**	**47.2**	**40.3**	-
GC	**55.9**	**69.5**	**65.1**	**52.9**	**43.2**	**35.7**	**45.3**	**44.4**	**40.0**	**49.8**	**47.4**	**36.7**	**48.8**	**41.7**	-
HA	**42.5**	**42.1**	**48.7**	**42.4**	**30.2**	**30.9**	**34.3**	**19.1**	**31.7**	**41.6**	**32.4**	**29.4**	**35.4**	**30.2**	28.7[3]
HH1	23.3	28.6	23.2		12.5	12.6	13.9	14.0	17.5	21.5	14.7	11.1	17.5	15.1	-
KD	**45.4**	**50.6**	**47.1**	37.0	26.9	23.2	29.6	25.8	33.3	**42.4**	20.0	23.4	33.7	28.7	-
KE	**45.3**	**40.8**	37.6	29.5	32.1	29.8	28.3	22.7	28.6	39.3	26.1	29.9	32.5	27.8	-
LA	35.6	32.8	36.3	26.6	22.1	20.1	29.2	31.1	24.3	32.2	46.7	23.8	30.1	26.0	-
LB	38.3	33.7	27.9	22.7	18.6	18.8	23.0	20.9	25.1	30.0	26.8	25.9	26.0	22.4	-
LC	39.7	**40.0**	33.2	32.0	23.6	20.9	27.1	21.8	26.3	30.7	**48.2**	25.6	30.8	26.5	-
MA	**67.4**	**63.9**			**52.1**	**49.6**	**51.7**	**49.3**	**46.7**	**50.0**	**44.2**	**49.9**	**52.5**	**45.5**	**43.4**[3]

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)	Distance Corrected to Relevant Receptor
MC	**52.7**	**58.7**			35.1	**41.7**	**42.6**	**43.0**	39.3	**41.9**	**41.5**	34.7	**43.1**	37.3	36.2[3]
N1A	**58.9**	**60.3**			**41.7**	**41.1**	**42.8**	**46.4**	**41.0**	**48.6**		34.9	**46.2**	39.7	36.7[3]
N1B		**48.9**				26.7	38.4	38.0	35.2	**41.0**	**40.0**	35.4	38.0	34.1 (32.7)[2]	32.2[3]
N2A	**42.3**	**63.1**		18.0	23.3	17.1	21.8	23.8	34.1	37.9	26.6	23.1	30.1	25.9	-
OA		26.5	**53.5**		29.2	36.7	28.1	35.6	34.4	39.1	29.0	29.3	34.1	29.4	-
OB	**56.3**	**57.7**	**56.7**	**42.4**	**40.9**	35.0	**42.4**	**45.6**	**46.2**	**43.9**	38.9	33.9	**45.0**	38.5	-
OC	**50.2**		28.8	32.5	34.1	**40.9**		36.0	38.7	**44.3**	34.7	29.9	37.0	31.9	-
OD	**62.5**	**60.1**	**55.8**	**46**	**45.2**	31.1	**43.6**	**45.1**	**41.4**	**45.3**	**45.1**	**44.2**	**47.1**	**40.4**	-
OE	**47.8**	**46.8**	**42.6**	27.6		28.5	34.2	35.5	**43.0**	**45.8**			39.1	34.1	-
OG		**20.8**	**51.8**	36.0	31.5	35.1		38.3		**47.4**	37.4	26.2	36.0	31.1	30.1[3]
OH		**63.7**	**61.4**	33.3		30.5	34.4	**41.6**	**53.0**	**48.3**	8.3	26.5	**40.1**	34.8	30.2[3]
OI	**40.6**	**43.5**	34.1	34.2	29.5		29.9	33.8	**44.5**	**50.4**			37.8	33.5	28.3[3]
OJ	**74.4**	**77.9**	**55.1**			**41.5**		38.7	39.9	**42.5**	39.2	28.6	**48.6**	**43.8**	35.7[3]
OP4	**55.1**	**54.8**	**51.1**	**43.6**	36.5	**44.4**	**42.7**	39.9	**40.6**	39.9	38.7	30.4	**43.1**	36.8	-
PS1A	**54.1**	**45.8**	**48.5**	34.6	37	32.3	**43.8**	39.4	37.2	39.4	38.1	35.2	**40.4**	34.6	-
RA	**49.8**	**55.9**	**46.4**	**43.9**	34.3	26.8	39	39.0	**41.5**	**48.2**	**40.6**	38.5	**42.0**	36.1	-

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)	Distance Corrected to Relevant Receptor
SA	**51.9**	**47.5**	**41.8**	28.3	29.4	27.7	**40.1**	28.1	29.9	38.4	32.9	36.4	36.0	30.8	-
SU	35.8	26	38.1	34.8	24.3	25.2	28	24.8	39.1	**41.0**			31.7	27.9	-
TA	**41.8**	**45.7**	**43.6**	37.9	36.0			25.5	34.6	34.4	36.1	29.9	36.6	31.7	-
UA	**44.1**	**53.3**	**43.9**	**40.0**	34.7	31.6	27.9	34.0	37.6	**43.6**	37.6	29.7	38.2	32.7	31.8[3]
UB	**52.6**	**56.9**	**46.9**	33.5	31.7	30.1	33.8	36.0	38.8	**45.2**	38.5	31.3	39.6	34.0	31.3[3]
UC	32.6	**61.8**		35	36.6	34.5		35.8	39.8	**46.2**	**42.5**	34.9	**40.0**	34.4	31.2[3]
VD	**52.9**	**57.8**	**61.5**			25.9	30.9	25.4	28.2	37.9	27.5	21.8	37.0	32.4	30.2[3]
WA	**64**	**62.4**	**47.7**	**40.4**	36.7	29.5	**40.9**	34.6	32.8	32.8	**41.7**	37.2	**41.7**	35.5	-
WB	**52.4**	**47.8**	39.2	31.5	35.8	20.9	32.2	30.6	31.0	31.2	35.6	34.1	35.2	30.1	-
WF	**57.1**	**63.7**	**41.5**	29.7	34.2	27.6	32.3	28.4	31.4	35.9	39.3	35.4	38.0	32.5	-
XE	**42**		26.9		22.1	22.3	35.3	27.4	36.5	**49.8**	26.7	29.7	31.9	27.3	-
ZA	**58.3**		21.3		25.5	34.9	**43.3**	27.8	38.7	**44.3**	23.6	25.3	34.3	29.7	-
ZC	39.8		23.5			21.6	36.4	23.8	33.9	**47.0**	26.5	29.0	31.3	26.8	-
ZK	**49.9**		20.4		23.5	29.2	**42.3**	27.1	35.0	**44.6**	28.0	31.0	33.1	28.5	-
ZO		**50.3**	**50.7**	36.2	28.7	27.7	**42.3**	27.9	38.7	**49.3**	26.7	30.3	37.2	32.0	-
ZP	**49.6**	**41.5**	**49.2**	**43.8**	33.0	31.5	**45.4**	28.3	36.4	**53.0**	30.1	32.2	39.5	33.8	-

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (1)	Distance Corrected to Relevant Receptor
ZQ	**50.5**	**49.4**	**66.6**	**47.7**	**43.1**	**49.2**	**64.0**	38.6	**56.2**	**72.0**	**41.7**	**40.4**	**51.6**	**44.3**	-
ZR	**63.4**	**63.8**	**60.7**	**43.7**	**45.0**	**51.3**	**64.3**	**41.2**	**49.0**	**54.6**	**41.5**	**44.2**	**51.9**	**44.3**	-

1 See Appendix C for details on bias adjustment

2 Data capture is less than 75% therefore an Annualised mean has been calculated from the short term monitoring data (Calculated using methodology described in Box 7.9 Technical Guidance LAQM TG(16)) using background diffusion tube sites HH1, LA, KD and WF. The bias adjusted short term monitoring result is recorded in brackets.

3 Monitoring location is not representative of public exposure. NO_2 concentration has been estimated at the closer receptor using the NO_2 fall-off with distance" calculator (http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html), which follows the procedure explained in Box 5.2 of Technical Guidance LAQM.TG(16)

4 Distance correction calculation was undertaken using an adjacent published background concentration, because the measured concentration was lower than the published background concentration for the given diffusion tube location. Recommendation by LAQM Helpdesk 26/4/2012.

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

C1: Significant changes to sources / changes to proposed monitoring in 2016

No significant changes to report.

C2: Monitoring / modelling of emissions

New monitoring data from 2015 has confirmed ongoing exceedances of the annual mean NO_2 objective at the following locations within the existing borough wide AQMA:

Sandwell MBC Nitrogen Dioxide Annual Mean Exceedance Areas	
Area	**Description Of Area**
1	Area between M5, Birmingham Road and Blakeley Hall Road - Oldbury
8	Dudley Road East / Roway Lane (A457), Oldbury
9	Area surrounding the M6/M5, Junctions 7- 8 Great Barr and 1-2 West Bromwich respectively
10	Newton Road / Birmingham Road (A34), Great Barr
11	Bearwood Road, Smethwick
16	All Saints Way / Expressway, West Bromwich
22	Gorsty Hill, Blackheath

Sandwell Council will continue to monitor air quality at key locations to confirm the trends in pollutant concentrations, in order to determine whether compliance with the objectives is achieved in future years. Where locations are currently compliant with the objectives, further monitoring will be undertaken to confirm ongoing compliance, with a view to removing identified locations from the list of key exceedance areas within the borough wide AQMA.

At the current time Sandwell MBC will retain its borough wide AQMA, as this is deemed the most effective method for reducing concentrations of NO_2 and other key pollutants such as particulate matter.

C3: QA/QC on monitoring data

Air quality data should meet Quality Control and Quality Assurance (QA/QC) criteria. The purpose of this is to ensure that the concentrations of pollutants measured represent the actual concentrations of pollutants in the atmosphere. In addition, the data must be consistent over time and sufficiently accurate and precise to enable a comparison with the National Air Quality Objectives. Sandwell MBC follows QA/QC procedures laid down in Technical Guidance provided by DEFRA in LAQM.TG(16).

C3.1 Automatic Monitoring

All analysers are calibrated at fortnightly intervals by an experienced Local Authority Officer and the results are scaled and validated every two months. The validation process takes account of: calibration factors, negative or out of range data, rapid 'spikes' in data and comparisons with results from other monitoring stations. This is in accordance with the procedure described in the AURN Operator's Manual.

All monitoring data is collected, scaled and ratified in accordance with Technical Guidance LAQM TG (16). The operation of all monitoring equipment was carried out in accordance with the AEA Site Operator's Manual.

The following automatic analysers are used within Sandwell's monitoring stations:

West Bromwich AURN

APNA370 Ambient NOx
APOA370 Ambient O_3

Tapered Element Oscillating Microbalance (TEOM) with Filter Dynamics Measurement System (FDMS) measuring PM_{10} (Particulate Matter < 10 microns)

West Bromwich Roadside

Teledyne API T200 Ambient NOx

Birmingham Road

APNA370 Ambient NOx
Tapered Element Oscillating Microbalance (TEOM) with Filter Dynamics Measurement System (FDMS) measuring PM_{10} (Particulate Matter < 10 microns)

Wilderness Lane – Great Barr

APNA370 Ambient NOx
Tapered Element Oscillating Microbalance (TEOM) with Filter Dynamics Measurement System (FDMS measuring PM_{10} (Particulate Matter < 10 microns)

Haden Hill

APNA370 Ambient NOx
Tapered Element Oscillating Microbalance (TEOM) 1400AB Measuring PM_{10} (Particulate Matter <10 microns)
Tapered Element Oscillating Microbalance (TEOM) 1400AB Measuring $PM_{2.5}$ (Particulate Matter < 2.5 microns)

Short-term to Long-term Data adjustment

Data with <75% data capture rate were adjusted in accordance with Box 7.9 of LAQM. TG (16), which states that it is permissible to annualise the data using background, roadside or kerbside sites. The data collated from the following sites has been annualised:

Nitrogen Dioxide: West Bromwich and Wilderness Lane Great Barr

PM_{10}: West Bromwich

Data was used from the background AURN sites at Tyburn Road, Birmingham, Acocks Green Birmingham, Coventry Allesley and Leamington Spa for NO_2 and Tyburn Road Birmingham and Leamington Spa for PM_{10}.

Table C.1 Site: Nitrogen Dioxide West Bromwich - Annualisation

	West Bromwich NO_2 µg/m3	Birmingham Acocks Green NO2 µg/m3	Birmingham Tyburn Rd NO2 µg/m3	Coventry Allesley NO2 µg/m3	Leamington Spa NO2 µg/m3	
Annual Meal (AM)	23.17	18.77	29.77	22.79	19.30	
Period Mean (PM)		21.76	33.84	24.04	19.42	
Ratio (AM/PM)		0.86	0.88	0.95	0.99	
					0.92	Average Ratio (Ra)
					21.34	**Annualised Mean**

Table C.2 Site: Nitrogen Dioxide: Wilderness Lane Great Barr Annualisation

	Wilderness Lane NO_2 µg/m3	Birmingham Acocks Green NO2 µg/m3	Birmingham Tyburn Rd NO2 µg/m3	Coventry Allesley NO2 µg/m3	Leamington Spa NO2 µg/m3	
Annual Meal (AM)	28.43	18.77	29.77	22.79	19.30	
Period Mean (PM)		25.46	36.16	32.56	27.11	
Ratio (AM/PM)		0.74	0.82	0.70	0.71	
					0.74	Average Ratio (Ra)
					21.12	**Annualised Mean**

Table C.3 Site: PM_{10}: West Bromwich Annualisation

	West Bromwich PM_{10} µg/m3	Birmingham Tyburn Rd PM_{10} µg/m3	Leamington Spa PM_{10} µg/m3	
Annual Meal (AM)	19.67	14.62	15.29	
Period Mean (PM)		17.48	20.17	
Ratio (AM/PM)		0.84	0.76	
			0.80	Average Ratio (Ra)
			15.68	**Annualised Mean**

PM Monitoring Adjustment

Tapered Element Oscillating Microbalance (TEOM) data is collected and ratified. Filter Dynamics Measurement System (FDMS) TEOM's are considered to be gravimetrically equivalent and therefore require no further adjustment. For non TEOM only instruments measuring PM_{10}, the King's College Volatile Correction Model has been applied to the data.

No such correction has been developed for $PM_{2.5}$ at the current time.

The instruments are manually checked on a fortnightly basis. Instrument filters are changed when the filter loading reaches 80% or is likely to reach 80% before the unit can be visited again. All work is carried out in accordance with the procedures described in the AURN Operator's Manual.

C4.2 Diffusion Tube Monitoring

In 2015 Sandwell MBC changed their diffusion tube supplier and details of both companies which undertook the analysis are presented below: Diffusion tubes were

exposed for monthly periods as prescribed in the Diffusion Tube Monitoring Calendar published by DEFRA[6].

Diffusion Tube Details		
Supplier	ESG (Didcot)	Gradko International
Period	January – July 2015	August –December 2015
Type Of Tube	Nitrogen Dioxide NO_2	Nitrogen Dioxide NO_2
Type of Absorbent	Triethanolamine	Triethanolamine
Method of Tube Preparation	50% TEA in Acetone	50% TEA in Acetone
Exposure Dates	LAQM Exposure Calendar 2015	LAQM Exposure Calendar 2015
Exposure Duration	One Month	One Month
Bias Adjustment Factor	0.79	0.96

ESG- Didcot and Gradko International follow the procedures set out in the Air Proficiency Testing Scheme (AIR-PT) an independent analytical proficiency testing scheme operated by LGC Standards. AIR offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient air.

The results of proficiency testing demonstrated that ESG-Didcot and Gradko had 'Satisfactory' Performance during all four rounds of testing in 2015. The results also demonstrated that ESG had 'Good' precision in the majority of testing rounds undertaken in the 2015 co-location studies, whilst Gradko had 'Good' precision in all testing rounds[7].

As a result of the change in laboratory part way through the year, Sandwell MBC was unable to submit results to the National co-location study**.**

The 2015 diffusion tube data has been bias adjusted in accordance with technical guidance LAQM TG(16) using a National Bias Correction Factor.

[6] http://laqm.defra.gov.uk/diffusion-tubes/data-entry.html
[7] Diffusion Tube Precision 2013-2015 http://laqm.defra.gov.uk/documents/Tube_Precision_2015_version_06_16-Final-REDUCED.pdf

The bias adjustment factor for each supplier was significantly different. To ensure an accurate bias corrected annual mean was presented, the following weighted bias adjustment methodology was undertaken for each diffusion tube. (Methodology recommended by the LAQM Helpdesk) was adopted:

((Jan – July average Concentration x 0.79)* (7/12)) + ((Aug – Dec average Concentration x 0.96)* (5/12)) = Weighted Bias Adjusted Annual Mean

Discussion of Choice of Factor to Use

The National Bias Adjustment Factors were selected because Sandwell's was unable to undertake a co-location study due to the change in diffusion tube supplier. Sandwell Council's monitoring sites also cover a large range of site types including urban background, kerbside and roadside and facades of buildings which will result in variations in recorded concentrations. The National Factors are calculated from a range of diffusion tube settings and are deemed representative of all monitoring sites within Sandwell.

Where data capture is below the required 75% (9 months) of the full calendar year, the Annualised Mean has been estimated using the procedure set out in Box 7.9 of LAQM.TG(16) for short term monitoring data and is presented as the annual mean in Table A.2. Where the result has been annualised, the bias adjusted short term annual mean monitoring result is recorded in brackets.

A total of 42 diffusion tubes are sited at locations with no relevant receptor. Results have been distance corrected using DEFRA's NO_2 Fall-Off with Distance Calculator[8] to the closest receptor. Distance corrected results are presented in Table B.1. Diffusion tube WA could not be distanced corrected, as the monitoring site is located at a distance that exceeds the maximum limit allowable when using the distance correction tool.

[8] http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

Appendix D: Map(s) of Monitoring Locations

Figure D.1 Map of Automatic Monitoring Sites

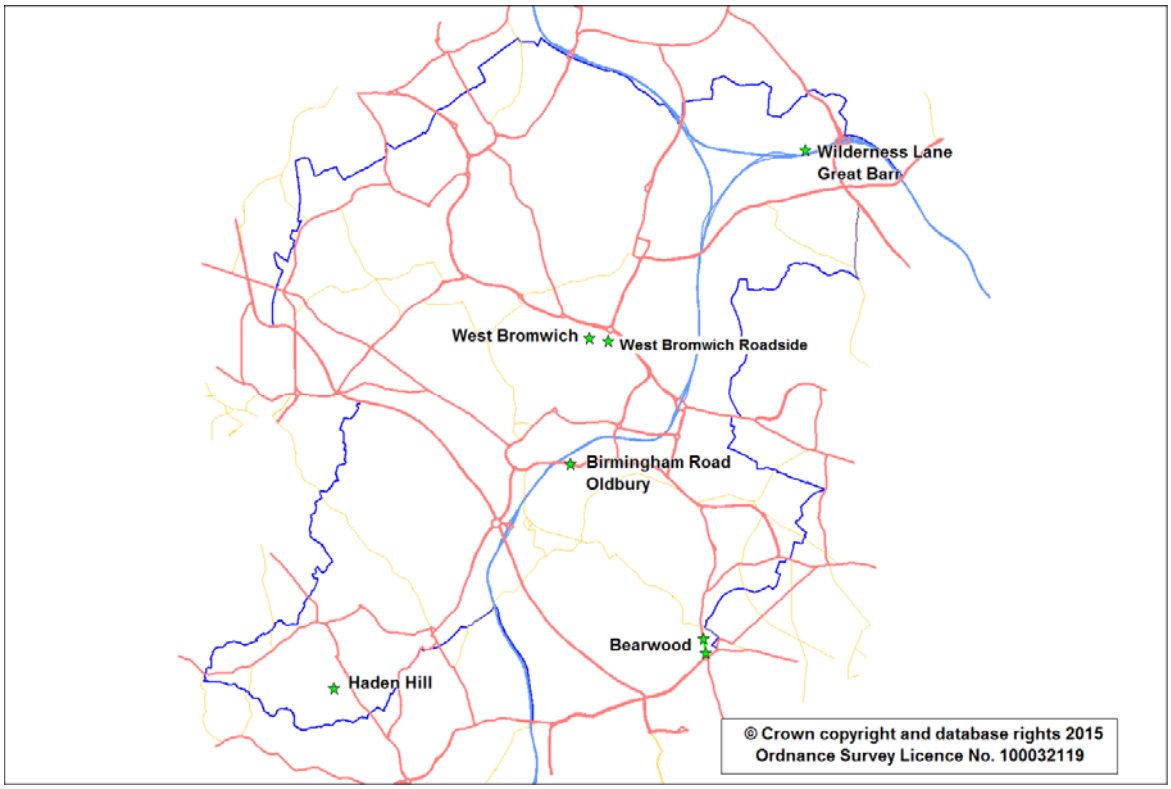
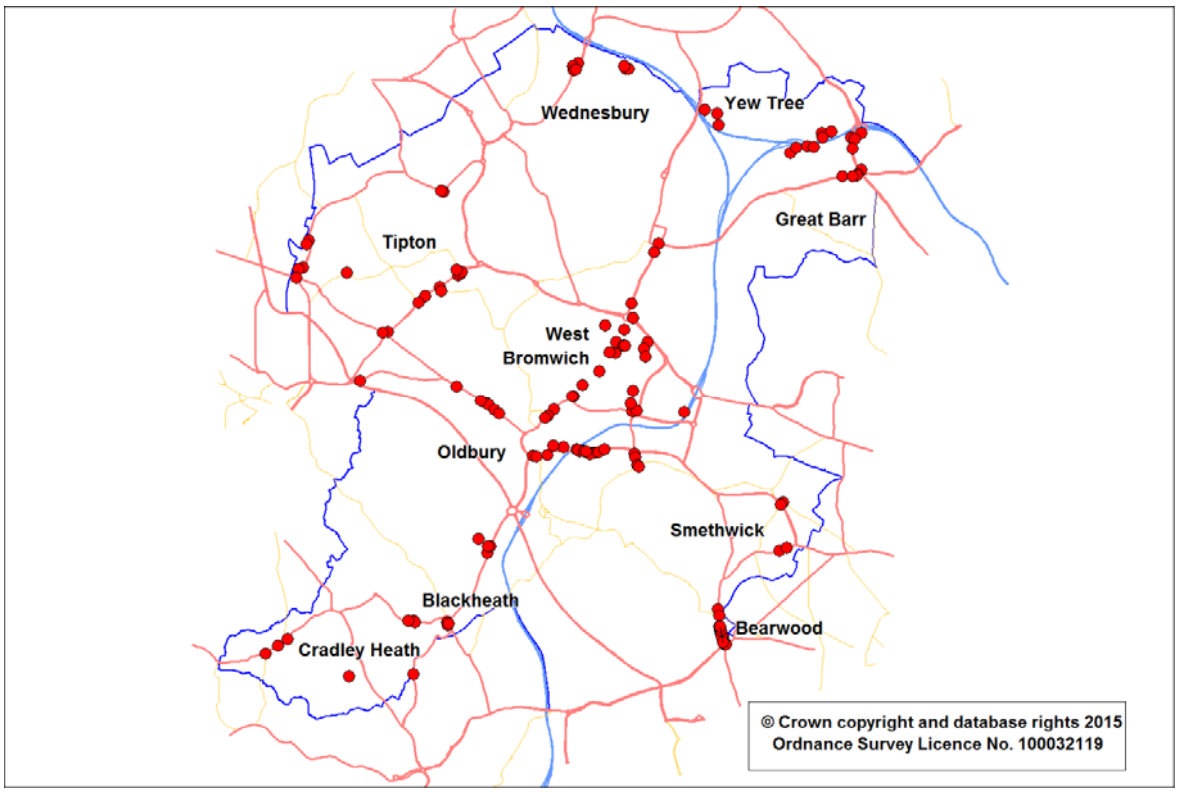


Figure D.2 Map of Non-Automatic Monitoring Sites



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
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
LETCP	Low Emission Towns and Cities Programme
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
O_3	Ozone
OPSIS	The OPSIS System measures multiple gases over an Open Path using the DOAS (Differential Optical Absorption Spectroscopy) technique.
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
SMBC	Sandwell Metropolitan Borough Council
SO_2	Sulphur Dioxide
TEOM	Tapered Element Oscillating Microbalance
$\mu g/m^3$	Microgrammes per Cubic Metre

References

1. Census. 2011 http://www.statistics.go.uk/census2011
2. Environmental Enquiry, Air Quality, Socioeconomic and Respiratory health. 2010
3. Air Quality and Social Deprivation in UK: An Environmental Inequalities Analysis 2006
4. DEFRA, Abatement Cost Guidance for Value in Changes in Air Quality May 2013
5. Public Health England 2014, 'Estimating Local Mortality Burdens Associated with Particulate Air Pollution
6. Diffusion Tube Calendar http://laqm.defra.gov.uk/diffusion-tubes/data-entry.html
7. Diffusion Tube Precision 2013-2015 http://laqm.defra.gov.uk/documents/Tube_Precision_2015_version_06_16-Final-REDUCED.pdf
8. Diffusion Tube Fall off With Distance Calculator http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
9. DEFRA 2016. Local Air Quality Management Technical Guidance TG.16.
10. DEFRA 2016. Local Air Quality Management Policy Guidance PG.16.
11. AIR-PT – Annual Performance Criteria for NO2 Diffusion Tubes used in Local Air Quality Management (LAQM), http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-%28April-2014-February-2016%29-NO2-report.pdf
12. Volatile Correction Model for Haden Hill PM_{10} TEOM Analyser http://www.volatile-correction-model.info/default.aspx
13. Sandwell Metropolitan Borough Council Updating and Screening Assessment 2015
14. Sandwell Metropolitan Borough Council Air Quality Action Plan 2009
15. LETCP Planning Guidance http://cms.walsall.gov.uk/low_emissions_towns_and_cities_programme

16. LETCP Procurement Guidance
http://cms.walsall.gov.uk/low_emissions_towns_and_cities_programme

17. Black Country Air Quality Supplementary Planning Document
https://www.sandwell.gov.uk/downloads/file/23699/black_country_air_quality_spd_draft