



2017 Air Quality Annual Status Report (ASR)

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

September 2017

Dudley Metropolitan Borough Council

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Report Reference number	DudleyMBC/ESH/1/2017
Date	September 2017

Executive Summary: Air Quality in Our Area

Air Quality in the Borough of Dudley

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

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

In 2007 Dudley MBC declared the whole borough as an Air Quality Management Area with respect to exceedances of the national air quality nitrogen dioxide (NO₂) annual mean objective.

Air quality in Dudley has continued to meet national air quality objectives with the exception of NO₂ which is mainly generated from combustion sources, specifically internal combustion engines in road vehicles. During the calendar year of 2016, Dudley MBC deployed NO₂ diffusion tubes at 50 sites and operated four automatic monitoring stations which monitor NO₂. Three of the stations also monitor for PM₁₀ and one of the stations was upgraded to monitor for PM_{2.5} at the end of 2016.

In 2015, eight roadside locations within the borough showed exceedances of the national air quality NO₂ annual mean objective and a further four sites were marginally compliant. However, air quality monitoring in 2016 showed a slight upward trend resulting in all twelve locations referenced in 2015 exceeding the national air quality NO₂ annual mean objective, these are listed below:

- Halesowen Road, Netherton
- Windmill Hill, Cradley,
- High Street, Pensnett
- Dudley Street, Sedgley
- High Street, Quarry Bank

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

² Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

- High Street, Wordsley
- Birmingham Road, Dudley
- Castle Hill, Dudley
- Mill Street, Brierley Hill
- Buffery Road, Dudley
- Hall Street, Dudley
- Burton Road/Eve Lane, Gornal

In addition monitoring undertaken during 2016 identified 2 further areas of exceedance

- New Road, Stourbridge
- Pedmore Road, Lye

Although levels at the existing monitoring locations generally increased during 2016, Dudley MBC did not identify any additional areas in the borough that need further investigation for NO₂ through additional monitoring. Air quality monitoring will continue during 2017/18 to quantify concentrations of NO₂, to inform future revisions of the air quality action plan and to confirm if compliance is maintained in areas where improvements have or are being made.

The air quality in the Borough complies with the national air quality objectives for particulate matter and PM₁₀ and PM_{2.5} will continue to be monitored to compare to national air quality objectives in order to determine continuing compliance or otherwise.

Actions to Improve Air Quality

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

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of the uptake of cleaner vehicle fuels and technologies. The programme consists of 4 main work streams, which are:

- 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) –finalised in October 2016, which sets out the aims for creating a low emission future. The LEVS will compliment 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 project funded by the UK Government’s **Clean Vehicle Technology Fund**, for ten coaches to be modified with the latest pollution reducing equipment to minimise emissions of nitrogen dioxide and particulates has been concluded. The monitoring carried out 12 months after installation of the equipment on the coaches has shown a reduction in emissions of nitrogen oxides by up to 94% for the Euro III standard coaches and by up to 80% for the Euro II standard coaches, therefore benefitting the local environment and the health of Dudley residents.
- A project funded by **Defra’s Air Quality Grant Programme** to upgrade a cycle and pedestrian link across the A458 in Cradley has been completed. The project aimed to reduce traffic congestion thereby improving air quality and improving road safety. During the project, Dudley MBC officers worked closely with the local community

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to promote the scheme and deliver cycle and pedestrian training in nearby schools. The impacts of the scheme on local air quality was monitored by collecting NO₂ and PM₁₀ data from the nearby automatic monitoring station and further NO₂ data from diffusion tubes located nearby at Windmill Hill and Colley Gate. Unfortunately in line with the general upwards trend for 2016 in the borough the results for NO₂ increased, however the particulate matter results showed a significant reduction from 22 to 16µg/m³. Following completion of the cycle and pedestrian training programme at the schools, a traffic survey was undertaken to assess the traffic flow and modal shift and travel surveys were carried out at the schools. Both the traffic and travel survey demonstrated positive outcomes.

- An anti idling project **funded by Defra** to raise awareness at schools and provide information on Dudley Council's web site to reduce the idling of car engines outside schools continues with presentations to Primary Schools and the distribution of information leaflet at the schools. An additional educational initiative involving Dudley Borough schools to promote walking to school in place of students being driven to school is being planned by Public Health officers at Dudley for 2017.
- The West Midlands Combined Authority has secured funding from the Clean Bus Technology Fund for 150 National Express buses which are currently in service in the West Midlands to be retro-fitted with particle traps during 2017 / 18. This work is designed to improve emissions performance from Euro II to Euro VI standard.
- Better provision of passenger information at key bus / rail interchanges has included improvements made to Merry Hill bus station in Brierley Hill, to be completed in 2017.
- The West Midlands Low Emission Bus Delivery Plan was launched in the summer of 2016 and was awarded first prize at the National Air Quality Awards on the 10th November 2016 for Passenger Transport Project of the Year. Within the project the exceedance areas of Netherton and Wordsley, which show the highest measured

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concentrations of NO_x in the Dudley Borough are flagged up as priority areas for consideration of the use of cleaner bus fleets. This initiative is to be pursued in 2017 / 18.

- West Midlands Travel were awarded in excess of £3 million to fund 29 electric/hybrid buses and the associated infrastructure by the Office of Low Emission Vehicles (OLEV) in July 2016.



Picture low emission bus Number 1 Service

In addition to these projects, there are a number of road network improvements that are coordinated with internal and external partners to continue to deliver road traffic management improvements to the borough's road system, in line with the West Midlands Local Transport Plan. These provide additional measures to reduce traffic congestion and improve air quality. In particular a major highways scheme is underway to alleviate traffic congestion in Pensnett High Street which will improve air quality & remove relevant receptors. Pensnett High Street being listed as having areas of exceedence for NO₂ earlier in this report.

Conclusions and Priorities

Monitoring at automatic monitoring stations and diffusions tubes results for 2016 showed an increase in levels of nitrogen dioxide across the borough. Levels of particulate matter continued to decrease at all three of the continuous monitoring stations. There are no specific developments that the increase in NO₂ can be attributed to. It is thought that the increase is most likely attributable to adverse climatic conditions experienced during 2016. Whilst NO₂ levels increased in 2016 the long term trend is downwards and it is anticipated that the figures for 2017 will show a reduction in levels continuing with the downwards trend, depending again on the unpredictable effect of climate.

The Dudley Air Quality Action Plan is currently undergoing review to take account of the West Midlands Combined Authority and changes in focus since the original Air

Quality Action Plan was written in 2011. This will be an ongoing process throughout 2017 / 18.

The main actions for Dudley MBC moving forward in 2017/18

- To improve local air quality to achieve the national air quality NO₂ annual mean objective across the borough and to maintain and improve where possible measured levels of PM₁₀ and PM_{2.5}.
- To fully participate as a component of the West Midlands Combined Authority to achieve strategic air quality improvements across the region.
- To work with Transport for West Midlands in particular to improve the bus fleet in areas that exceed the national air quality NO₂ annual mean objective within Dudley Metropolitan Borough.
- To continue to monitor for NO₂, PM₁₀ and PM_{2.5} to establish real time data to enable the prioritisation of resources and attention to be focussed on the most relevant location for air quality improvements.
- To use the real time air quality data to model future predictions in air quality in Dudley Metropolitan Borough and to carry out source apportionment for the areas of exceedance to inform the revision of the air quality action plan
- To continue to require measures which encourage the use of public transport, walking, cycling and the uptake of cleaner vehicles, including through responsible land use planning.
- To monitor the implementation of the Pensnett major highways improvement scheme, which commenced spring 2017, in order to assess compliance with the air quality outcomes predicted for the scheme.
- To monitor progress with & provide support for the planned midland metro extension between Wednesbury and Brierley Hill.
- To raise awareness through the ongoing school education programme and Public Health initiative for 2017 and the DMBC website and by participating in National Clean Air Day, providing information to the public on how to become involved in local & national air quality initiatives.

The main challenges for Dudley MBC

- To successfully address modal shift, encouraging citizens to change from using private vehicles to public transport, walking or cycling to reduce traffic emissions and congestion to improve air quality and provide benefits in terms of personal and collective health.
- To increase public awareness of how an individual can positively improve air quality by effectively reducing vehicle emissions; for example by switching off the vehicle engine when stationary whilst unloading/loading or when waiting in stationary traffic.
- To work effectively with the West Midlands Combined Authority (WMCA) on strategic transport initiatives for the West Midlands through a memorandum of understanding.
- To achieve a coordinated approach to air quality matters at a strategic and a local level with the West Midlands Combined Authority, Office of Public Health, Public Health England and neighbouring local authorities.
- To accommodate resource restrictions for air quality within Dudley MBC due to financial restraint whilst continuing to effectively address air quality issues.
- Completing the review and revision of the Dudley Air Quality Action Plan in 2017/18.

Local Engagement and How to get Involved

Everyone can help to improve air quality and as a consequence, improve health and the environment. The reduction in dependence on private transport will result in less pollution, less noise and less congestion. Dudley MBC is committed to striking the right balance of providing for economic and social needs whilst reducing the need for private travel and protecting health and the environment. This can only be achieved by working in partnership with the West Midlands Combined Authority (WMCA) in developing a sustainable transport plan which takes into account regional and local land use planning. The WMCA and Dudley MBC have information on sustainable travel options including bus, rail, metro, cycle and walking routes. For further information go to: <https://www.tfwm.org.uk/delivery/sustainable-travel/> and

<http://www.dudley.gov.uk/resident/bins-recycling/sustainable-development/actions-for-sustainability/transport-and-access/>.

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:-

- Car sharing when travelling for work or leisure purposes and where the use of personal transport is unavoidable, helpful tips on minimising emissions;
<http://www.dudley.gov.uk/resident/bins-recycling/sustainable-development/faq-cando/travel/>
- Choosing to walk, see The Fitter for Walking Project at:
<http://www.dudley.gov.uk/resident/parking-roads/road-safety/fitter-for-walking-project/>]
- A scheme to encourage residents to use alternative transport to private vehicles for one day per week. In conjunction with this initiative, cycling opportunities have been developed by Economic Regeneration & Transportation at Dudley MBC. For further information go to:
<http://www.dudley.gov.uk/resident/parking-roads/road-safety/cycling/cycle-maps/>
- There are events, walkways and cycle routes along the Dudley and West Midlands canals network to help promote modal shift and encourage family days out without the need for private vehicles. Further information can be found at: <https://canalrivertrust.org.uk/about-us/our-regions/west-midlands-waterways>
- For all walking and cycling opportunities in Dudley Metropolitan Borough go to www.lets-get.com
- The 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/>

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The above measures will help to reduce congestion on the highway network in Dudley Metropolitan Borough, consequently reduce the amount of pollution emitted and therefore improve air quality. Personal fitness will also be improved where walking or cycling is the chosen modal shift option.

Ways to Communicate

The Dudley MBC Community forum can be utilised by residents and business proprietors to gain greater access to Dudley MBC to discuss ideas and pass on comments. For further information go to:

<http://www.dudley.gov.uk/community/community-council/community-forums/>

An enquiry can be made or advice requested by completing a form on the Dudley MBC website:

<https://dudley.firmstep.com/default.aspx/RenderForm/?F.Name=Qux9ydTZYAq&HideToolbar=1> or by email to: EnvSafetyHealth.DUE@dudley.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Dudley Metropolitan Borough during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

A summary of AQMA declared by Dudley Metropolitan Borough Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at:

<http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/>
or <http://uk-air.defra.gov.uk/aqma/list>

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the Dudley Borough AQMA.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
The Dudley Borough AQMA	Declared December 2007	Nitrogen dioxide exceeding the annual mean objective value of 40 µg/m3	Dudley MB	Whole of Dudley Borough	NO	91ug/m3*	86ug/m3	Dudley MBC AQAP link to the AQMA: http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/air-quality-action-plan/

*site 27GX

Dudley MBC confirm the information on UK-Air regarding their AQMA(s) is up to date.

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

Defra's appraisal of last year's ASR concluded that there were no adverse comments to be made on the submission made by Dudley MBC.

Dudley MBC has taken forward a number of direct measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

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

Measures to be completed over the next reporting year:

- Annual staff survey to report on the progress of the Dudley MBC Travel Plan for DMBC employees
- Undertake a travel survey to establish rail usage from Stourbridge Junction station
- Introduction of the use of the low NOx boiler planning condition on appropriate planning applications within Dudley MB
- Input into the taxi licensing review for Dudley MBC
- Work with Public Health officers to roll out a walk to school & reduce engine idling project within Dudley MB
- Progress the highways scheme to reduce congestion & improve air quality in Pensnett High Street
- Encourage the use of buses which have been subject to emissions reduction technology on services which operate in areas of air quality exceedance within Dudley MB

Key Outcomes of the above measures:

- The availability of data to demonstrate if targets & progress towards achieving cleaner air has been achieved
- Reduced background NOx production due to the provision of low NOx boilers in new build properties

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- Better restrictions on the ages of taxi's used within Dudley MB
- Reduced emissions due to better engine idling control, particularly in the vicinity of the boroughs schools
- Progress towards the completion of a major highways scheme to improve air quality in Pensnett High Street which will have a target to show no exceedences of the NO₂ annual mean air quality objective once the scheme is complete.
- Data on the use of buses with emission control technology applied within Dudley MB & the subsequent reduction in emissions to air, as monitored / modelled.

Dudley MBC` s priorities for the coming year are;

- Continue to operate the air quality monitoring programme.
- Monitor ongoing infrastructure improvements such as the major highway scheme ongoing in Pensnett High Street and proposed Midland Metro extension proposal.
- Monitor performance measures to determine the effectiveness of implemented mitigation measures such as the use of the extended car parking facilities serving the Stourbridge Junction railway station.
- Pursue the measures within the Black Country and Low Emission Towns and Cities Project low emission vehicle strategies.
- Impose appropriate conditions concerning air quality on planning decision notices to promote good air quality.
- Determine potential effects on Dudley MB resulting from the implementation of the Birmingham City Clean Air Zone.
- Consider any effective improvements to air quality achievable through Taxi licensing initiatives.
- Undertake awareness raising initiatives with partners such as the office of public health at Dudley MBC.
- Assist with cycle network improvements and active travel plan schemes to encourage modal shift.

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- Assist with providing education on air quality to schools within the Dudley Metropolitan Borough, to include the imposition of anti-idling measures.
- Working with the West Midlands Combined Authority to develop bus infrastructure and an improved passenger transport fleet.

The principal challenges and barriers to implementation that Dudley MBC anticipates facing are as follows;

- Encouraging modal shift, for citizens to change from using private vehicles to public transport, walking or cycling to reduce traffic emissions and congestion to improve air quality and provide benefits in terms of personal and collective health.
- Effectively increasing public awareness of how an individual can effectively reduce vehicle emissions; for example by switching off the vehicle engine when stationary whilst unloading/loading or when waiting in stationary traffic.
- To work effectively with the West Midlands Combined Authority (WMCA) on strategic transport policies for the West Midlands through a memorandum of understanding.
- Achieving a coordinated approach to air quality matters at a strategic and a local level with the WMCA, Office of Public Health, Public Health England and neighbouring authorities.
- Accommodating resource restrictions for air quality within Dudley MBC due to ongoing austerity measures whilst continuing to effectively address air quality issues.
- Completing the revision of the Dudley Air Quality Action Plan by the end of year 2017/18.

Progress on the following measures has been slower than expected:

- The highways improvement scheme for Pensnett High Street was delayed for several months due to funding and approval issues.
- The completion of the LETCP Group LEVS was not completed within the projected time period due to the added complications of the evolution of the West Midlands Combined Authority.

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Dudley MBC anticipates that the measures stated above and in Table 2.2 will achieve compliance through pursuance of the Dudley Borough air quality action plan.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Dudley MBC anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Dudley Borough AQMA.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Dudley MBC Travel Plan: internal to DMBC	Alternatives to private vehicle use	Car & lift sharing schemes	DMBC	Complete	On going	Transport for West Midlands (tfwm) targets the increase use of public transport and cycling. Annual review.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Travel Plans required as part of Planning requirements. Car sharing scheme on Council website for staff.	On going	Mode Shift Targets; Bus use inc by 5% by 2020 (2015 baseline data) Cycle usage to 5% of all journeys by 2023.
2	Stourbridge Rail Station	Alternatives to private vehicle use	Rail based Park & Ride	West Midlands Combined Authority (WMCA)		819 free car parking spaces have been implemented, and 62 Cycle storage facilities Short term phase: already increased number of free car parking spaces to 1000 Long Term phase: plan to install electric charging points near to the station building.	WMCA Strategic Transport Plan Monitoring Process Customer Satisfaction, Travel Demand and Modal Share. Performance indicators http://www.wmca.org.uk/strategy-and-publications.aspx Ref. Customer 10 modal share of all journeys. Annual data from sample requested from ONS for National Travel Survey,	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Resurfacing in Brook Road car park completed June 2016	2016	Critical factor to reduce private vehicle usage from Stourbridge to Birmingham. Likely reduction of private vehicle use on A458 corridor which includes Windmill Hill, Cradley as an area of poor air quality.

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							household survey data.				
3	Midland Metro Extension between Wednesbury and Brierley Hill	Alternatives to private vehicle use	Other	Midland Metro Alliance with the West Midlands Combined Authority (WMCA),	2016	2019/23 Monitor development schedule	<p>WMCA Strategic Transport Plan Monitoring Process Customer Satisfaction, Travel Demand and Modal Share.</p> <p>Performance indicators http://www.wmca.org.uk/strategy-and-publications.aspx</p> <p>Ref. Annual data from Passenger Focus Survey.</p>	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Outline Business Case has been prepared, approved by the Combined Authority Board and submitted to Government Summer 2017. Design work ongoing.	2023	<p>The proposed scheme runs for approx 11 km from the existing line at Wednesbury to Brierley Hill.</p> <p>Encourage modal shift to a less polluting travel mode.</p>
4	Regulation of Environmental Permits	Environmental Permits	Other	DMBC	Annually March/April	Ongoing action reviewed at Principal Officer and team meetings	Inspections to be carried out in accordance with ESH delivery Plan	NO _x PM ₁₀ PM _{2.5} Enforce compliance with permit emission limits.	Planned inspections are made in accordance to the risk rating	31/3/2017	Reduce emissions to air from stationary industrial sources
5	The Metropolitan Freight Strategy	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	West Midlands Combined Authority (WMCA)	2013	Proposed West Midlands Strategic Freight Corridor Stourbridge to Walsall	The Metropolitan Freight Strategy will provide the strategic framework to prioritise and coordinate investment in schemes, actions and initiatives which will	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	West Midlands Combined Authority (WMCA), are to refresh the Freight Strategy in due course.	April 2019	Freight Strategy for the West Mids is currently being reviewed.

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							enhance freight movements by all modes in order to support West Midlands Strategic Transport Plan Key Route Network performance targets which are currently being established				
6	Black Country Air Quality Supplementary Planning Document	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	DMBC/ Low Emissions Towns & Cities Programme (LETCP)	Complete	On going	To update the Black Country Core Strategy to allow implementation of the West Midlands Low Emissions Towns and Cities Air Quality guidance as detailed in row 8 below.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions & NO _x emissions from new build	consultation complete, report to went to Cabinet September 2016 and was approved.	September 2016	To protect and enhance air quality through development http://www.dudley.gov.uk/resident/planning/planning-policy/local-plan/bcaqspd/
7	Monitoring the effectiveness of Air Quality Planning Recommendations	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	DMBC	Complete	On going	To meet the Black Country Core Strategy target LOI ENV8- proportion of planning permissions granted in accordance with air quality sections recommendations – 100% target	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions & NO _x emissions from new build	Achieved 100% target for 2015/16 financial year. See: http://www.dudley.gov.uk/resident/planning/planning-policy/local-development-framework/annual-monitoring-report/	Rolling programme	To protect and enhance air quality through planning applications

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8	West Midlands Low Emissions Town & Cities Programme Good Practise Air Quality Planning Guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	DMBC/ Low Emissions Towns & Cities Programme (LETCP)	Complete	May 2014	Number of Planning permissions granted with air quality conditions as outlined in WM LETC Planning Guidance document.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions & NO _x emissions from new build	Publication of Guidance and implementation across the West Midlands Metropolitan Authorities	On going	Guidance published. See http://cms.walsall.gov.uk/low_emissions_towns_and_cities_programme
9	West Midlands Low Emissions Town & Cities Programme Low Emissions Strategy	Policy Guidance and Development Control	Low Emissions Strategy	DMBC/ Low Emissions Towns & Cities Programme (LETCP)	Complete	Each WMLA will now undertake the necessary implementation work together with strategic implementation by the WMCA	Adoption of the Low Emission Strategy within each of the West Midland Metropolitan Authorities.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	LEVS is now complete all but finishing touches such as acknowledgements & available on the Walsall web site, see row 8	Completed strategy by September 2016	Aim to improve air quality in the West Midlands from a combined Authority approach
10	West Midlands Low Emissions Town & Cities Programme, Good Practise Procurement Guidance	Policy Guidance and Development Control	Sustainable Procurement Guidance	DMBC/ Low Emissions Towns & Cities Programme (LETCP)	Complete	From September 2014 On going	Improve vehicle fleet emission	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Publication of 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
11	Control of New Biomass Installations	Promoting Low Emission Plant	Other policy	DMBC	Complete	On going	Annual work programme to record locations of biomass appliances	NO _x PM ₁₀ PM _{2.5} Reduced emissions from new build	Quarterly update of information via Building Control to record locations of biomass appliances	Annual rolling programme	To enable the evaluation of all Biomass installations and identify all required measures to protect air quality
12	Consolidated Dudley MBC Borough smoke control order	Promoting Low Emission Plant	Other	DMBC	Complete	January 2018	Number of smoke control enforcement actions	NO _x PM ₁₀ PM _{2.5} Reduced emissions from burning appliances	Ongoing action	Ongoing	All premises within Dudley Borough, with no exemptions are included in the consolidated order

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13	Low NOx boilers installed at new developments	Promoting Low Emission Plant	Other	DMBC	Propose new planning condition for low NOx boilers with maximum NOx emissions of under 40 mg/kWh to minimise the impact of building emissions on local air quality	2017 / 18	Record the number of planning applications which include conditions requiring low NOx boilers to be provided.	NO _x Reduced NOx emissions from new build	Ongoing action	On going	Aim to reduce background measured concentration of NO _x Planners were not supporting the condition in planning applications in 2016, progress can be reported on this issue in the ASR for 2017.
14	Encouraging the Uptake of Low Emissions Vehicles	Promoting Low Emission Transport	Other	DMBC	Complete	On going	Planning conditions imposed as standard to provide electric charging points to encourage the uptake of low emission vehicles. Target 100% of eligible planning applications	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	In 2015, 137 planning decision notices have electric charging point condition requirement	On going	Officers can use WM LETC Planning Guidance document or parking SPD at Dudley MBC to recommend conditions in planning applications to increase the uptake of low emission vehicles.
15	Taxi Licensing	Promoting Low Emission Transport	Taxi Licensing conditions	DMBC	Complete	On going	DMBC to carry out MOT tests as a licensing condition for all taxi's to ensure compliance including emissions tests	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	The overall licensing test average pass rate 63% for Hackney Carriage and 75% for Private Hire full tests; 2015 / 16 data	Rolling programme	As of 21/06/16 995 total Licensed Vehicles by Dudley MBC comprising of 395 Hackney Carriages 600 Private Hire

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							0-6 year old vehicles – 1 test per year 6-10 year old vehicles – 2 tests per year 10 year and older vehicles – 3 tests per year				
16	Travel Planning promotion in the wider community	Promoting Travel Alternatives	Encourage / Facilitate home-working Workplace Travel Planning	DMBC	December 2014	On going	Increase the number of employees working in companies with a Travel Plan to 18%- The amended DMBC Traffic and Transportation Service Plan.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Travel Plan adopted December 2014	On going Annual staff surveys	Encourage less days of travel to reduce congestion and improve air quality
17	Implementation of proposed Local & Strategic Cycle Network	Promoting Travel Alternatives	Promotion of cycling	DMBC	Complete	On going	Black Country Core Strategy LOI TRAN4a 1% Increase in cycling use of monitored routes by 2026 Black Country Core Strategy LOI TRAN4b Increase % length implemented	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Dudley MBC has produced three cycling maps (available on the website or local library) promote cycling, taking part in Bike Week and other events. Increase cycle routes and improve infrastructure that have been identified in the Cycle Network Programme. Cycle maps are currently subject to review.	Rolling Programme	The road safety & travel awareness team provides training, advice and information to cyclists of all ages and types to help change mode shift to reduce air pollution and traffic congestion. http://www.dudley.gov.uk/resident/parking-roads/road-safety/cycling/cycle-maps !
18	Cycle Purchase Scheme For DMBC Employees	Promoting Travel Alternatives	Promotion of cycling	DMBC	Complete	On going	Black Country Core Strategy LOI TRAN4a 1% Increase in cycling use of monitored routes by 2026	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Cycle monitoring at local sites in the borough has shown a good increase in cycle usage on key corridors.	On going	Promotion of cycling to help change modal shift to reduce air pollution and traffic congestion

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							West Midlands Strategic Transport Plan PI – Mode share of all journeys: public transport, cycling, walking, car, other (ONS National Travel survey/household data).				
19	Active Travel Plan for Cycling and Walking	Promoting Travel Alternatives	Promotion of cycling	DMBC	In progress	On going	Automatic cycle counters on key cycle network links.. Figures reported on annual basis via planning policy Annual Monitoring Report to compare with national figures	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Implementing cycle routes, regular cycle meetings, working with schools to make safer walking and cycling, implementing new pelican & toucan crossings	Rolling Programme	Public Health are developing an active travel strategy to promote walking and cycling across the borough to reduce congestion and improve air quality
20	Schools walking & cycling Initiative	Promoting Travel Alternatives	School Travel Plans	DMBC	Complete	On going	Black Country Core Strategy LOI TRAN4a 1% Increase in cycling use of monitored routes by 2026 West Midlands Strategic Transport Plan PI – Mode share of all journeys: public transport, cycling,	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	100% of schools have Travel Plans and sustainable mode share maintained through ongoing engagement with schools	Rolling Programme	Annual travel packs given to new intake years, travel interventions given when new crossings are installed, training given when requested by schools.

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							walking, car, other (ONS National Travel survey/household data).				
21	Awareness Raising Campaign to reduce idling vehicles	Public Information	Via leaflets (and Posters and working with schools)	DMBC	2011	On going	Maintain an anti idling campaign	NO _x Reduced vehicle emissions	Website upgrade, preparation and distribution of promotional material ongoing Educational programme at schools. Signs and posters placed at schools and bus stations	On going	The Defra Grant funded a campaign in 2013; however promotional material is still used in the educational programme at primary schools in Dudley Borough.
22	Dudley Council Website	Public Information	Via the Internet (& Twitter)	DMBC	Complete	On going	Annual website review of all air quality pages including educational material for schools	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Information and reports updated annually	On going	Information on air quality in Dudley Borough Included on the Council web site. http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/ .
23	Reporting Smoky Vehicles	Public Information	Via the Internet (& Twitter)	DMBC	2010	On going	100% of reported smoky vehicles to be actioned within 5 working days	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Reporting programme ongoing via Website and by contacting Dudley Council by phone or email or twitter	On going	Encourage the public to alert Dudley council to any such vehicles so that appropriate action can be taken http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/vehicle-air-pollution-smoky-vehicles/
24	Control of Bonfires and use of Other Unauthorised Fuels	Public Information	Other	DMBC	Complete	On going	75% of reported bonfires & use of unauthorised fuel to be actioned within	PM ₁₀ PM _{2.5} Reduced emissions from stationary uncontrolled	Measured throughout the year and reported each quarter	On going	Encourage the public to use alternative methods of disposal of waste to reduce the impact on local air quality

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							5 working days in accordance with the ESH Delivery Plan	sources			
25	Anti Idling Measure	Traffic Management	Anti-idling enforcement	DMBC	2011	On going	Patrols deployed to areas for traffic restrictions following requests from general public	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Patrols are deployed outside schools to enforce traffic restrictions The Traffic Management Act 2004 prohibits the setting of targets for the number of penalty charge notices issued	Ongoing	Traffic enforcement officers give advice if they see any contravention of the traffic order to stop idling of vehicle engines to reduce emissions
26	DMBC 20mph speed limits outside schools	Traffic Management	Reduction of speed limits, 20 mph zones	DMBC	Annual reviews	On going	Annual assessments for road safety near schools to be applied for the safer routes programme.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	As part of the Council's policy for 20mph Speed Limits outside schools, the Council deliver an annual programme of Safer Routes to School initiatives which includes a range of mandatory and advisory 20mph speed limits and zones around schools to encourage more sustainable modes of travel.	Rolling Programme	Research by Imperial College (2013) concluded reduced speeds can benefit air quality due to lower P.M. from diesel vehicles. This action could therefore improve AQ, however consideration of congestion due to this measure needs to be taken.
27	Reducing Congestion	Traffic Management	UTC, Congestion management, traffic reduction	DMBC highways	Complete	On going	The West Midlands Strategic Transport Plan contains a number of congestion performance targets relating to the performance of the transport system.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	A range of transport schemes are delivered on an annual basis to support congestion reduction.	Rolling Programme	Current works being implemented include Pensnett, High Street Major Highway Improvement, ,

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28	Highway Enforcement	Traffic Management	Workplace parking levy, parking Enforcement on highway	DMBC	Complete	On going	Complaints received concerning obstruction from on road parking should reduce with the implementation of actions to address the issue	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Undertake on-street parking enforcement of Traffic Regulation Orders Circa 1500 parking enforcement actions taken in 2015	Rolling Programme	Reduce parking obstructions on road to prevent congestion and improve air quality
29	Defra AQ grant 2014/15	Traffic Management	Other	DMBC	2014	On going	Install new crossing by end of 2015 in Windmill Hill, Colley Gate. Second traffic survey w/c 4 th July 2016 to show impact of improvement of new crossing.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	New Crossing completed end of November 2015. First traffic survey completed, Second survey w/c 4 th July 2016	Assessment of the traffic survey to be completed by July 2017. Continue to monitor and assess the impact on reducing air pollution	Correlate the traffic and travel surveys to ascertain if there has been a shift in mode of transport due to new crossing and improvement in traffic flow. Continue to monitor air quality to assess any improvements
30	Developing and Delivering Bus Infrastructure Improvements via Implementation of Voluntary Bus Partnership Commitments.	Transport Planning and Infrastructure	Bus route improvements	West Midlands Combined Authority with DMBC	2011	On going	New buses have been installed on routes between Dudley and Wolverhampton and Dudley and Brierley Hill and Stourbridge and Birmingham	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	WMCA have secured funding from the Clean Bus Technology Fund for National Express to fit particle traps on 150 buses in the next 12 months, which will effectively improve them from Euro II to Euro VI. Further improvements will be achieved through partnership working within the recently formed West Midlands Bus Alliance.	Rolling Programme.	Improve vehicle fleet to Euro VI which will improve air quality in Dudley Borough.

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31	Provision of Better Information for Passengers at Key Railway Interchange Facilities; E.G. Merry Hill.	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	DMBC	Complete	On going	The West Midlands Strategic Transport Plan contains a number of customer satisfaction, travel demand and modal share targets relating to public transport.	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	2015 but evaluation will continue until 2018	2018	Improvements to Merry Hill Bus Station, including passenger information to be completed in May 2017. Development work on the redevelopment of Dudley Bus Station is on-going
32	DMBC vehicle fleet emission control.	Vehicle Fleet Efficiency	Driver training and ECO driving aids	DMBC, the Institute of Advanced Motorists & West Midland Fire Service	2014	On going	Complete two courses a year for driver training for the over 60's 35 hours every 5 years of compulsory training for DMBC drivers of 3.5 tonne and above vehicles	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	Two courses a year for driver training for the over 60's 2016/17	Rolling programme	Approximately 330 drivers driving 3.5 tonne and above vehicles
33	Improving the DMBC Fleet	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	DMBC	Complete	Rolling programme of renewal of vehicles	All new fleet vehicles must comply with latest Euro Standards	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	New vehicles purchased to be of latest Euro Standards	Rolling programme	The improvement of the vehicle fleet will assist in the improvement of air quality in Dudley Borough
34	Clean Vehicle Technology Fund (CVTF)- Retrofit programme for 10 coaches.	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	DMBC	2014	On going	Second emission test to showed up to a 94% reduction in emissions	NO _x PM ₁₀ PM _{2.5} Reduced vehicle emissions	10 Coaches retrofitted, emission testing has shown positive effect.	December 2016	The coaches travel within Dudley Borough through areas that have exceedances in air quality, this will help to reduce the impact of vehicle emissions in such areas

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.

Dudley 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, in particular PM_{2.5}. The Dudley Health & Wellbeing Board has the responsibility for the health and wellbeing of residents in Dudley Borough and has developed a Health and Wellbeing Strategy, setting out the priorities for the people living and working in Dudley Borough. Public Health has a benchmark indicator for the fraction of mortality attributable to particulate air pollution, which is published as a public health outcome and can be found using the link below. By working closer together, the effect of measures introduced to cut PM_{2.5} levels can be measured in terms of health benefits and reduced mortality. The measures introduced may also have the beneficial effect of addressing other pollutants such as PM₁₀ and NO₂. For information on Public Health at Dudley MBC see the link below:

<http://www.dudley.gov.uk/community/initiatives/health-wellbeing/>

<http://www.phoutcomes.info/search/air%20pollution#pat/104/ati/101/par/E45000005>

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

- The installation of monitoring equipment at Colley Gate air quality monitoring station will enable the real time monitoring of PM_{2.5} data allowing Dudley MBC to identify trends and any elevated PM_{2.5} concentrations at that location. The data may then be used to benchmark progress on reducing PM_{2.5} emissions and give a better understanding of the associated health effects at a local level.

Table 2.2: Progress on Measures to Improve Air Quality, shows that Dudley MBC has the following existing measures in place to address PM_{2.5};

- Encouraging alternative ways to travel, by public transport, cycling or walking and encouraging the uptake of low emission vehicles for business fleets and public transport. Improving public transport services, walkways and cycle paths will improve general health, ease congestion on the roads and reduce emissions of PM_{2.5}.
- Educating citizens and businesses through various media with respect to improving air quality through responsible actions.
- Planning and development controls to control and where possible improve air quality through regeneration. By introducing policy guidance to assist in improving air quality through regeneration developers will be encouraged to incorporate alternative travel options through travel plans, improve convenient and segregated cycle paths to link to local networks, incorporate electric vehicle charging points, provide facilities for other ultra-low emission vehicles and any other innovative mitigation measures that facilitate a change in road transport behaviour, thus minimising emissions of PM_{2.5}.
- The control of emissions from industrial processes including combustion processes. Effective regulation of environmental permits issued by Dudley MBC to ensure that industry complies with current legislation controlling emissions of particulate matter. The increased use of biomass as a fuel to meet renewable energy targets may give rise to increased emissions of PM_{2.5} if combustion plants are not well managed.
- The control of emissions from solid fuel domestic heating through the consolidated Dudley Borough Smoke Control Order which includes every premises located in the Dudley Borough.
- The enforcement of legislation to ensure the public and contractors use appropriate methods to dispose of waste to reduce PM_{2.5} emissions due to the uncontrolled combustion of waste materials.
- Reducing traffic congestion through the careful management of road infrastructure, improved traffic and pedestrian signals, speed restrictions

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and parking enforcement to reduce obstructions on congested roads will reduce traffic congestion and also therefore reduce emissions of PM_{2.5}.

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

Dudley MBC undertook automatic (continuous) monitoring at 4 sites during 2016. All four of the stations monitor for nitric oxide, nitrogen dioxide and total oxides of nitrogen (NO/NO₂/NO_x) and three of the stations also monitor for fine particulates (PM₁₀) whilst one also monitors PM_{2.5}. There are three diffusion tubes at each of the monitoring stations, co-located with the NO_x analyser and this data is used to assess diffusion tube accuracy by comparing the two monitoring techniques. The data from the co-located tubes is reported to the national network to be used in the calculation of the national bias adjustment factor.

- **Central Dudley, St James`s Road** - monitoring NO/NO₂/NO_x and PM₁₀. This station has been operational since 1999 but was re-located by approximately 150m to a similar site in 2015. It is classified as an urban background site and data from this site is representative of typical exposure levels found in urban centres but away from main roads. The national air quality NO₂ annual mean objective is not presently exceeded at the station.
- **Colley Gate, Cradley** - monitoring NO/NO₂/NO_x PM₁₀ and PM_{2.5}. This roadside monitoring station has been operational since 2006 and monitors roadside pollution levels indicating that the national air quality NO₂ annual mean objective is not presently exceeded at the station, although it is at nearby diffusion tube locations on Windmill Hill. Dudley MBC selected this location to identify new priority measures to tackle PM_{2.5}. The installation of a Grimm EDM-180 at the end of 2016, has enabled the monitoring of PM₁₀ and PM_{2.5}.

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- **Burnt Tree, Ernest Road, Dudley** - monitoring NO/NO₂/NO_x and PM₁₀. This roadside monitoring station has been operational since August 2010 and monitors roadside pollution levels indicating that the national air quality NO₂ annual mean objective is not presently exceeded at the station, although it is at nearby diffusion tube locations in Birmingham Road. As no exceedences are currently being logged at this site it was closed on 31 12 16.
- **Wordsley, High Street** - monitoring NO/NO₂/NO_x. This roadside monitoring station has been operational since April 2011 and monitors roadside pollution levels in one of the areas of exceedence within Dudley MB where the national air quality NO₂ annual mean objective has been exceeded during this measurement period.

Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at; <http://naei.defra.gov.uk/data/gis-mapping>

The map in Appendix D shows the location of all NO_x diffusion tube monitoring sites within Dudley Borough and the four automatic air quality monitoring stations. Measurement data for historic and current diffusion tube surveys can be downloaded from the Dudley Council website:

<http://gismo.dudley.gov.uk/public/envprot/no2/default.asp>

Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Dudley MBC undertook non- automatic (passive) monitoring of NO₂ at 51 sites during 2016. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D.

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

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

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B, Table B.1.

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

During 2016, Dudley MBC undertook automatic (continuous) monitoring of NO₂ levels at four sites and non-automatic (passive) monitoring by deploying diffusion tubes at 51 sites. All locations are representative of public exposure and the results have been ratified using LAQM.TG (16). Diffusion tube results are adjusted using a national bias adjustment factor.

The data in Table A.3 and Table A.4 indicates:

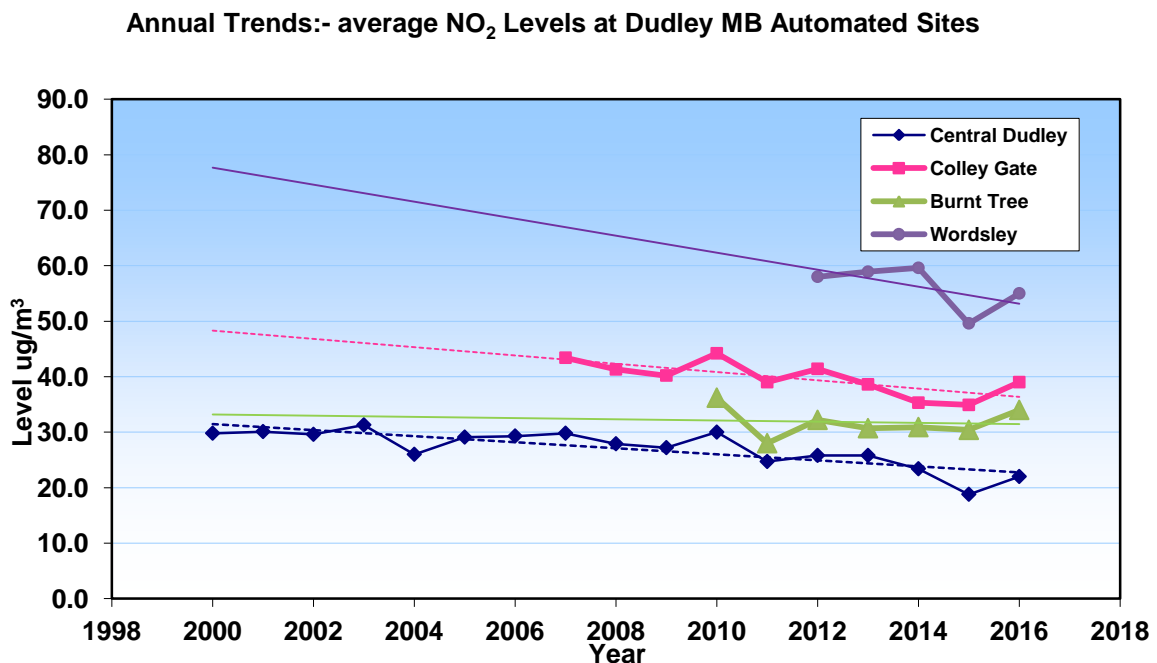
- Excellent overall data capture of 98.3 % at the automatic monitoring sites and 99.5% at the diffusion tube sites over the year 2016.
- Only one of the four automatic (continuous) monitoring stations (Wordsley site) shows exceedances of the national air quality NO₂ annual mean objectives.
- There has been a general increase in measured NO₂ concentrations at all four of the automatic monitoring stations in 2016 when compared to the previous years, this is likely to be due to the effect of climatic conditions during 2016.
- There have been no more than 18 exceedances of the 200 µg/m³ short term hourly NO₂ objective recorded at any of the four automatic air quality monitoring stations.

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- There were no exceedances at Dudley Central, Burn Tree or the Colley Gate monitoring stations.
- There was one exceedance at Wordsley monitoring station.

Figure 1 below shows trend graphs for the data monitored by the four automatic air quality monitoring stations showing an encouraging long-term downward trend despite the unexpected increase in measured concentrations during 2016.

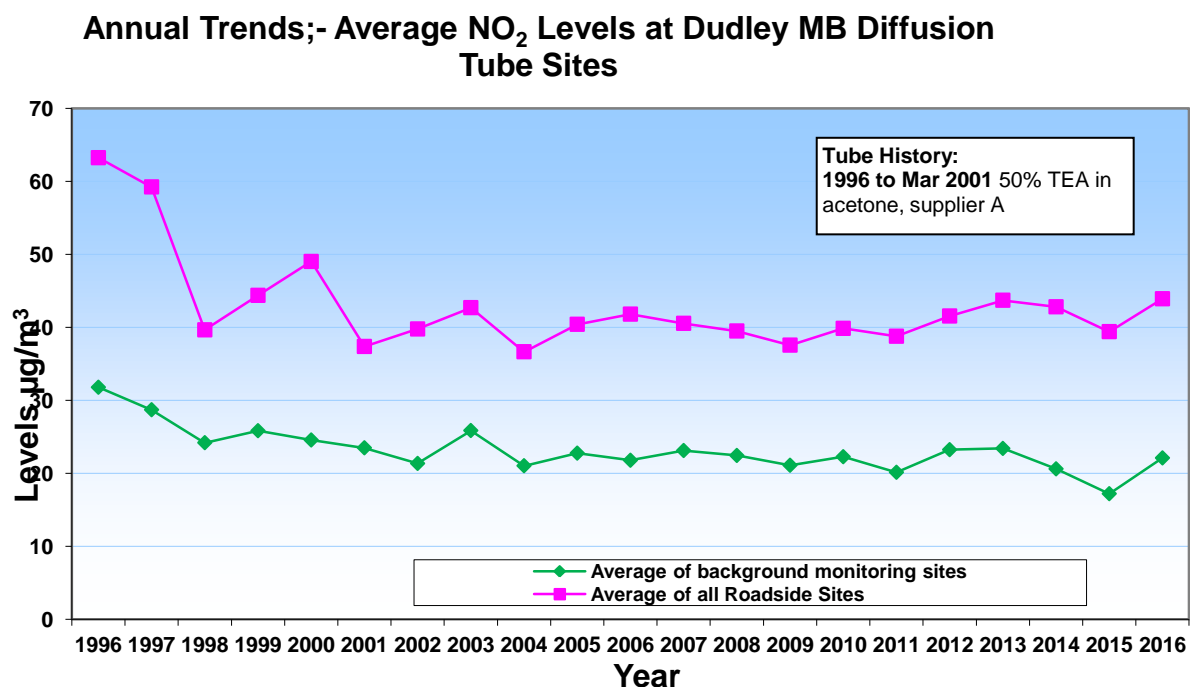
Figure 1 Trends in Annual Mean NO₂ Concentrations Measured at Automatic Monitoring Sites



The full dataset for 2015 diffusion tube monthly mean values are provided in Appendix B.

Figure 2 shows the average results for NO₂ concentrations measured by diffusion tubes located across the borough. The results have been calculated from the mean concentrations measured at roadside and background locations.

Figure 2 Trends in Annual Mean NO₂ Concentrations measured at Diffusion Tube Monitoring Sites



The results from diffusion tube locations exhibited a gradual downward trend over the years that data has been captured previous to 2016, which shows a slight overall increase for 2016. This has resulted in the confirmation that twelve areas exceed the national air quality NO₂ annual mean objective, these are at the following locations:

- Halesowen Road, Netherton
- Windmill Hill, Cradley,
- High Street, Pensnett
- Dudley Street, Sedgley
- High Street, Quarry Bank
- High Street, Wordsley
- Birmingham Road, Dudley
- Castle Hill, Dudley
- Mill Street, Brierley Hill
- Buffery Road, Dudley
- Hall Street, Dudley
- Burton Road/Eve Lane, Gornal

In addition monitoring for 2016 identified 2 further areas of exceedance

- New Road, Stourbridge
- Pedmore Road, Lye

The national air quality NO₂ annual mean objective measured by diffusion tubes at three locations along Halesowen Road, Netherton (27g, 27gX and 27j see table A.3) are greater than 60µg/m³, which indicates that an exceedance of the 1-hour mean objective is likely.

The above areas of exceedance are located within the Dudley Borough wide AQMA, where monitoring will continue to refine future revisions of mitigation measures included in the annual air quality work programme and Dudley air quality action plan.

3.2.2 Particulate Matter (PM₁₀)

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

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

During 2016, Dudley MBC undertook monitoring of PM₁₀ levels at the three automatic air quality monitoring stations located in Central Dudley, Colley Gate and Burnt Tree. All of these locations are representative of public exposure.

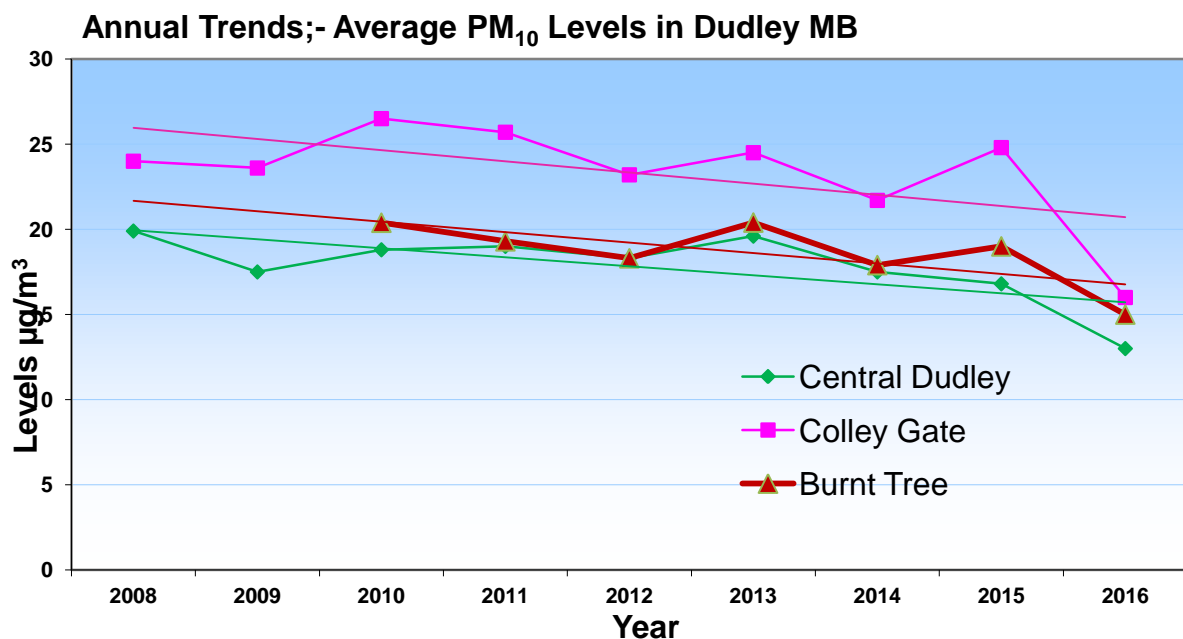
The results show:

- Good data capture; >94% average at all three locations for 2016.
- There are no exceedances of the annual mean concentration of 40 µg/m³ at any of the three automatic air quality monitoring stations operated by Dudley MBC during 2016.
- No more than 35 24-hour exceedances of 50 µg/m³ PM₁₀ have been recorded at any of the three automatic air quality monitoring stations operated by Dudley MBC during 2016.

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- There were zero exceedances of $50 \mu\text{g}/\text{m}^3$ PM_{10} at Dudley Central monitoring station & Burnt Tree monitoring station.
- There were three exceedances of $50 \mu\text{g}/\text{m}^3$ PM_{10} at Colley Gate monitoring station.
- The trend graph in Figure 3 shows that between 2008 and 2016 the annual average $\text{P}_{\text{M}10}$ concentrations measured at the three automatic air quality stations fluctuate from year to year but there is a downward trend at all of the stations and a particularly welcome significant downwards trend for 2016 results. The results remain well below the air quality annual objective of $40\mu\text{g}/\text{m}^3$.

Figure 3 Trends in Annual Mean PM10 Concentrations



3.2.3 Particulate Matter ($\text{PM}_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $\text{PM}_{2.5}$ annual mean concentrations for the past 2 years.

Dudley MBC replaced the TEOM with a Grimm EDM-180 monitor at the Colley Gate Automatic Monitoring site late in 2016 which enabled PM_{10} and $\text{PM}_{2.5}$ to be monitored. Just 6.1% of the total possible recordable data for 2016 was monitored & recorded.

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Due to the lack of data for 2016 Dudley MBC have used the PM₁₀ data from the three automatic monitoring stations in Central Dudley, Colley Gate and Burnt Tree to provide estimated PM_{2.5} concentrations using the nationally derived correction factor 0.7 this has given an estimated annual mean of 11.9µg/m³ at Central Dudley, 13.3 µg/m³ at Colley Gate 12.6µg/m³ at Burnt Tree. All of these estimates are lower than the suggested annual average limit value of 25 µg/m³ by 2020.

Table A.7 in Appendix A presents data for the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past 5 years.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
DMBC1	Central Dudley	Urban Background	394291	290460	NO ₂ ; PM ₁₀	YES	Chemiluminescent; TEOM(VCM)	N/A	N/A	3.3
DMBC2	Colley Gate	Roadside	394243	284626	NO ₂ ; PM ₁₀	YES	Chemiluminescent; TEOM(VCM)*	21	3.5	1.5
DMBC3	Burn Tree	Roadside	395761	290575	NO ₂ ; PM ₁₀	YES	Chemiluminescent; TEOM(VCM)	9	10.5	1.5
DMBC4	Wordsley	Roadside	389134	286893	NO ₂	YES	Chemiluminescent	7	3.3	1.5

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
13b	Padarn Close, Sedgley	Suburban	391105	293975	NO2	Y	3	N/A	N	3
32	Dudley Street, Sedgley	Roadside	391853	293650	NO2	Y	4	2.6	N	3
32b	Dudley Street, Sedgley	Roadside	391875	293642	NO2	Y	0	2.7	N	3.1
32e	High Street, Sedgley	Roadside	391823	293788	NO2	Y	0	2.9	N	3.3
32f	High Street, Sedgley	Roadside	391825	293830	NO2	Y	0	1.2	N	2.9
62b	Birmingham Road, Dudley	Roadside	395597	290560	NO2	Y	0	6.5	N	2.5
62e	Birmingham Road, Dudley	Roadside	395402	290568	NO2	Y	0	4.4	N	2
62r-t	Ernest Road AQMS	Roadside	395762	290575	NO2	Y	10	14	Y	2
53	High Street, Amblecote	Roadside	389593	285840	NO2	Y	0	1.9	N	3.2
16b	High Street, Stourbridge	Roadside	390141	284350	NO2	Y	0	1.3	N	2.6
16m	New Road, Stourbridge	Roadside	390177	284074	NO2	Y	0	2	N	3
34a-ac	High Street, Wordsley	Roadside	389135	286893	NO2	Y	1.5	3.2	Y	3

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Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
34ay	High Street, Wordsley	Roadside	389133	286910	NO2	Y	0	1.6	N	2.7
34h	High Street, Wordsley	Roadside	389245	286707	NO2	Y	1.5	3.0	N	3
21c	Clent View, Stourbridge	Suburban	388457	282895	NO2	Y	8	N/A	N	3
54	Himley Rd Gornal Wood	Roadside	391159	290740	NO2	Y	0	2.4	N	3
57a	Burton Road	Roadside	392576	291949	NO2	Y	0	3.6	N	3
10f-10h	StJames Rd AQMS	Urban Background	394282	290385	NO2	Y	N/A	30	Y	3
10e	Ednam Road, Dudley	Urban Background	394327	290483	NO2	Y	N/A	29	N	3
63	Castle Hill, Dudley	Roadside	394647	290507	NO2	Y	2	3.7	N	3
63c	Hall Street, Dudley	Roadside	394719	290191	NO2	Y	3	2	N	3.2
5w	New Street, Dudley	Urban Centre	394530	290358	NO2	Y	0	1.7	N	3
35c	Buffery Road	Roadside	395064	289514	NO2	Y	0.5	2.2	N	3
19e	Hagley Road Halesowen	Roadside	396462	283211	NO2	Y	0	2.8	N	3.4
3a	Drews Holloway, Halesowen	Roadside	394550	284373	NO2	Y	0	4.3	N	2.8
3bx3bx	Windmill Hill, Halesowen	Roadside	394499	284408	NO2	Y	0	4.7	N	2.4
3c	Windmill Hill, Halesowen	Roadside	394506	284423	NO2	Y	0	4	N	3

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Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
3e	Windmill Hill, Halesowen	Roadside	394384	284543	NO2	Y	0	2.7	N	2.6
3gx	Windmill Hill, Halesowen	Roadside	394321	284596	NO2	Y	0	2.1	N	3.3
3r-t	Colley Gate AQMS, Halesowen	Roadside	394236	284627	NO2	Y	N/A	3.5	Y	2
3u	Colley Gate opposite AQMS, Halesowen	Roadside	394225	284643	NO2	Y	N/A	2	N	3
15a	Stourbridge Road, Halesowen	Roadside	396392	283752	NO2	Y	0	2.4	N	3
18	Hawthorne Road, Hayley Green	Suburban	395135	282662	NO2	Y	N/A	16	N	1.8
50e	Pedmore Road, Lye	Roadside	392005	284144	NO2	Y	0	2.8	N	2.9
51	Morvale Gardens, Lye	Urban Background	392155	284349	NO2	Y	N/A	18	N	2
33	High Street, Pensnett	Roadside	390989	289254	NO2	Y	0	6.5	N	2.2
33p	High Street, Pensnett	Roadside	391017	289224	NO2	Y	0	3.8	N	2.9
33ex	Birds Meadow, Pensnett	Suburban	391027	289410	NO2	Y	N/A	1.9	N	3
30	High Street, Quarry Bank	Roadside	393125	286009	NO2	Y	0	2.7	N	3.5
30eX	High Street,	Roadside	392976	286070	NO2	Y	0	2.3	N	2.8

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Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
	Quarry Bank									
30g	High Street, Quarry Bank	Roadside	392943	286098	NO2	Y	0	2.3	N	2.9
30t	King Street, Quarry Bank	Urban Background	393038	285843	NO2	Y	N/A	1.6	N	2.7
60	Belper Row, Netherton	Urban Background	395215	287554	NO2	Y	N/A	2	N	3
27g	Halesowen Road, Netherton	Roadside	394417	288178	NO2	Y	0	1.5	N	2.7
27gX	Halesowen Road, Netherton	Roadside	394417	288171	NO2	Y	0	1.5	N	2.7
27j	Halesowen Road, Netherton	Roadside	394416	288169	NO2	Y	0	1.6	N	2.7
27p	Halesowen Road, Netherton	Roadside	394474	288029	NO2	Y	0	2.7	N	2.9
14	High Street, Brierley Hill	Roadside	391845	287081	NO2	Y	0	4.8	N	3.1
14a	High Street, Brierley Hill	Roadside	391859	287232	NO2	Y	0	3.1	N	3
45c	Mill Street, Brierley Hill.	Roadside	391890	286967	NO2	Y	0	1.9	N	3
49	Talbot Street, Brierley Hill	Urban Background	391678	287306	NO2	Y	N/A	1.7	N	3.1

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
Central Dudley	Urban Background	Automatic	N/A	98.8	26	26	23	19	22
Colley Gate	Roadside	Automatic	N/A	99.1	41	39	35	35	39
Burn Tree	Roadside	Automatic	N/A	97.6	32	31	31	30	34
Wordsley	Roadside	Automatic	N/A	97.7	60	59	60	50	55
17b	Urban Background	Diffusion Tube	N/A		22.4	21.7	20.3	-	-
13b	Suburban	Diffusion Tube	N/A	100	17.4	16	14.1	11.8	14
32	Roadside	Diffusion Tube	N/A	100	44.4	39.7	40.1	38.5	41.9
32b	Roadside	Diffusion Tube	N/A	100	46.3	46.1	43.6	41.9	44
32e	Roadside	Diffusion Tube	N/A	100	42.8	42.1	40.5	38.1	45.1
32f	Roadside	Diffusion Tube	N/A	100	45.1	40.5	40.5	37.9	43.2
62b	Roadside	Diffusion Tube	N/A	100	47.7	46.3	46.4	43.3	47
62d	Roadside	Diffusion Tube	N/A	0	37.4	36.8	32.1	-	-
62e	Roadside	Diffusion Tube	N/A	100	35.9	38.7	40.3	36.2	40.7
62r-t	Roadside	Diffusion Tube	N/A	100	37.4	37.2	32.4	31.3	33.7
53	Roadside	Diffusion Tube	N/A	100	37.4	37.4	35.9	33.2	37.3
16b	Roadside	Diffusion Tube	N/A	100	37.4	29.8	31.9	30.1	33.5

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Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
16m	Roadside	Diffusion Tube	N/A	100	-	40.7	38.5	35.5	42.1
34a-ac	Roadside	Diffusion Tube	N/A	100	52.4	49.3	47.4	43.4	47.3
34ay	Roadside	Diffusion Tube	N/A	100	63.9	59.5	58.1	51.3	50.7
34h	Roadside	Diffusion Tube	N/A	100	-	-	-	30	35
21c	Suburban	Diffusion Tube	N/A	100	14.5	14.1	12.7	10.8	14.6
54	Roadside	Diffusion Tube	N/A	100	42.6	37.7	39.5	34.7	36.1
57a	Roadside	Diffusion Tube	N/A	100	45.1	41.3	40.4	37.5	39.4
10-10b	Urban Background	Diffusion Tube	N/A	100	26.5	25.3	23.4	21.6	23.8
10e	Urban Background	Diffusion Tube	N/A	92	-	-	-	22.5	26.1
63	Roadside	Diffusion Tube	N/A	92	49.2	51.7	44.7	41.1	42.3
63c	Roadside	Diffusion Tube	N/A	100	-	40	42.3	38.2	43.6
5w	Urban Centre	Diffusion Tube	N/A	100	49.2	42	33.1*	36.7	37.2
35c	Roadside	Diffusion Tube	N/A	100	50.9	41.4	40.3	38.6	41.3
19e	Roadside	Diffusion Tube	N/A	100	42.8	36.6	35.8	32.1	36
3a	Roadside	Diffusion Tube	N/A	100	52.3	44.3	40.7	39	43.9
3bx	Roadside	Diffusion Tube	N/A	100	47.8	44.9	43.6	40.8	46.3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
3c	Roadside	Diffusion Tube	N/A	100	41.8	39.1	36.1	34.1	39.5
3e	Roadside	Diffusion Tube	N/A	100	43.9	45.7	43.7	40.9	41.5
3gx	Roadside	Diffusion Tube	N/A	100	46.7	41.2	43	41.3	43.2
3r-t	Roadside	Diffusion Tube	N/A	92	41.8	38.5	37.1	36.8	39.7
3u	Roadside	Diffusion Tube	N/A	100	-	-	-	34.1	35.6
15a	Roadside	Diffusion Tube	N/A	100	45.6	38.5	39.9	34.8	38.2
18	Suburban	Diffusion Tube	N/A	100	16.7	14.3	14.4	12.8	14.2
50d	Roadside	Diffusion Tube	N/A	0	37.2	37	34.9	-	-
50e	Roadside	Diffusion Tube	N/A	100	32.6	39.1	39.2	34.6	39.7
51	Urban Background	Diffusion Tube	N/A	100	20	19.4	17.2	16.4	20
33	Roadside	Diffusion Tube	N/A	100	38.2	34.5	36	32.3	35
33p	Roadside	Diffusion Tube	N/A	100	55.3	50	51.6	45.9	47
33ex	Suburban	Diffusion Tube	N/A	100	23.9	22.3	21.3	18.6	19.8
30	Roadside	Diffusion Tube	N/A	100	57.5	53.1	54.7	50.4	53.7
30eX	Roadside	Diffusion Tube	N/A	100	55.1	46.5	47.9	44.5	47.1
30g	Roadside	Diffusion Tube	N/A	100	42.3	37.8	38.3	34.2	37.9

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
30t	Urban Background	Diffusion Tube	N/A	100	24.5	22.3	20.4	19	20.2
60	Urban Background	Diffusion Tube	N/A	100	25.7	25.2	23	21.2	22.6
27g	Roadside	Diffusion Tube	N/A	100	<u>70.1</u>	<u>62.6</u>	<u>64.7</u>	<u>65.1</u>	<u>66.5</u>
27gX	Roadside	Diffusion Tube	N/A	100	<u>66.9</u>	<u>66.2</u>	<u>65.5</u>	<u>62.6</u>	<u>67.8</u>
27j	Roadside	Diffusion Tube	N/A	100	59.5	59	59.5	57.5	<u>60.7</u>
27p	Roadside	Diffusion Tube	N/A	100	46.1	49.8	47.3	41.6	48.5
14	Roadside	Diffusion Tube	N/A	100	38.1	38.3	37.6	35.9	33
14a	Roadside	Diffusion Tube	N/A	100	38.7	34.3	34.2	33.4	32.4
45c	Roadside	Diffusion Tube	N/A	100	39.4	40.1	40.9	37.9	41.4
49	Urban Background	Diffusion Tube	N/A	100	23.3	22.3	19.1	17.4	19.9

Diffusion tube data has been bias corrected

If applicable, all data has been distance corrected for relevant exposure

Notes:

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

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

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2012	2013	2014	2015	2016
Central Dudley	Urban Background	Automatic	N/A	98.8	0	0	0	0	0
Colley Gate	Roadside	Automatic	N/A	99.1	0	0	0	0	0
Burnt Tree	Roadside	Automatic	N/A	97.6	0	0	0	1	0
Wordsley	Roadside	Automatic	N/A	97.7	17(200.6)3	5	7	5	1

Notes:

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

(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
Central Dudley	Urban Background	N/A	97.4	18.3	19.6	17.5	16.4	17
Colley Gate	Roadside	N/A	89.6	23.2	24.5	21.7	21.9	19
Burnt Tree	Roadside	N/A	95.0	18.3	20.4	17.9	17.5	18

Annualisation has been conducted where data capture is <75%

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2012	2013	2014	2015	2016
Central Dudley	Urban Background	N/A	97.4	5	6	4	5	0
Colley Gate	Roadside	N/A	89.6	12	11	6	7	3
Burnt Tree	Roadside	N/A	95.0	4	5	5	4	0

Notes:

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

Table A.7 – PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
Colley Gate	Roadside	N/A	6.1 ⁽³⁾	13.9	15.1	13.3	14.1	12.6 ⁽³⁾

Annualisation has been conducted where data capture is <75%

Notes:

(3) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
13b	17.60	16.73	17.86	10.10	11.78	11.48	6.08	8.52	12.71	19.01	22.49	27.77	15.2	14	N/A
32	43.22	44.10	46.16	44.46	42.99	41.40	42.88	44.44	40.85	42.75	59.71	53.88	45.6	41.9	42.1
32b	37.21	44.20	57.35	52.50	56.94	58.46	28.74	38.01	37.21	52.41	58.50	52.41	47.8	44.0	N/A
32e	43.06	44.77	56.97	49.00	53.12	59.44	30.86	40.26	38.78	61.28	56.35	53.97	49.0	45.1	N/A
32f	46.41	44.66	52.44	45.70	47.26	51.51	29.28	38.14	38.77	56.47	55.68	56.64	46.9	43.2	N/A
62b	45.45	55.00	56.83	52.30	51.83	48.06	47.72	43.70	45.82	52.98	54.39	59.46	51.1	47.0	N/A
62e	48.08	41.93	50.90	42.18	44.50	36.13	41.38	39.76	39.92	44.54	49.69	51.30	44.2	40.7	N/A
62r-t	30.48	40.41	47.63	33.58	36.36	39.73	27.46	21.57	29.73	44.91	45.10	42.16	36.6	33.7	32.8
53	38.86	40.36	44.37	40.46	44.95	36.48	26.94	32.87	32.97	41.34	48.99	57.67	40.5	37.3	N/A
16b	40.61	37.51	37.20	33.84	29.86	28.74	29.20	30.37	28.85	32.94	43.54	63.99	36.4	33.5	N/A
16m	45.17	45.15	51.88	42.57	38.93	40.51	32.87	37.71	37.02	49.23	54.88	73.78	45.8	42.1	N/A
34a-ac	48.22	47.33	53.86	50.23	54.93	49.44	41.34	46.46	46.79	56.43	59.83	61.90	51.4	47.3	52.6
34ay	64.91	57.86	59.04	53.80	60.59	57.69	53.75	53.78	51.11	57.14	66.23	26.02	55.2	50.7	N/A
34h	37.77	41.80	43.18	33.01	33.28	38.39	27.25	29.55	33.10	39.89	44.10	54.61	38.0	35.0	33.5
21c	13.76	16.78	16.07	11.31	11.53	11.21	5.07	7.48	11.81	19.20	19.67	46.89	15.9	14.6	N/A

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54	48.66	39.81	38.37	41.41	39.48	36.55	37.27	36.09	33.45	39.86	42.98	37.45	39.3	36.1	N/A
57a	37.52	41.77	50.59	42.08	47.13	43.00	31.99	38.76	37.54	50.64	54.78	38.55	42.9	39.4	N/A
10f – 10h	24.99	26.65	27.52	22.17	22.49	23.42	13.63	17.54	24.23	34.63	33.63	40.12	25.90	23.82	N/A
10e	27.55	28.51	28.85	22.52	24.94		15.05	20.52	24.42	33.93	33.29	52.87	28.4	26.1	N/A
63	42.23	51.03	50.71		46.41	46.87	41.42	43.22	36.70	48.29	46.83	52.62	46.0	42.3	40.2
63c	38.26	43.73	51.17	44.62	47.68	52.47	33.95	39.88	40.70	59.81	50.10	66.96	47.4	43.6	39.9
5w	33.07	43.78	45.55	41.19	38.49	38.00	37.06	40.33	27.81	45.22	44.18	50.40	40.4	37.2	N/A
35c	43.19	43.11	44.80	41.29	39.47	45.95	47.32	43.15	38.82	44.48	54.09	52.91	44.9	41.3	40.5
19e	32.30	37.26	41.15	36.25	38.56	44.78	26.70	31.74	34.54	44.85	41.82	59.62	39.1	36.0	N/A
3a	42.00	48.31	51.86	51.04	48.83	46.37	43.78	44.63	43.07	49.85	54.77	48.18	47.7	43.9	N/A
3bx	47.92	64.55	52.53	46.30	47.91	45.96	45.59	44.30	42.40	52.40	59.59	54.59	50.3	46.3	N/A
3c	34.08	49.56	45.97	43.67	43.27	43.78	33.33	36.28	36.77	51.23	42.96	54.37	42.9	39.5	N/A
3e	35.37	47.86	46.76	47.68	51.52	53.76	39.69	44.65	41.36	57.87	27.85	47.03	45.1	41.5	N/A
3gx	51.29	58.96	48.54	41.98	43.51	40.50	46.01	40.83	44.77	45.18	56.22	45.74	47.0	43.2	N/A
3r-t	40.64	52.16		38.32	41.44	41.47	41.63	39.33	39.84	46.46	47.05	46.88	43.2	39.7	N/A
3u	43.88	40.34	41.77	41.33	36.07	38.74	36.03	35.91	37.48	43.30	45.80	23.24	38.7	35.6	N/A
15a	35.57	40.76	44.09	41.57	41.35	46.14	27.66	34.97	35.30	52.97	45.95	51.85	41.5	38.2	N/A
18	17.81	16.76	16.37	11.03	12.98	12.43	7.27	9.00	13.13	19.50	21.74	27.69	15.5	14.2	N/A
50e	43.53	40.85	43.76	34.16	42.24	47.73	30.53	32.04	35.11	57.31	53.98	56.29	43.1	39.7	N/A
51	20.80	22.11	22.29	17.23	16.49	17.27	11.20	12.13	16.10	25.51	28.38	51.25	21.7	20.0	N/A
33	31.73	39.01	41.65	41.04	39.83	42.83	26.10	29.44	32.60	49.56	38.28	44.05	38.0	35.0	N/A
33p	50.42	49.45	52.58	48.96	51.57	47.80	50.55	48.03	55.40	45.00	50.61	62.80	51.1	47.0	N/A
33ex	28.19	26.11	22.14	17.57	16.01	16.15	11.55	15.11	18.27	24.38	26.74	36.48	21.6	19.8	N/A
30	66.25	50.27	49.97	47.59	49.01	59.42	61.16	60.31	59.30	58.47	68.38	70.54	58.4	53.7	N/A
30eX	52.82	47.37	51.07	52.59	44.75	50.17	47.53	50.36	44.28	53.66	57.79	62.52	51.2	47.1	N/A
30g	33.50	41.35	45.06	41.76	39.46	46.59	32.13	34.01	33.94	48.67	50.29	47.05	41.2	37.9	N/A
30t	21.78	28.91	24.74	20.43	18.25	18.05	12.51	<0.21	19.68	30.34	33.35	35.60	22.0	20.2	N/A

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60	24.71	26.68	28.35	20.47	20.69	21.46	13.89	17.02	21.92	31.41	31.48	36.60	24.6	22.6	N/A
27g	65.48	71.80	66.80	76.11	60.93	73.94	83.30	74.54	73.22	67.76	77.98	75.16	72.3	66.5	N/A
27gx	67.09	68.68	64.28	69.22	69.33	74.21	83.81	80.95	77.83	71.55	70.89	86.28	73.7	67.8	N/A
27j	58.87	59.44	61.89	56.77	57.38	67.37	74.40	70.97	72.32	66.04	74.97	71.82	66.0	60.7	N/A
27p	42.56	56.25	58.68	48.23	45.89	61.37	35.06	52.17	40.10	68.08	69.40	54.37	52.7	48.5	N/A
14	43.67	41.12	39.98	38.41	34.95	35.59	38.04	35.67	18.86	8.71	50.86	44.07	35.8	33.0	N/A
14a	35.40	35.27	34.77	35.71	34.61	32.00	30.59	30.21	30.62	37.12	47.22	38.74	35.2	32.4	N/A
45c	35.66	40.03	47.16	43.45	44.35	55.52	31.35	34.75	40.35	56.19	58.16	52.77	45.0	41.4	N/A
49	22.94	24.55	25.43	19.46	16.14	17.52	10.77	12.31	16.90	29.68	31.73	32.52	21.7	19.9	N/A

Local bias adjustment factor used

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tube Bias Adjustment Factors

The NO₂ tubes employed by Dudley MBC are supplied and analysed by Gradko International Ltd., Winchester, Hampshire. Full details are provided in Box 1.1

Box 1.1: Nitrogen Dioxide diffusion tube information

Diffusion Tube Details	
Type Of Tube	Nitrogen Dioxide (NO ₂)
Type of absorbent	Triethanolamine
Method of tube preparation	20% TEA in water
Monitoring site locations	See Table A.8.
Exposure dates	Tubes are exposed in accordance with the NETCEN calendar
Exposure duration	One month
Measured concentrations	See Table B.1
Bias Adjustment Factor	0.92
Spreadsheet Version Number	06/17

Factor from Local Co-location Studies

Data provided by Dudley MBC for use in the national survey is summarised in Box 1.2

Box 1.2 Dudley MBC Co-Location Data 2016

Dudley MBC Co Location Study								
Site	Type	Site Type	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁶	Bias Adjustment Factor (A) (Cm/Dm)
Central Dudley	20% TEA in Water	UB	12	26	22	18.6%	G	0.84
Colley Gate	20% TEA in Water	R	11	43	38	12.4%	G	0.89
Burnt Tree	20% TEA in Water	R	12	37	34	11.0%	G	0.90
Wordsley	20% TEA in Water	R	12	51	54	-5.6%	G	1.06
							Mean	0.92
							National Factor	0.92

Discussion of Choice of Factor to Use

Local Authorities are advised to report both the adjustment factor from their local study, and the national bias adjustment factor. Box 1.2 above demonstrates that the Dudley MBC locally derived average value of 0.92 matched the national bias adjustment factor of 0.92 calculated using spreadsheet version 06/17.

The decision of which bias adjustment factor to use depends upon a number of issues that will need to be considered. It is up to each Local Authority to take account of the factors and set out the reasons for the choice made. Dudley MBC has chosen to use the national factor for the following reasons:

- The survey consists of over 29 studies where tubes are exposed over a wide range of settings which differ from the co-location sites employed in Dudley MB. For example, none of the Dudley MBC co-location sites assessed are on a building façade in a canyon-like street.
- The automatic analysers have been operated using local, rather than national, QA/QC procedures.
- During some years, data capture from the automatic analysers has been less than 90%; use of nationally calculated bias adjustment factors enables a consistent approach to be used from one year to the next.

PM Monitoring Adjustment

King's College ERG (Environmental Research Group) have developed a new model to correct TEOM concentrations to "gravimetric equivalent" values, based on the purge concentrations measured by FDMS analysers. To assist local authorities with the Volatile Correction Model, ERG has developed a web portal that will allow the correction algorithms to be automatically applied. It allows TEOM measurements to be corrected for the loss of volatile components of particulate matter that occur due to the high sampling temperatures employed by this instrument. The resulting

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corrected measurements have been demonstrated as equivalent to the gravimetric reference equivalent.

Data from 01/01/2010 onwards has been corrected using DEFRA's Volatile Correction Model (VCM) web portal. Corrections for the 2016 data were carried out on 17th February 2016 and the portal may include some un-ratified FDMS data and/or distant temperature & pressure sites.

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). Guidance in LAQM. TG (16) states that it is permissible to annualise the data using roadside or kerbside sites. Burnt Tree Automatic Monitoring Station was deployed in July 2010 at a roadside location. Data was used from the background AURN sites at Tyburn, Birmingham and Leamington Spa for NO₂ however data was not available for PM₁₀ at these locations. As Burnt Tree is classed as roadside location, data was used from Dudley MBC roadside locations at Colley Gate and Brierley Hill Rose, which is no longer operational (both with >95% data capture) the following calculations were employed:

Box 1.3 Site: Burnt Tree automatic monitoring station data from 30/7/2012 (5 months)

Roadside NO ₂	Annual Mean 2010 (Am)	Period Mean 2010 (Pm)	Ratio (Am/Pm)
Colley Gate	44.2	46.7	0.95
Brierley Hill Rose	45.3	47.6	0.95
Burnt Tree		38.2	
		Average (Ra)	0.95

Burnt Tree period mean = 38.2 x 0.95 = 36.2

Box 1.4 Site: Burnt Tree automatic monitoring station data from 30/7/2012 (5 months)

Background NO ₂ AURN Network	Annual Mean 2010 (Am)	Period Mean 2010 (Pm)	Ratio (Am/Pm)
Tyburn, Birmingham	37.3	44.0	0.8
Leamington Spa	28.3	28.6	1.0
Burnt Tree		38.2	
		Average (Ra)	0.9

Burnt Tree period mean = 38.2 x 0.90 = 35.1

Box 1.5 Site: Burnt Tree automatic monitoring station data from 30/7/2012 (5 months)

Roadside PM ₁₀	Annual Mean 2010 (Am)	Period Mean 2010 (Pm)	Ratio (Am/Pm)
Colley Gate	25.5	24.1	1.1
Brierley Hill Rose	22.9	21.7	1.1
Burnt Tree		19.3	
		Average (Ra)	1.1

Burnt Tree period mean = 19.3 x 1.1 = 20.4

QA/QC of Automatic Monitoring

The chemiluminescent NO₂ analysers are housed in an air-conditioned environment and are operated according to manufacturers' instructions. Calibration of instruments is carried out once every two weeks by Dudley MBC personnel. The calibration is performed with zero air from the analyser's internal generators which contain charcoal and Purafil to remove any trace of oxides of nitrogen from the sample stream and a certificated gas cylinder of nitric oxide supplied by BOC. 15-minute averaged data is collected and scaled using the determined calibration factors. All instruments are serviced at 6-monthly intervals by engineers from Environmental Technology plc, and are covered by that firm's service contract.

QA/QC of diffusion tube monitoring

The current test laboratory, Gradko, participates in two centralised QA/QC schemes:

- AIR, which is an independent analytical proficiency-testing (PT) scheme, operated by Laboratory of the Government Chemist (LGC) Standards and supported by the Health and Safety Laboratory (HSL). The scheme, which started in April 2014, combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

- A monthly field inter comparison exercise.

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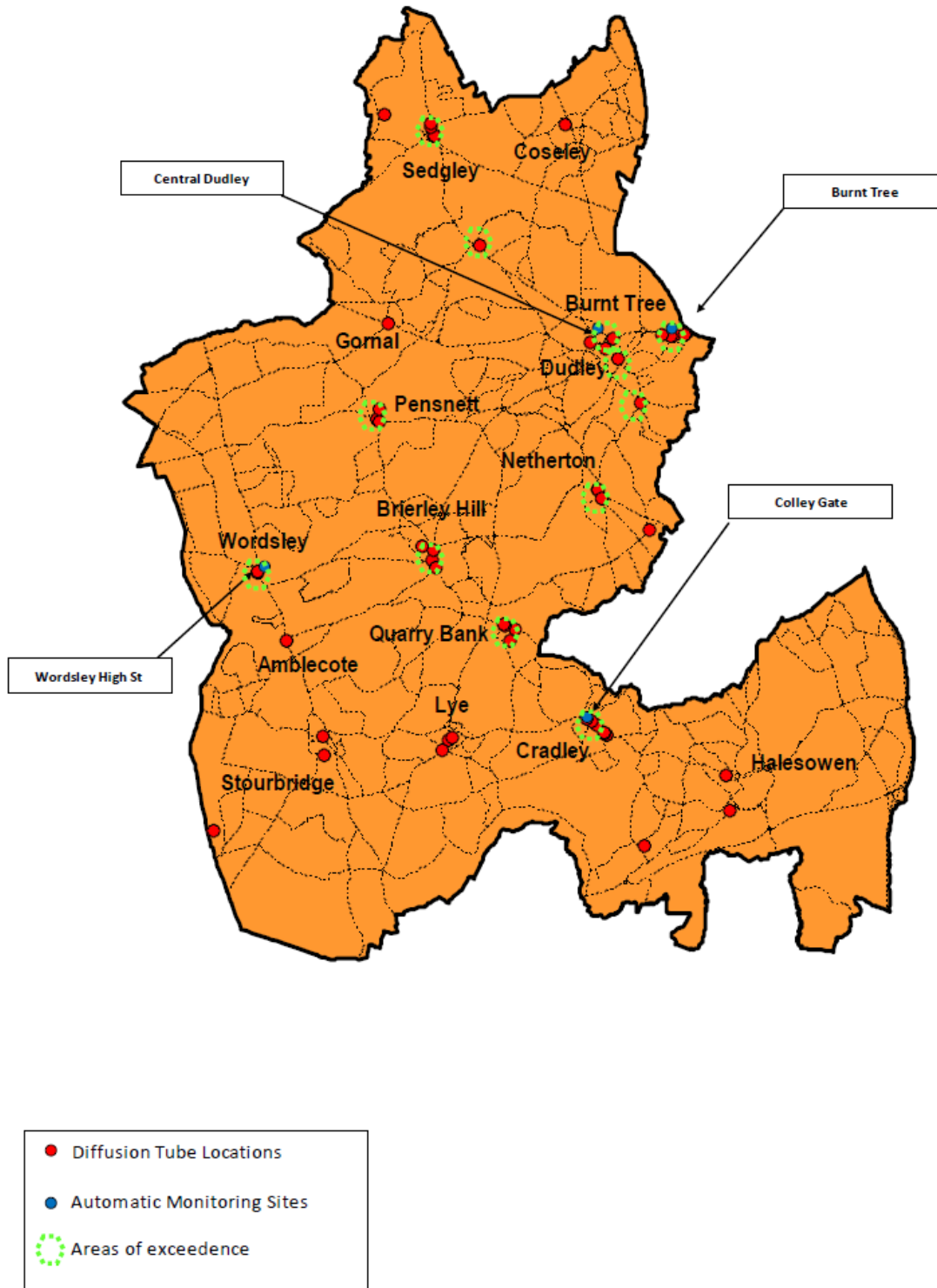
The laboratory demonstrated excellent levels of performance with regard to AIR NO₂ PT performance criteria over the period January 2016 to October 2016, see Box 1.6:

Box 1.6 Gradko Summary Performance for AIR NO₂ PT Rounds AR012, AR013, AR015 and AR016

Summary of Gradko Diffusion Tube Performance During 2015				
WASP/AIR NO ₂ PT Round	AR PT AR012	AR PT AR013	AR PT AR015	AR PT AR016
Evaluation Period	Jan- Feb 2016	April- May 2016	July- Aug 2016	Sept- Oct 2016
% of results submitted which were deemed to be satisfactory based upon a z-score of ± 2	100%	100%	100%	100%

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

Map of Automatic Monitoring Sites and Diffusion Tube Locations



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ³	
	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

³ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide
...	...

References

1. Defra (2016) Local Air Quality Management Technical Guidance LAQM. TG (16)
2. Defra (2016) Local Air Quality Management Policy Guidance LAQM. PG (16)
3. DUDLEY MBC (2015) Updating and Screening Assessment
4. DUDLEY MBC (2015) Air Quality Action Plan Progress Report
5. DUDLEY MBC (2011) Air Quality Action Plan
6. DUDLEY MBC (2016) ASR