



2019 Air Quality Annual Status Report (ASR)

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

Date: September 2019

Blackburn with Darwen Borough Council

Local Authority Officer	Blackburn with Darwen Borough Council
Department	Environment and Operations
Address	King William Street, Blackburn, BB1 7DY
Telephone	01254 267699
E-mail	Simon Kirby
Report Reference number	ASR2019
Date	September 2019

Executive Summary: Air Quality in Our Area

Air Quality in the Borough of Blackburn with Darwen

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

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

There are four Air Quality Management Areas (AQMAs) in the Borough. They were declared because nitrogen dioxide levels were too high. These AQMAs are located at busy urban junctions where nearby buildings hinder the dispersion of traffic exhaust fumes:

- Intack
- Bastwell
- Blackamoor
- Four Lane Ends

In general terms, there has been a gradual reduction in nitrogen dioxide exposure, and this reduction became more significant from 2017 onwards. There hasn't been an exceedance at a relevant receptor⁴ during 2017 and 2018. Information relating to these AQMAs is included in this report and can also be found on the [Defra AQMA website](#).

The results of nitrogen dioxide monitoring elsewhere in the Borough are also encouraging. No exceedances have been identified in 2017 and 2018, including at four former AQMAs.

There are no exceedances of other national objectives.

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

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

⁴ Relevant receptors for annual mean exposure are locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc. Excluding places of work, gardens and kerbside locations

Actions to Improve Air Quality

Some measures reported in this Annual Status Reports and preceding reports have required major investment, such as:

- the £40million Pennine Reach project to improve bus services on specific routes;
- the £20 million improvements to the Manchester/Clitheroe train line;
- a new junction on the A678 at Furthergate, which reroutes traffic from an AQMA which has since been revoked; and
- new intelligent traffic lights systems and junction modifications at several AQMAs

Changes are also being implemented at a national level, and as time marches on older more polluting road vehicles are being replaced.

Action has been taken, and it is good to be able to report that there haven't been any exceedances of a national objective in our Borough since 2016. However, we can't be complacent, as circumstances may change, and compliance with the national objectives isn't enough. The Council must seek to reduce pollution where it is feasible to do so, in pursuit of better health outcomes.

Measures to be implemented include:

- Physical changes to the road infrastructure:
 - A new link road that will remove traffic from one busy arm of a junction in the middle of the Blackamoor AQMA, which is part of a £13million Growth Deal 3 funded project.
 - A new intelligent traffic light system at the Four Lane Ends AQMA, with £70k of funding from Blackburn with Darwen Council, Lancashire County Council and the Department of Transport. The system will sense traffic and adjust the sequencing of the lights to minimise congestion, thereby reducing emissions.
- More electric vehicle charging points in public places, and virtually all new housing and commercial developments in the Borough now incorporate electric vehicle charging facilities, in accordance with the Council's [Air Quality Planning Advisory Note](#).

Blackburn with Darwen Borough Council

- Projects to make public transport and shared car use more attractive – These include new quality bus shelters, car sharing clubs, personal travel planning and extra spurs for the 26km Weavers Wheel cycle route.
- Cycling and walking initiatives to encourage active travel:
 - Health Walks
 - Adult cycle training
 - Bike hire
 - Bike maintenance
 - Led rides
 - Weekly Ride the Park events

Conclusions and Priorities

It is encouraging to report that three more of the Borough's Air Quality Management Areas (AQMAs) have been revoked since the last ASR was published, and that there hasn't been an exceedance of a relevant air quality objective in the Borough during 2017 and 2018. However, the Council won't be revoking the four remaining AQMAs until it is evident that the recent improvement has become a lasting trend (5 years or more).

The Council will press on with schemes to bring about further improvements at the Blackamoor and Four Lane Ends AQMAs.

The situation is not as straight forward at the Intack and Bastwell AQMAs, as the current action plans have run their course. The Council therefore intends to await the outcome of monitoring over the next year or two to see if the significant recent improvement in air quality are short lived or a more long term trend. Resources are limited and we must prioritise so that effort is directed to where it is needed most.

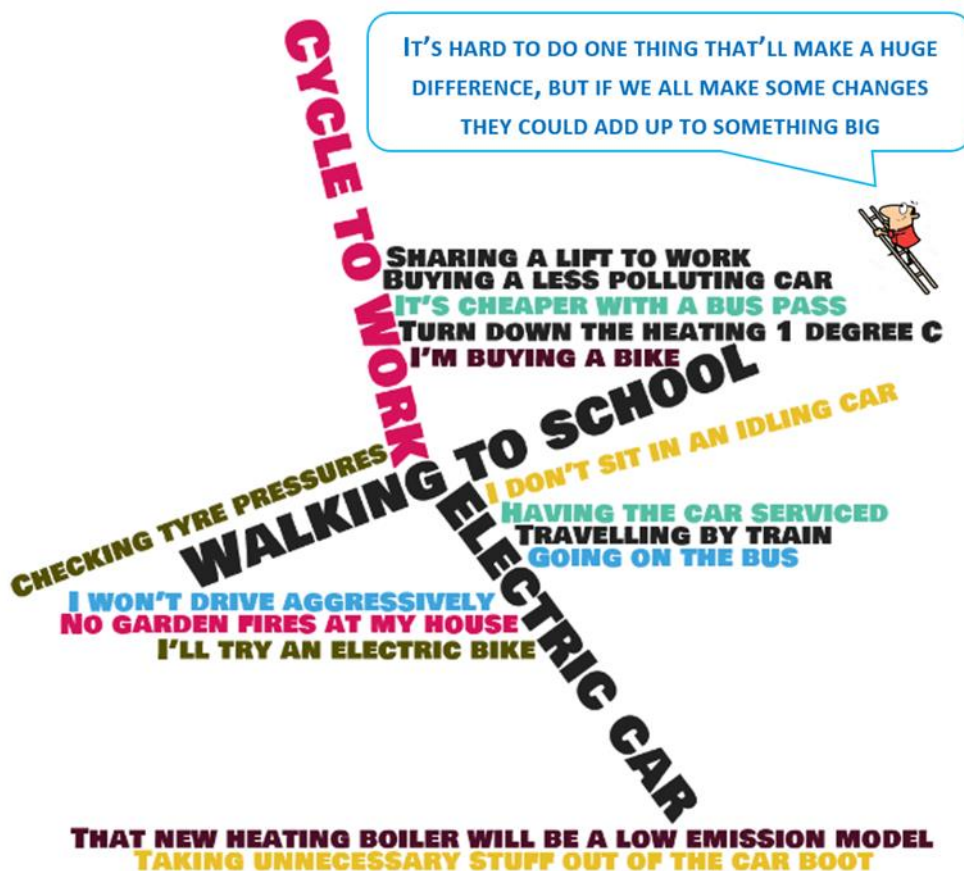
The Council's priorities are therefore similar to those identified in the 2018 ASR.

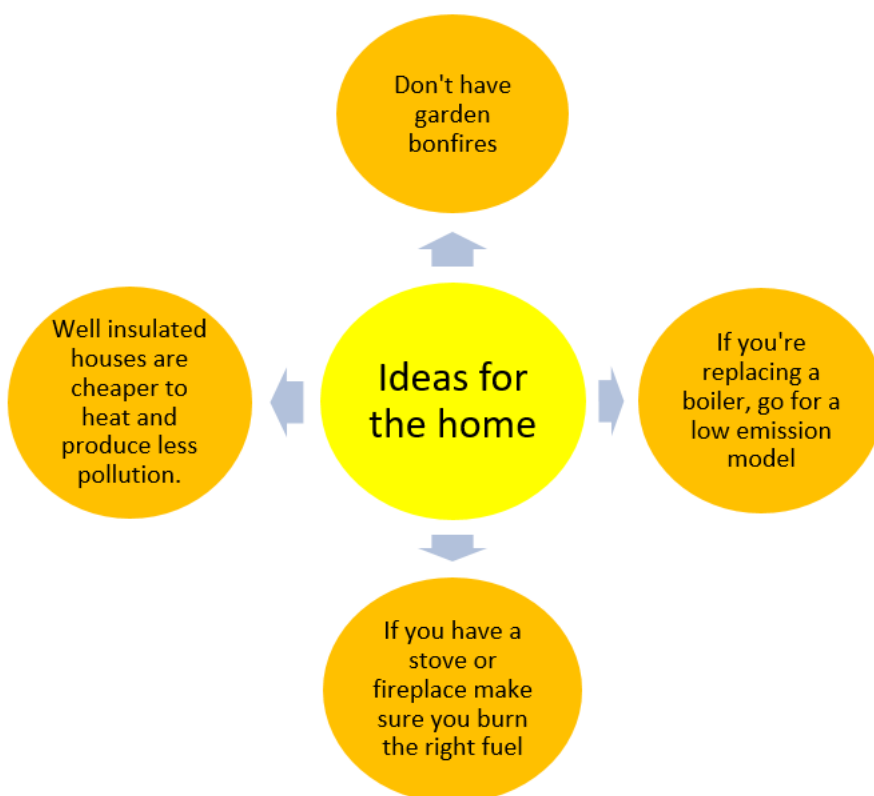
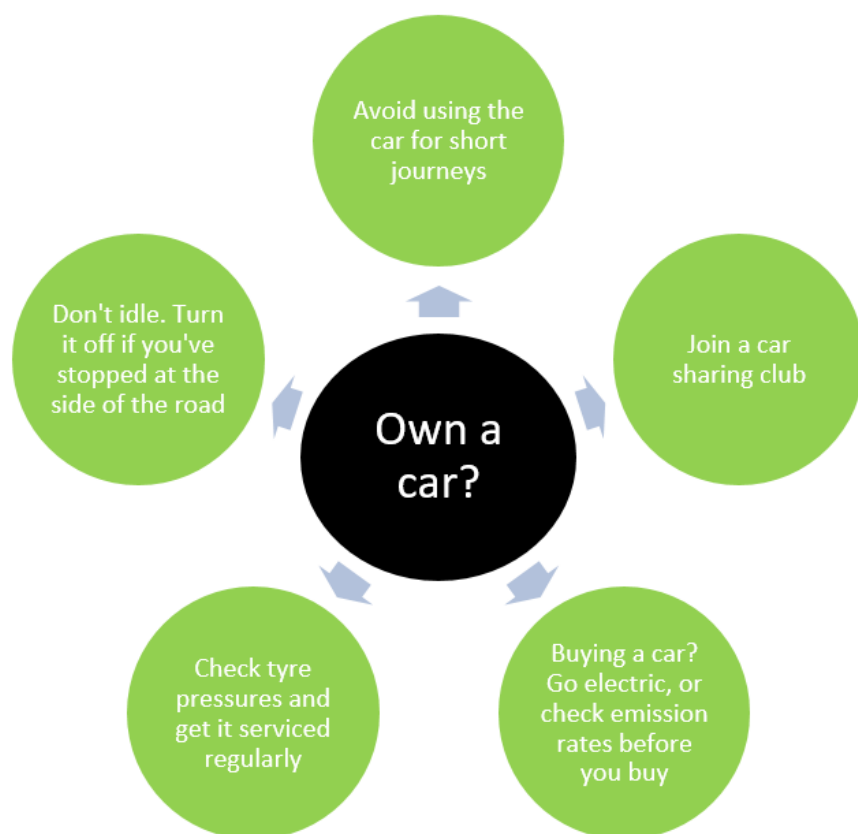
1. Blackamoor AQMA (No.6) – Work is due to start in early 2020 with a programmed completion by the end of March 2021.
2. Four Lane Ends AQMA (No.7) – To commence work on the installation of a new intelligent traffic management system during 2019.

3. Intack and Bastwell AQMAs (No. 1 and No.2) – The Action Plans for these two AQMAs have run their course. These plans will be revised if monitoring identifies a deterioration in air quality in subsequent years.
4. Monitoring - To continue to monitor nitrogen dioxide levels in the Borough, including:
 - In existing AQMAs
 - At revoked AQMAs, to check that the air quality doesn't deteriorate
 - At potential pollution hotspots, including the two locations that were subject to recent detailed assessments (the Toll Bar junction on Accrington Road and the Moorgate/Livesey Branch Road junction)

Local Engagement and How to Get Involved

There are lots of ways in which we can do something.





For more information click on the links below:

[Car sharing](#)

[Finding electric vehicle charging points](#)

[Electric vehicles – government grants](#)

[Vehicles eligible for the Electric Vehicle Homecharge Scheme](#)

[Household Waste Disposal Centres](#)

[Bulky Item Collection](#)

[Garden fires - Advice](#)

[Stove and fireplace information](#)

[Smoke Control Areas](#)

[Energy advice](#)

[Grants to save energy](#)



Interested in alternatives to car travel? Go to bwdconnect.org.uk for information on travelling by bus, train, car sharing, cycling and walking. Save money, keep fit, help lower carbon and pollution emissions, and you might even have some fun. There are loads of ideas for those journeys that you have to make, and for leisure activities too.

FREE APP TO DOWNLOAD AND USE

- AVAILABLE IN BOTH ANDROID AND APPLE VERSIONS
- BEGINNER, INTERMEDIATE AND ADVANCED ROUTES
- THE APP INCLUDES INTERACTIVE MAP AND VOICE INSTRUCTIONS
- ALL ROUTES HAVE BEEN RISK ASSESSED AND CREATED BY LOCAL CYCLING EXPERTS

EAST LANCASHIRE CYCLING APP

DISCOVER AND EASILY FOLLOW 25 ROUTES AROUND AREA

CONNECTING EAST LANCASHIRE
CONNECT

MAKE THE CHANGE, MAKE THE CONNECTION

GET IT ON **Google Play** | Download on the **App Store**

SEARCH FOR 'BLACKBURN AREA CYCLE ROUTES' | SEARCH FOR 'BLACKBURN CYCLING ROUTES'



The number of public charging points are increasing



Find local charging points at Zap-map.com

Table of Contents

Executive Summary: Air Quality in Our Area	i
Air Quality in the Borough of Blackburn with Darwen	i
Actions to Improve Air Quality	ii
Conclusions and Priorities	iii
Local Engagement and How to get Involved	iv
1 Local Air Quality Management	1
2 Actions to Improve Air Quality	2
2.1 Air Quality Management Areas	2
2.2 Progress and Impact of Measures to address Air Quality in the Borough of Blackburn with Darwen	4
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations	11
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	13
3.1 Summary of Monitoring Undertaken	13
3.1.1 Automatic Monitoring Sites	13
3.1.2 Non-Automatic Monitoring Sites	13
3.2 Individual Pollutants	14
3.2.1 Nitrogen Dioxide (NO ₂)	14
Appendix A: Monitoring Results	15
Appendix B: Full Monthly Diffusion Tube Results for 2018	35
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	38
Appendix D: Map(s) of Monitoring Locations and AQMAs	40
Appendix E: Summary of Air Quality Objectives in England	46
Glossary of Terms	47

List of Tables

Table 2.1 – Declared Air Quality Management Areas	3
Table 2.2 – Progress on Measures to Improve Air Quality	7
Table A.1 – Details of Automatic Monitoring Sites	15
Table A.2 – Details of Non-Automatic Monitoring Sites	16
Table A.3 – Annual Mean NO ₂ Monitoring Results	20
Table A.4 – 1-Hour Mean NO ₂ Monitoring Results	34
Table B.1 – NO ₂ Monthly Diffusion Tube Results - 2018	35

Table E.1 – Air Quality Objectives in England	46
---	----

List of Figures

Figure A.1.1 – NO ₂ Trends at AQMA 1 – Intack	24
Figure A.1.2 – NO ₂ Trends at AQMA 2 – Bastwell	25
Figure A.1.3 – NO ₂ Trends at Former AQMA 3 – Darwen Town Centre	26
Figure A.1.4 – NO ₂ Trends at former AQMA 4 – Witton	27
Figure A.1.5 – NO ₂ Trends at Former AQMA 5 – Earcroft	28
Figure A.1.6 – NO ₂ Trends at AQMA 6 – Blackamoor	29
Figure A.1.7 – NO ₂ Trends at AQMA 7 – Four Lane Ends	30
Figure A.1.8 – NO ₂ Trends at Former AQMA 8 – Former junction of Burnley Rd / Accrington Rd	31
Figure A.1.9 – NO ₂ Trends at NON-AQMA Diffusion Tube Sites (excluding AQMAs and former AQMAs)	32
Figure A.1.10 – NO ₂ Trends at the automatic monitor	33

1 Local Air Quality Management

This report provides an overview of air quality in the Borough of Blackburn with Darwen during 2018. 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 Blackburn with Darwen Borough Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Blackburn with Darwen 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:

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=20

See full list at <https://uk-air.defra.gov.uk/aqma/list>.

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs.

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		
						At Declaration		Now		Name	Date of Publication	Link
AQMA 1 - Intack	Declared 13/11/2005	NO ₂ Annual Mean	Blackburn	An area encompassing a number of properties at the junction of Accrington Rd / Shadsworth Rd / Whitebirk Rd	NO	46	µg/m ³	32	µg/m ³	Air Quality Action Plans Progress Report	2010	http://laqm.defra.gov.uk/document/s/2010_Action_Plan_Update.pdf
AQMA 2 - Bastwell	Declared 13/11/2005	NO ₂ Annual Mean	Blackburn	An area encompassing a number of properties at the junction of Whalley New Road / Whalley Range / Plane St	NO	43	µg/m ³	30	µg/m ³	Air Quality Action Plans Progress Report	2010	http://laqm.defra.gov.uk/document/s/2010_Action_Plan_Update.pdf
AQMA 6 - Blackamoor	Declared 1/2/2012	NO ₂ Annual Mean	Blackburn	An area encompassing a number of properties at the junction of Roman Road & B6231	NO	40	µg/m ³	34	µg/m ³	Action Plan not finalised, but details of new link road included in LTP2	n/a	-
AQMA 7 - Four Lane Ends	Declared 1/2/2012	NO ₂ Annual Mean	Blackburn	An area encompassing a number of properties at the junction of B6233, Revidge Rd & Lammack Rd	NO	44	µg/m ³	17	µg/m ³	Draft action Plan not finalised	n/a	-

Copies of 2019 revocation orders have been submitted to the RSW website. UK-Air website has yet to be updated to reflect the recent revocations.

2.2 Progress and Impact of Measures to address Air Quality in the Borough of Blackburn with Darwen

Defra's appraisal of last year's Annual Status Report concluded that, "...the conclusions reached [in the report] are acceptable for all sources and pollutants..." and, "The Council should continue to implement their air quality strategy, and continue monitoring."

Blackburn with Darwen Borough Council has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

The Council's 2018 Annual Status Report identified five priorities for 2018:

1. Blackamoor AQMA (No.6) – To commence work on the construction of the new link road during 2019. It will take an estimated 9 months to complete.

What has happened? – Plans were finalised following a consultation and a planning application will be submitted for the new link road later in 2019, with a March 2021 completion date. One arm of what is currently a busy four arm crossroads at heart of AQMA will become a dead-end, thereby reducing congestion

2. Four Lane Ends AQMA (No.7) – To commence work on the installation of a new intelligent traffic management system in 2019. The Council will also work with the St Mary's school to reduce reliance on private car journeys to school.

What has happened? - £70,000 has been secured for the work and the intelligent traffic light system has been purchased for installation in 2019. The system will sense traffic and adjust the sequencing of the lights to minimise congestion, thereby reducing emissions. Work with the school hasn't taken place due to limited resources.

3. Intack and Bastwell AQMAs (No.1 and 2) – The Action Plans for these two AQMAs had run their course and was to be reviewed 2018/2019.

What has happened? – The decision to review the Action Plans was based on a worst case assumption that the significant improvement observed in 2017 would be short-lived. However, 2018 has been another good year. There hasn't been an

exceedance at these locations for a second year running. The decision to invest significant time and money in a new action plan has been postponed. This review will take place if the situation deteriorates. Resources are limited and they have to be prioritised.

4. To continue to monitoring NO₂ levels in the Borough, including:

a. In existing AQMAs

What has happened? – There have been no exceedances of the objective during 2018

b. At revoked AQMAs, to see if the anticipated improvement is maintained

What has happened? – There have been no exceedances of the objective during 2018

c. At potential pollution hotspots, including the two locations that were subject to recent detailed assessments

What has happened? - There have been no exceedances of the objective during 2018

5. To deliver the Department of Transport's Access Fund project "CONNECTING East Lancashire" - we will work with businesses, educational establishments, residents and commuters in relation to raising the awareness of travel options and the choices available, in addition to delivering interventions that address specific barriers to active travel.

What has happened? There have been a variety of walking and cycling initiatives. See Table 2.2 for more information. Lovetoride.net has been encouraging people living and working in the Borough to cycle. Various events have been organised including:

- The Weavers Wheel Cycle Fest
- The Active Sustainability Roadshow
- Ride the Park
- Fresh Air at Witton Festival
- The Big Bike Revival at Darwen Aldridge Academy

Blackburn with Darwen Borough Council's priorities for the coming year are to implement improvements to the Blackamoor and Four Lane Ends AQMAs. It is expected that the following measures will be implemented:

- Blackamoor AQMA (No.6) – Work is due to start in early 2020 with a programmed completion by the end of March 2021.
- Four Lane Ends AQMA (No.7) – To complete the installation of a new intelligent traffic management system in 2019.

The principal challenges and barriers to implementation facing the Council haven't changed since 2017:

1. Our AQMAs are at busy urban junctions where emissions from slow moving vehicles are trapped by nearby buildings and the surrounding topography. This is particularly true for AQMA 7 at Four Lane Ends. The tightly formed Victorian streetscape can make it difficult to implement changes to physical infrastructure (e.g. changing road layouts).
2. Limited financial resources.
3. Relative to other more affluent areas, the profit made from developing land in our Borough is not particularly high. As a consequence, expensive mitigation options are less likely to be implemented

For the last two years (2017 & 2018) there hasn't been an exceedance at any of the AQMAs in the borough. Further monitoring in future years will reveal whether this is a short-lived improvement or part of a lasting trend.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, the Council anticipates that further additional measures not yet prescribed may be required in subsequent years to achieve compliance and enable the revocation of AQMA No.1 at Intack, AQMA No. 2 at Bastwell, and AQMA No.7 at Four Lane Ends.

Blackburn with Darwen Borough Council anticipates that the measures stated above and in Table 2.2 will secure long-term compliance in AQMA No. 6 at Blackamoor.

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	Link Road, Blackamoor	Transport Planning and Infrastructure	Other	Funding secures as part of Growth Deal 3 "Pennine Gateways" project, investing £13m in transport infrastructure across the Borough until March 2021.	Planning application to be submitted 2019	works to commence early 2020	Reduction in NO ₂ below annual objective	No estimate available at present	Included in Adopted Local Plan 2. Public consultation ended, planning application to be submitted 2019	Completion by the end of March 2021.	One arm of a busy 4 arm crossroads at heart of AQMA will become a dead-end, thereby reducing congestion
2	Pennine Reach	Transport Planning and Infrastructure	Bus route improvements	£40m - BwDBC & Lancashire county Council, DfT Funding	2015	2015/16	Findings of provisional report include: <ul style="list-style-type: none"> • Bus punctuality in the borough up 12% from 2015/16 to 2016/17 • YTD passenger growth up 12% on Accrington-Blackburn (route 6 & 7) buses • AQMA revoked due to relocation of A678/679 junction • Better bus journey times on some routes • Positive feedback for Blackburn and Accrington bus stations. 87% of customers preferring improved new stations, 38% of customers use them more 	0.02	Completed	Completed August 2017	Monitoring and Evaluation Report completed and submitted to Defra. Awaiting agreement with DfT.
3	Maximise Signal Efficiency	Traffic Management	Other	£70k for Four Lane Ends - BwDBC	2015/16	Initially 2016/17, but put back to 2018/19	New signal system at Blackamoor and Four Lane Ends	No estimate available	Blackamoor completed. Four Lane Ends system purchased	Four Lane Ends signal upgrade 2019	New Blackamoor road layout anticipated, so spend on evaluation not appropriate. Pleckgate system upgrade had been delayed because of

Blackburn with Darwen Borough Council

											limited resources, but funding now secured
4	Development Control	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	BwDBC	2016/17	2017/18	Implementation of Supplementary Planning Document - since amended	No estimate available	Planning Advisory Note completed and in use	July 2018	SPD not considered appropriate, Planning Advisory Note (PAN) implemented. Uptake of PAN methodology likely to increase now planning application verification checklist has been amended
5	Control of Bonfire and Chimney Emissions	Other	Other	BwDBC	Not applicable	Ongoing	Compliance with legislation and good practice	No estimate available	Responded to 130 service requests	Ongoing	
6	Control of Industrial Emissions	Environmental Permits	Other measure through permit systems and economic instruments	BwDBC, Local Industry	Not applicable	Ongoing	Compliance with Defra inspection regime	BAT - not quantified	All installations inspected in accordance with Defra regime	Ongoing	
7	Car Sharing - Shared wheels and relaunch of Royal Blackburn Hospital car share website	Alternatives to private vehicle use	Car Clubs	Lancashire Authorities, 2yrs of DfT Access Fund	Completed	Ongoing	Number of members	No estimate available	152 Blackburn with Darwen members	Ongoing	Funding
8	Weaver's Wheel - 26km cycle track route encircling Blackburn	Alternatives to private vehicle use	Other	BwDBC, 2015/19 £600k earmarked. Additional £50 2018/19 & 19/20 for network improvements, maintenance £30k per year	2014/15	2016-2019	26km of cycle track completed	No estimate available	Completed 2017. Extra spurs now being added over 3 years to 2021	2019, additional spurs completed 2021	Potential new spurs being identified, e.g. in Milking Lane area

Blackburn with Darwen Borough Council

9	Cycling events / training / bike hire	Alternatives to private vehicle use	Other	BwDBC	2014/15	2015 onwards	Number of participants	No estimate available	Participants: 26 Adult learn to ride, 23 Children learn to ride, 33 Balanceability, 64 Pedal around the park. 610 Hired bikes	2020	Active travel promotion is an established part of Public Health improvement initiatives and is embedded within the Health and Well-being Strategy
10	Personal travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	BwDBC, Hospital	2014/15	Ongoing	No. personal plans	No estimate available	3453 personal travel plans produced 2016/17 142 plans in 2018/19	2020	New reporting criteria have been adopted. Figures for new 2018/19 PTPs are those requested by clients, whereas previous figures included proactive plans distributed on "opt out" basis
11	Walking Initiatives	Promoting Travel Alternatives	Promotion of walking	BWDBC	ongoing	ongoing	Number of participants	No estimate available	Health Walk participants (including volunteer led) - 1596	ongoing	Active travel promotion is an established part of Public Health improvement initiatives and is embedded within the Health and Well-being Strategy
12	School travel plans at St Marys college and Pleckgate City Learning Centre	Promoting Travel Alternatives	School Travel Plans	BwDBC, School	Ongoing	2019/20	To be confirmed	No estimate available	None	2019/20	Lack of progress to date due to lack of funding for travel planning
13	Quality Bus Shelters	Transport Planning and Infrastructure	Public transport improvements - interchanges stations and services	£290k - BwDBC	2018	3yrs to 2021	Completed quality bus shelters	No estimate available	Ongoing	2020/21	

Blackburn with Darwen Borough Council

14	Parking Restrictions - Four Lane Ends Junction	Traffic Management	Other	BwDBC	2016/17	2018/18	Less congestion	No estimate available	No progress	2019	Likely to be small scale amendments to restrictions in vicinity of lights
15	Bus Stop Relocation	Traffic Management	Other	BwDBC	2016/17	Withdrawn from action plan	Withdrawn from action plan	Withdrawn from action plan	Withdrawn from action plan	Withdrawn from action plan	Withdrawn from action plan
16	Formal Right Turn on Shear Brow	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	BwDBC	2016/17	Withdrawn from action plan	Withdrawn from action plan	Withdrawn from action plan	Withdrawn from action plan	Withdrawn from action plan	Withdrawn from action plan

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.

According to the Public Health England website (Public Health Outcomes Framework⁵), the fraction of mortality in 2017 attributable to particulate air pollution in Blackburn with Darwen Borough, the North West and England was 4.04%, 5.06% and 4.07% respectively.

Blackburn with Darwen Borough Council is taking action to address PM_{2.5}. Details can be found in Table 2.2, but include the following measures:

- Bonfire Emissions – Action is being taken to reduce the number of domestic fires and to prevent illegal commercial burning through awareness raising, the Clean Air Act and waste related legislation (Table 2.2 Measure No.5).
- Emissions from the burning of domestic solid fuel - Approximately 38% of UK primary particulate matter emissions come from burning wood and coal in domestic open fires and solid fuel stoves⁶. Smoke emissions from stove and open fireplaces are being regulated through the Clean Air Act (Measure No.5). The large urban conurbations within the Borough are Smoke Control Areas, where restrictions are in place controlling burning in stoves and fireplaces.
- Physical changes at junctions - seeking to address congestion and reduce emissions at local hotspots. Examples include:
 - New intelligent traffic signals will be installed at the Four Lane Ends AQMA (Measure 3).
 - New Blackamoor link Road (Measure 1)

⁵ <https://www.lancashire.gov.uk/lancashire-insight/environment/monitoring-of-air-quality-and-health-impacts/>

⁶ <https://www.gov.uk/government/news/plans-to-cut-harmful-pollution-from-domestic-burning-set-out>

Blackburn with Darwen Borough Council

- Controlling industrial emissions – The Council and the Environment Agency are working with local permitted companies to ensure that industry complies with the relevant emission limits (Measure 6).
- Public transport – Bus services are under pressure in the current financial climate, but efforts have been made to implement some significant changes on specific routes. Recent major projects include the £40 million Pennine Reach project (Measure 2 – completed 2017) and lengthening of the double track section at Darwen station to allow a more robust and frequent service to run between Clitheroe, Blackburn and Manchester (completed 2015). New high quality bus shelters will be installed (Measure 15). When delivering the Department of Transport's Access Fund project "Connecting East Lancashire" we will work with businesses, educational establishments, residents and commuters in relation to raising the awareness of travel options and the choices available (Measure 10), in addition to delivering interventions that address specific barriers to active travel.
- Active travel is being encouraged. Work is being done to familiarise people with active travel options which can offer an alternative to the private car. Walking and cycling initiatives are proving popular (Measures 9 and 11). Traditional and electric bikes are available for hire (Measure 9). The 26km Weavers Wheel cycle route is complete, and new funding has been secured to add extra spurs (Measure 8).
- Blackburn with Darwen Borough Council are seeking opportunities to work with partner organisations and businesses and the public that will encourage active travel.
 - Together a Healthier Future is the Pennine Lancashire Sport England programme which aims to increase physical activity, targeting in particular, the most inactive. The programme is being developed, but it is likely that walking and cycling will be key themes.
 - The Council has identified significant interest in walking and other outdoor activities that link with active travel. Early engagement work has been undertaken with the Canals and Rivers Trust, Wildlife Trust and outdoor clubs, with a view to developing multi-use trails, increase the number of events and provide more promotion.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Blackburn with Darwen Borough Council undertook automatic (continuous) monitoring at one site during 2018. Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. There are no such circumstances in the Borough. National monitoring results are available at https://uk-air.defra.gov.uk/data/data_selector_service?show=auto&submit=Reset&limit_was=1.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

Earlier in 2019 Blackburn with Darwen Borough Council revoked three AQMAs: at Darwen Town Centre; Witton; and Earcroft. Monitoring will continue at the worst case receptors and nearby urban background locations, but monitoring elsewhere in the vicinity of the former AQMAs will be reduced. Some tubes will be moved elsewhere to investigate other potential hotspots or inform other projects, such as working with local schools. New sites are being considered.

3.1.2 Non-Automatic Monitoring Sites

Blackburn with Darwen Borough Council undertook non- automatic (passive) monitoring of NO₂ at 47 sites during 2019. 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 2018 dataset of monthly mean values is provided in Appendix B.

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

The results for monitoring locations DT24, DT39, DT47, DT48 and DT49 have been distance corrected to the nearest receptor (see Appendix C). Distance corrected exposures at the nearest relevant receptor can also be found in Table B.1

There have been no exceedances of the annual mean NO₂ objective in the borough at relevant receptors during 2017 and 2018. Annual mean NO₂ exposure at relevant worst case receptors has been well below 60µg/m³, which indicates that an exceedance of the 1-hour mean objective is also unlikely. Blackburn with Darwen Borough Council does not intend to declare any new AQMAs at the present time.

Trends over previous years are discussed in more detail in figures A.1.1 to A.1.9.

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)
CM1	Blackburn Accrington Road	Roadside	370241	428026	NO ₂	NO	Chemiluminescent	17.8	3.2	3

Notes:

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
DT1	14 St Helier	Urban Background	367034	425946	NO ₂	NO	2	n/a	NO	3
DT2	Moorgate Pub, Livesey Branch	Roadside	367135	425923	NO ₂	NO	1	3	NO	3
DT3	149 Livesey Branch Road	Roadside	367153	425915	NO ₂	NO	0	3	NO	3
DT4	238 Blackamoor Road	Roadside	370492	425781	NO ₂	NO	0	7.8	NO	3
DT5	283 Haslingden Road	Roadside	370489	425895	NO ₂	NO	0	8.5	NO	3
DT6	St Edwards School, Blackburn Rd, Darwen	Roadside	368298	423985	NO ₂	NO	0	2.4	NO	3
DT7	170 Accrington Road	Roadside	370386	427973	NO ₂	NO	0	4	NO	3
DT8	11-13 Bolton Rd	Roadside	369253	422099	NO ₂	YES	No exposure	1.8	NO	3
DT9	15 Shadsworth Road	Roadside	370826	427962	NO ₂	YES	0	2.3	NO	3
DT10	306 Accrington Road	Roadside	370818	428020	NO ₂	YES	0	2.5	NO	3

Blackburn with Darwen Borough Council

DT11	280 Accrington Road	Roadside	370758	428004	NO ₂	YES	0	4	NO	3
DT12	16 Whitebirk Road	Roadside	370836	428130	NO ₂	YES	0	5.2	NO	3
DT13	39 Peronne Crescent	Urban Background	370908	428217	NO ₂	NO	7.4	n/a	NO	3
DT14	371 Accrington Road	Roadside	370876	428054	NO ₂	YES	0	7.1	NO	3
DT15	114 Whalley new Road	Roadside	369025	429169	NO ₂	YES	0	2.2	NO	3
DT16	255 Whalley Range	Roadside	368964	429168	NO ₂	YES	0	2.5	NO	3
DT17	86 Whalley New Road	Roadside	368981	429090	NO ₂	YES	0	2.4	NO	3
DT18	9 Palm Street	Urban Background	369049	429064	NO ₂	NO	6.9	n/a	NO	3
DT19	24 Plane Street	Roadside	369074	429152	NO ₂	YES	0	2.2	NO	3
DT20	33 Bolton Road	Roadside	369259	422050	NO ₂	YES	0	2.9	NO	3
DT21	20 Market Street (Circus)	Roadside	369244	422192	NO ₂	YES	0	7.2	NO	3
DT22	15 Tudor Close	Urban Background	369157	422494	NO ₂	NO	3.7	n/a	NO	3
DT23	Hawkshead Close	Urban Background	366869	427601	NO ₂	NO	12	n/a	NO	3
DT24	Millstone, Darwen	Roadside	369278	422162	NO ₂	YES	2.6	5.4	NO	3
DT25	183 Redlam	Roadside	366652	427281	NO ₂	YES	0	2.6	NO	3

Blackburn with Darwen Borough Council

DT26	171 Buncer Lane	Roadside	366609	427295	NO ₂	YES	0	11	NO	3
DT27	12 Preston Old Road	Roadside	366591	427224	NO ₂	YES	0	7	NO	3
DT28	5 Campbell Place	Roadside	366668	427250	NO ₂	YES	0	5.1	NO	3
DT29	639 Blackburn Road	Roadside	368170	424617	NO ₂	NO	0	4.8	NO	3
DT30	179 Accrington Road	Roadside	370335	427988	NO ₂	NO	0	3	NO	3
DT31	145 Blackburn Road, Darwen	Roadside	368558	423362	NO ₂	NO	0	4	NO	3
DT32	7 Bolton Road, Darwen (DT32)	Roadside	369252	422131	NO ₂	YES	No exposure	2.1	NO	3
DT33	555 Blackburn Road	Roadside	368231	424376	NO ₂	YES	0	3.9	NO	3
DT34	486 Blackburn Road	Roadside	368240	424299	NO ₂	YES	0	6.5	NO	3
DT35	442 Blackburn Road	Roadside	368274	424164	NO ₂	YES	0	7.2	NO	3
DT36	9 View Road	Urban Background	368371	424195	NO ₂	NO	4.6	n/a	NO	3
DT37	26 Pickering Fold	Urban Background	369789	425346	NO ₂	NO	7	n/a	NO	3
DT38	2 Blackamoor Road	Roadside	369650	425374	NO ₂	YES	0	1	NO	3

Blackburn with Darwen Borough Council

DT39	138 Roman Road	Roadside	369613	425376	NO ₂	YES	2	0.5	NO	3
DT40	161 Roman Road	Roadside	369634	425359	NO ₂	YES	0	4	NO	3
DT41	113 Stopes Brow	Kerbside	369583	425358	NO ₂	YES	0	0.6	NO	3
DT42	535 Revidge Road	Roadside	367904	429576	NO ₂	YES	0	3.6	NO	3
DT43	254 Shear Brow	Roadside	367934	429582	NO ₂	YES	0	1	NO	3
DT44	Rhodes Avenue	Urban Background	367992	429697	NO ₂	NO	9	n/a	NO	3
DT45	331 Shear Brow	Roadside	367924	429561	NO ₂	YES	0	1.7	NO	3
DT46	38 Accrington Road	Roadside	369975	428172	NO ₂	YES	0	6	NO	3
DT47	Accrington Rd AURN monitor	Roadside	370241	428026	NO ₂	NO	17.8	3.2	YES	3
DT48	Accrington Rd AURN monitor	Roadside	370241	428026	NO ₂	NO	17.8	3.2	YES	3
DT49	Accrington Rd AURN monitor	Roadside	370241	428026	NO ₂	NO	17.8	3.2	YES	3

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 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
CM1	Roadside	Diffusion Tube	n/a	97	25.0	27.6	34.4	21.2	19.5
DT1	Urban Background	Diffusion Tube	n/a	100	18.5	17.8	17.5	14.8	14.1
DT2	Roadside	Diffusion Tube	n/a	100	27.9	27.8	30.2	24.9	24.3
DT3	Roadside	Diffusion Tube	n/a	100	41.5	39.2	40.9	33.8	34.5
DT4	Roadside	Diffusion Tube	n/a	100		28.4	30.6	22.8	21.8
DT5	Roadside	Diffusion Tube	n/a	100	32.4	29.5	31.2	22.9	20.9
DT6	Roadside	Diffusion Tube	n/a	100					20.5
DT7	Roadside	Diffusion Tube	n/a	100	39.4	36.2	42.6	32.1	28.6
DT8	Roadside	Diffusion Tube	n/a	100				29.3	35.1
DT9	Roadside	Diffusion Tube	n/a	100	33.2	29.1	33.9	25.0	25.6
DT10	Roadside	Diffusion Tube	n/a	100	42.3	39.9	42.5	34.5	32.3
DT11	Roadside	Diffusion Tube	n/a	100	36.6	36.4	36.3	28.2	26.7
DT12	Roadside	Diffusion Tube	n/a	83	25.8	24.7	25.9	20.2	19.3
DT13	Urban Background	Diffusion Tube	n/a	100	20.4	18.7	19.5	15.6	15.6

Blackburn with Darwen Borough Council

DT14	Roadside	Diffusion Tube	n/a	100	29.3	30.0	31.3	25.3	23.0
DT15	Roadside	Diffusion Tube	n/a	75	41.2	37.4	40.1	31.9	30.0
DT16	Roadside	Diffusion Tube	n/a	83	32.3	31.8	33.9	27.4	27.2
DT17	Roadside	Diffusion Tube	n/a	100	28.3	26.6	26.5	21.3	22.3
DT18	Urban Background	Diffusion Tube	n/a	92	18.7	18.9	19.4	16.1	16.7
DT19	Roadside	Diffusion Tube	n/a	92	29.4	28.4	29.5	24.0	22.2
DT20	Roadside	Diffusion Tube	n/a	100	36.5	34.6	37.0	27.1	28.0
DT21	Roadside	Diffusion Tube	n/a	100	27.4	25.0	25.0	20.5	19.7
DT22	Urban Background	Diffusion Tube	n/a	100	16.9	16.1	17.0	14.5	12.3
DT23	Urban Background	Diffusion Tube	n/a	100	17.4	15.5	16.6	12.7	13.7
DT24	Roadside	Diffusion Tube	n/a	100				20.9	22.5
DT25	Roadside	Diffusion Tube	n/a	100	35.3	34.4	37.3	25.6	27.3
DT26	Roadside	Diffusion Tube	n/a	100	24.3	21.8	23.5	17.4	17.0
DT27	Roadside	Diffusion Tube	n/a	100	24.8	24.0	25.2	19.6	19.6
DT28	Roadside	Diffusion Tube	n/a	100	28.5	27.3	30.5	22.3	22.2
DT29	Roadside	Diffusion Tube	n/a	100	34.0	32.2	34.0	25.7	27.2
DT30	Roadside	Diffusion Tube	n/a	100	30.6	28.5	30.1	27.7	25.2
DT31	Roadside	Diffusion Tube	n/a	92	34.5	28.7	29.2	22.4	23.2

Blackburn with Darwen Borough Council

DT32	Roadside	Diffusion Tube	n/a	100			45.9	32.4	34.2
DT33	Roadside	Diffusion Tube	n/a	100	34.5	30.0	33.3	25.6	26.1
DT34	Roadside	Diffusion Tube	n/a	100	33.5	31.7	34.6	26.9	25.2
DT35	Roadside	Diffusion Tube	n/a	100	33.1	32.8	33.2	25.9	22.4
DT36	Urban Background	Diffusion Tube	n/a	100	21.6	21.5	21.1	17.1	15.9
DT37	Urban Background	Diffusion Tube	n/a	100	20.3	17.7	19.9	15.2	16.5
DT38	Roadside	Diffusion Tube	n/a	100	43.0	40.0	45.0	33.6	34.2
DT39	Roadside	Diffusion Tube	n/a	100	38.5	42.6	38.7	35.9	33.0
DT40	Roadside	Diffusion Tube	n/a	83	38.9	35.7	39.5	29.4	30.3
DT41	Kerbside	Diffusion Tube	n/a	100	45.1	42.5	46.7	30.6	29.4
DT42	Roadside	Diffusion Tube	n/a	100	28.3	28.2	30.6	25.1	24.1
DT43	Roadside	Diffusion Tube	n/a	100	44.2	40.0	42.3	34.3	32.9
DT44	Urban Background	Diffusion Tube	n/a	100	21.2	21.6	20.6	16.2	16.8
DT45	Roadside	Diffusion Tube	n/a	75	44.5	41.8	45.3	36.5	35.2
DT46	Roadside	Diffusion Tube	n/a	100	38.2	34.4	30.8	22.4	21.0
DT47	Roadside	Diffusion Tube	n/a	100	-	24.9	25.9	20.6	20.3
DT48	Roadside	Diffusion Tube	n/a	100	-	24.6	26.1	20.2	20.2
DT49	Roadside	Diffusion Tube	n/a	100	-	24.1	26.7	21.3	19.6

☒ Diffusion tube data has been bias corrected

☐ Annualisation has been conducted where data capture is <75% **Annualisation not required as capture ≥75% at all monitoring locations**

Notes:

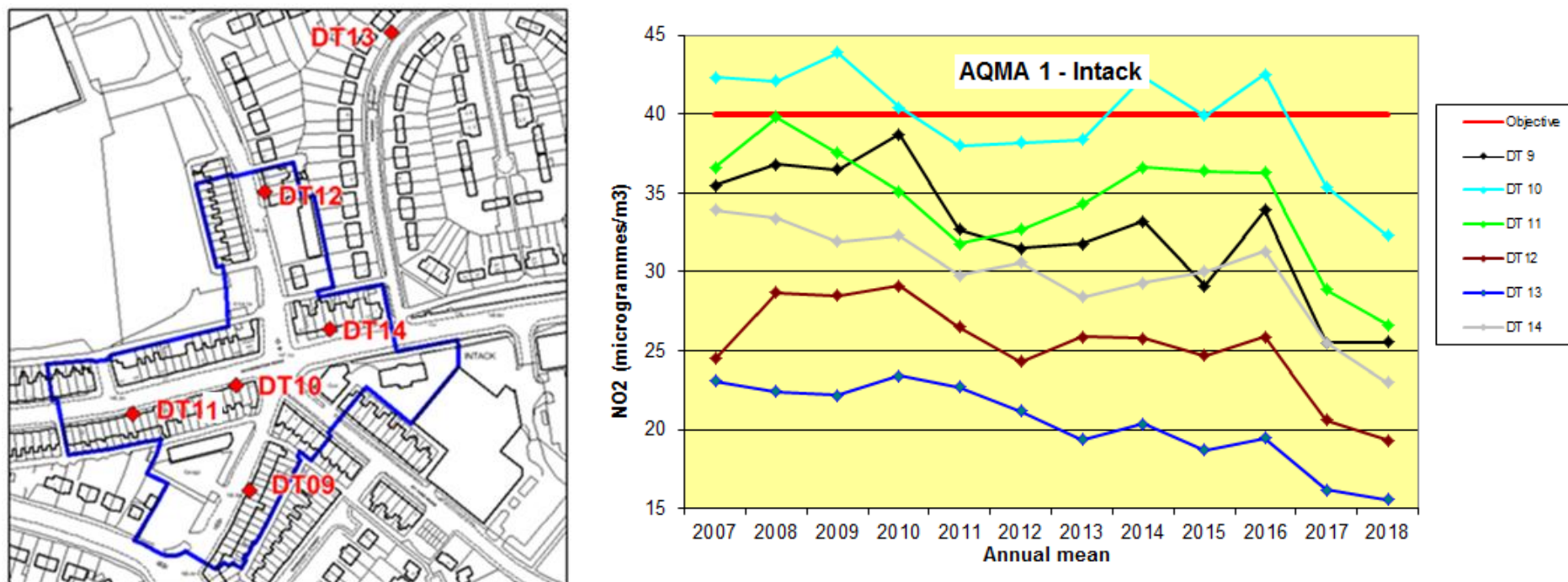
Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

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

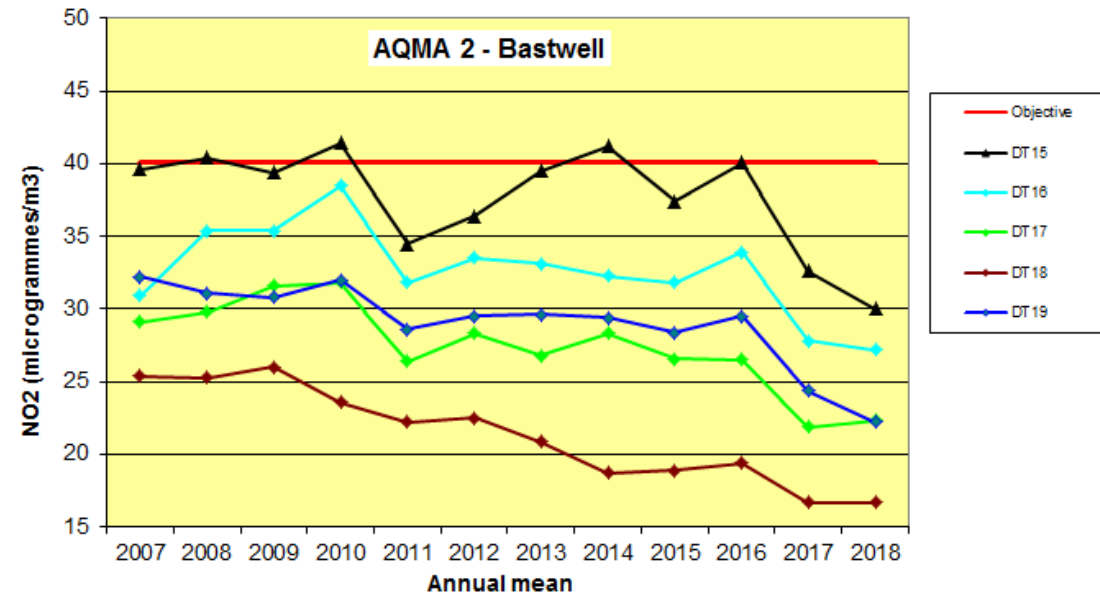
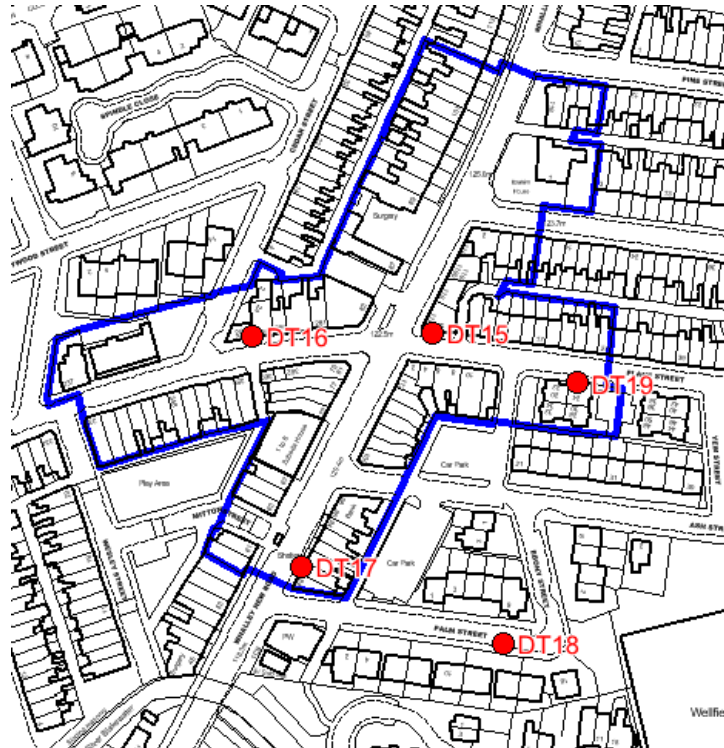
(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.1.1 – NO₂ Trends at AQMA 1 – Intack

Exposure during 2017 and 2018 at the Intack AQMA was under the annual mean NO₂ national objective, but there have been exceedances as recently as 2016 so the AQMA will not be revoked.

Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

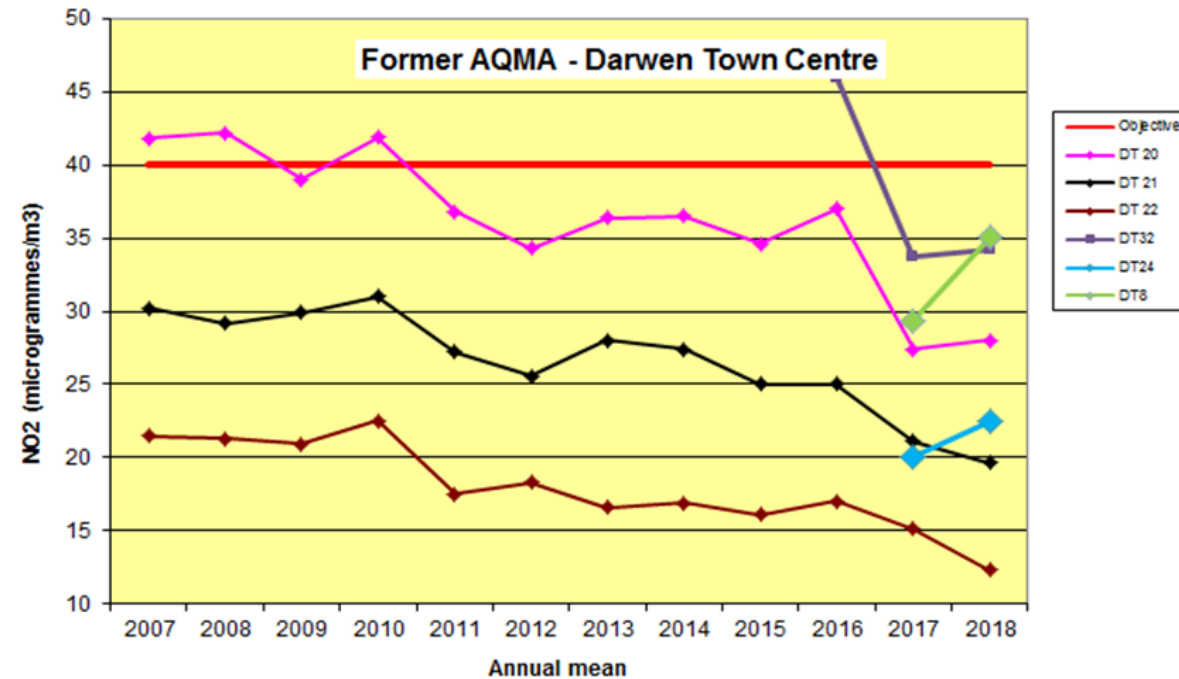
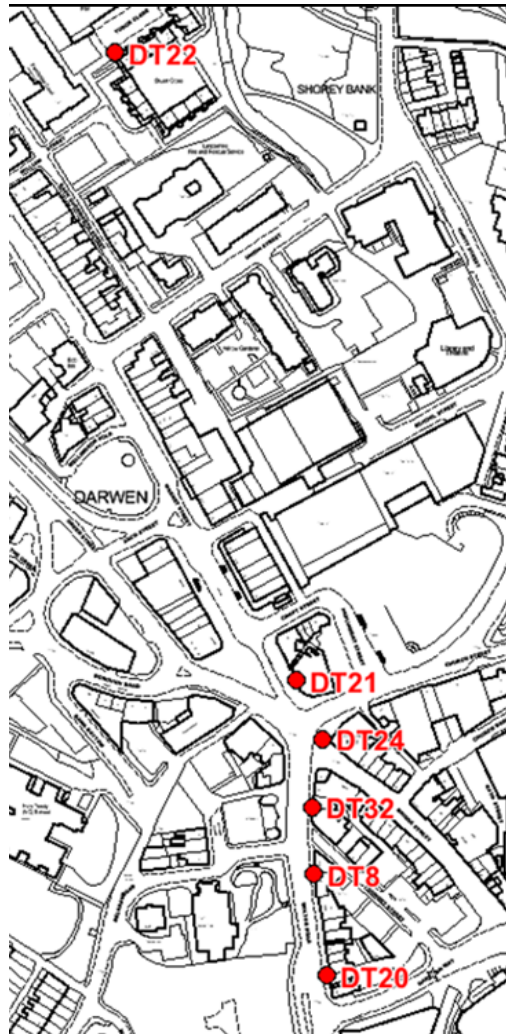
Figure A.1.2 – NO₂ Trends at AQMA 2 – Bastwell



Exposure during 2017 and 2018 at the Bastwell AQMA was under the annual mean NO₂ national objective, but there have been exceedances in recent years so the AQMA will not be revoked.

Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

Figure A.1.3 – NO₂ Trends at Former AQMA 3 – Darwen Town Centre

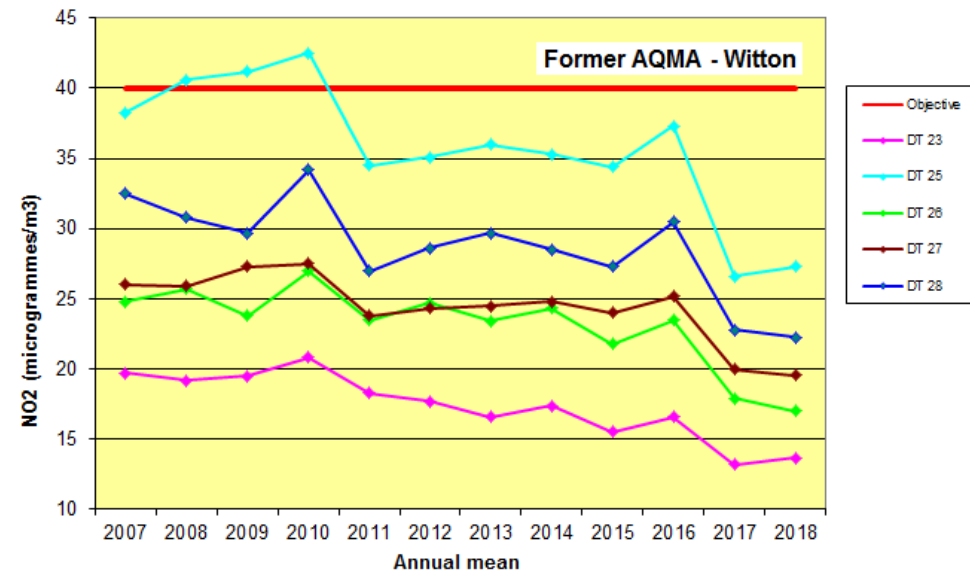
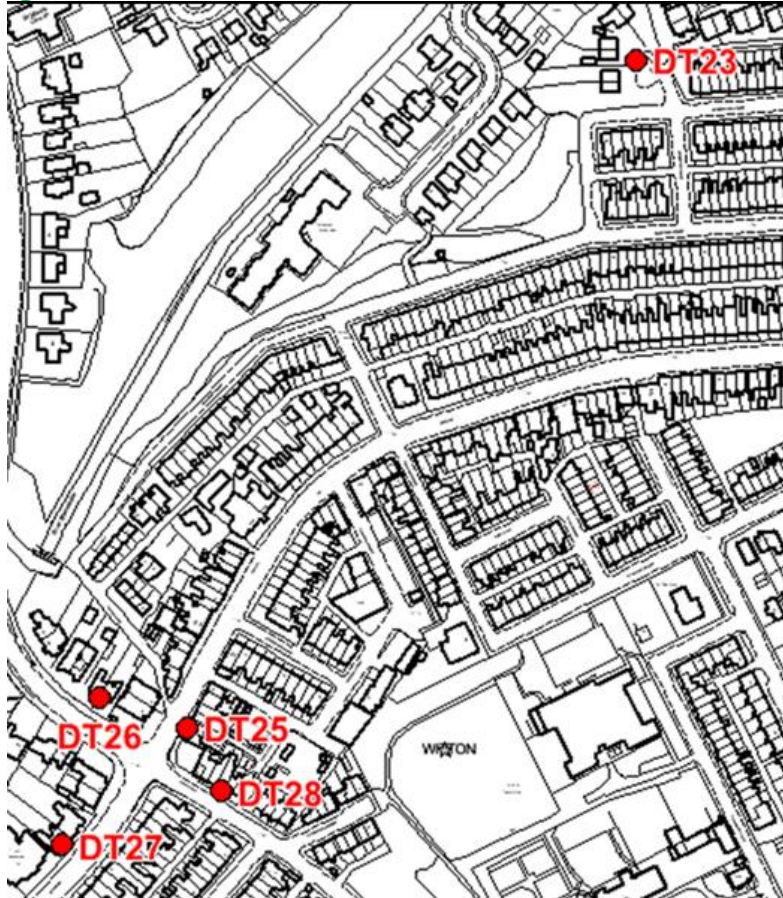


There hasn't been an exceedance of the NO₂ annual mean objective at a relevant receptor in the Darwen Town Centre since 2010. There was evidence of a long term improvement so the AQMA was revoked in 2019 (this course of action was discussed in the previous ASR).

Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

There are no relevant receptors at DT8 and DT32. Monitoring was undertaken here to inform potential planning decisions, e.g. conversion of premises from commercial to residential.

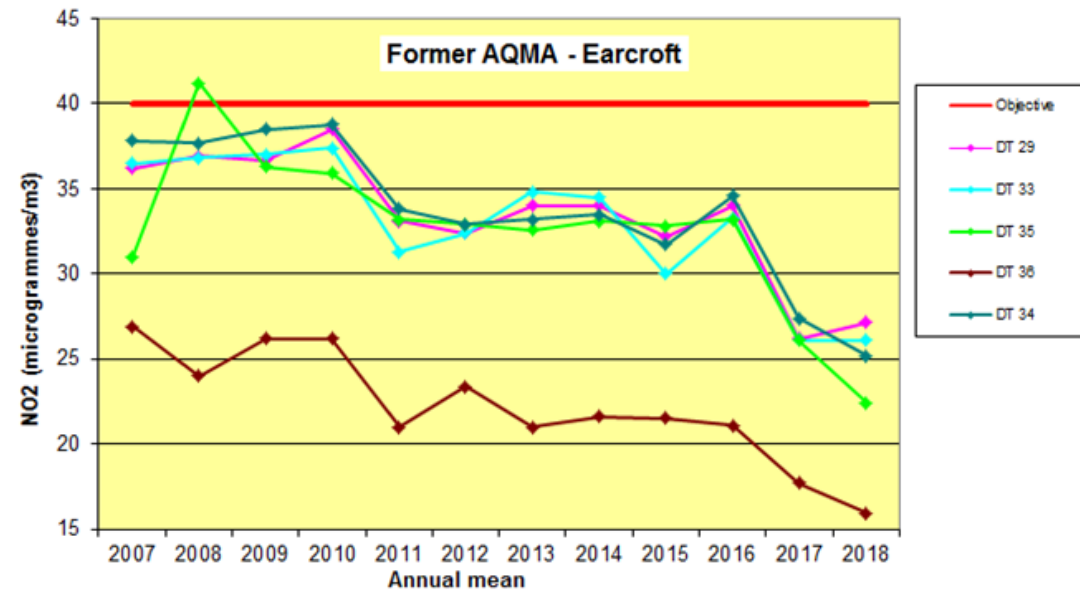
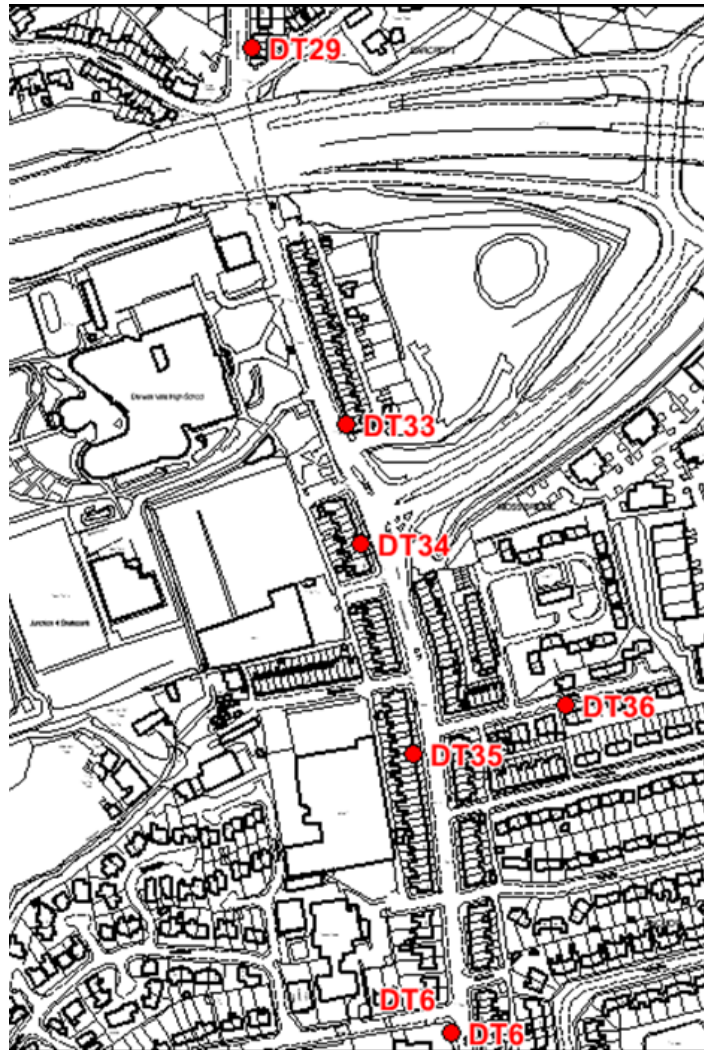
Figure A.1.4 – NO₂ Trends at former AQMA 4 – Witton



There hasn't been an exceedance of the NO₂ annual mean objective at a relevant receptor in Witton since 2010. There was evidence of a long term improvement so the AQMA was revoked in 2019 (this course of action was discussed in the previous ASR).

Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

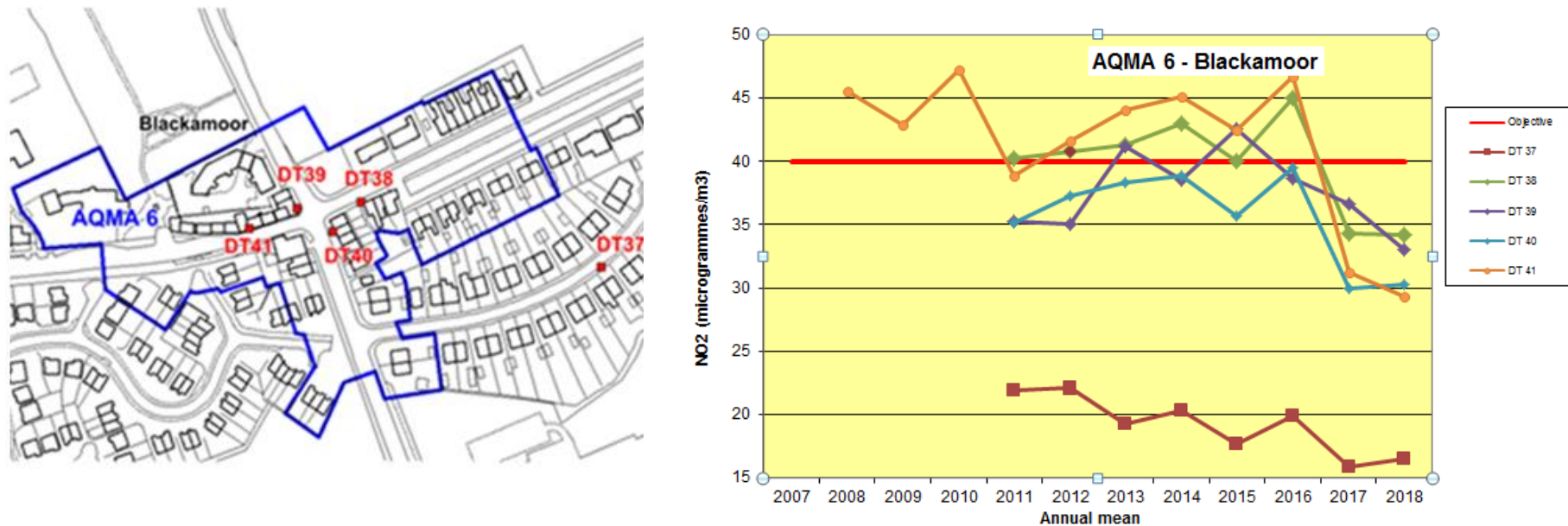
Figure A.1.5 – NO₂ Trends at Former AQMA 5 – Earcroft



There hasn't been an exceedance of the NO₂ annual mean objective at a relevant receptor in Earcroft since 2008. There was evidence of a long term improvement so the AQMA was revoked in 2019 (this course of action was discussed in the previous ASR).

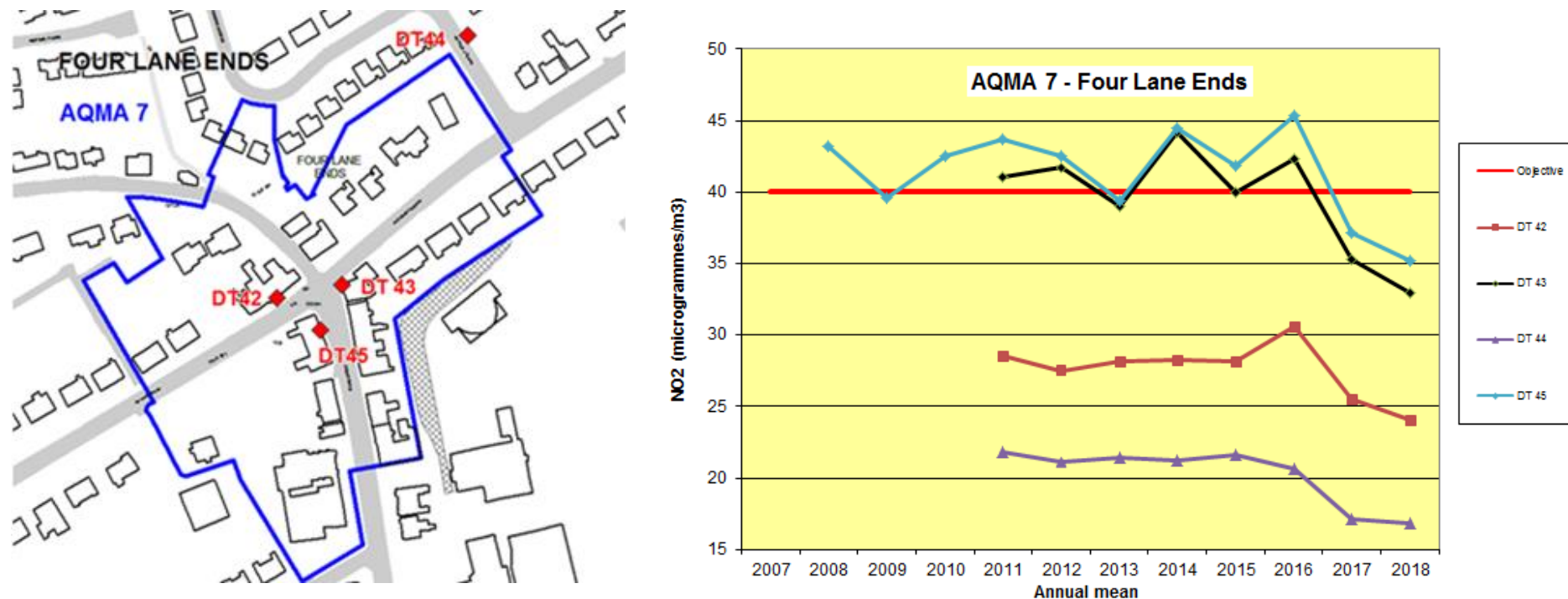
Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

Figure A.1.6 – NO₂ Trends at AQMA 6 – Blackamoor



Exposure during 2017 and 2018 at the Blackamoor AQMA was under the annual mean NO₂ national objective, but there have been exceedances in recent years so the AQMA will not be revoked.

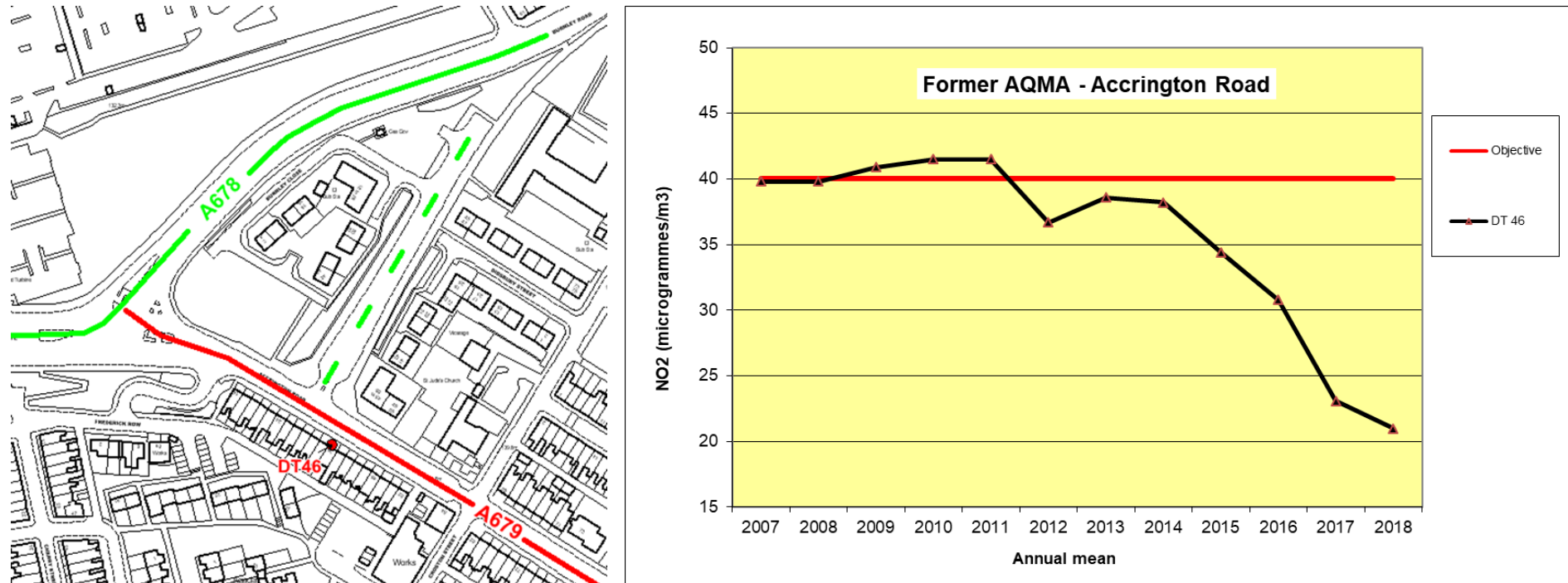
Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

Figure A.1.7 – NO₂ Trends at AQMA 7 – Four Lane Ends

Exposure during 2017 and 2018 at the four Lane Ends AQMA was under the annual mean NO₂ national objective, but there have been exceedances as recently as 2016 so the AQMA will not be revoked.

Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

Figure A.1.8 – NO₂ Trends at Former AQMA 8 – Former junction of Burnley Road / Accrington Road

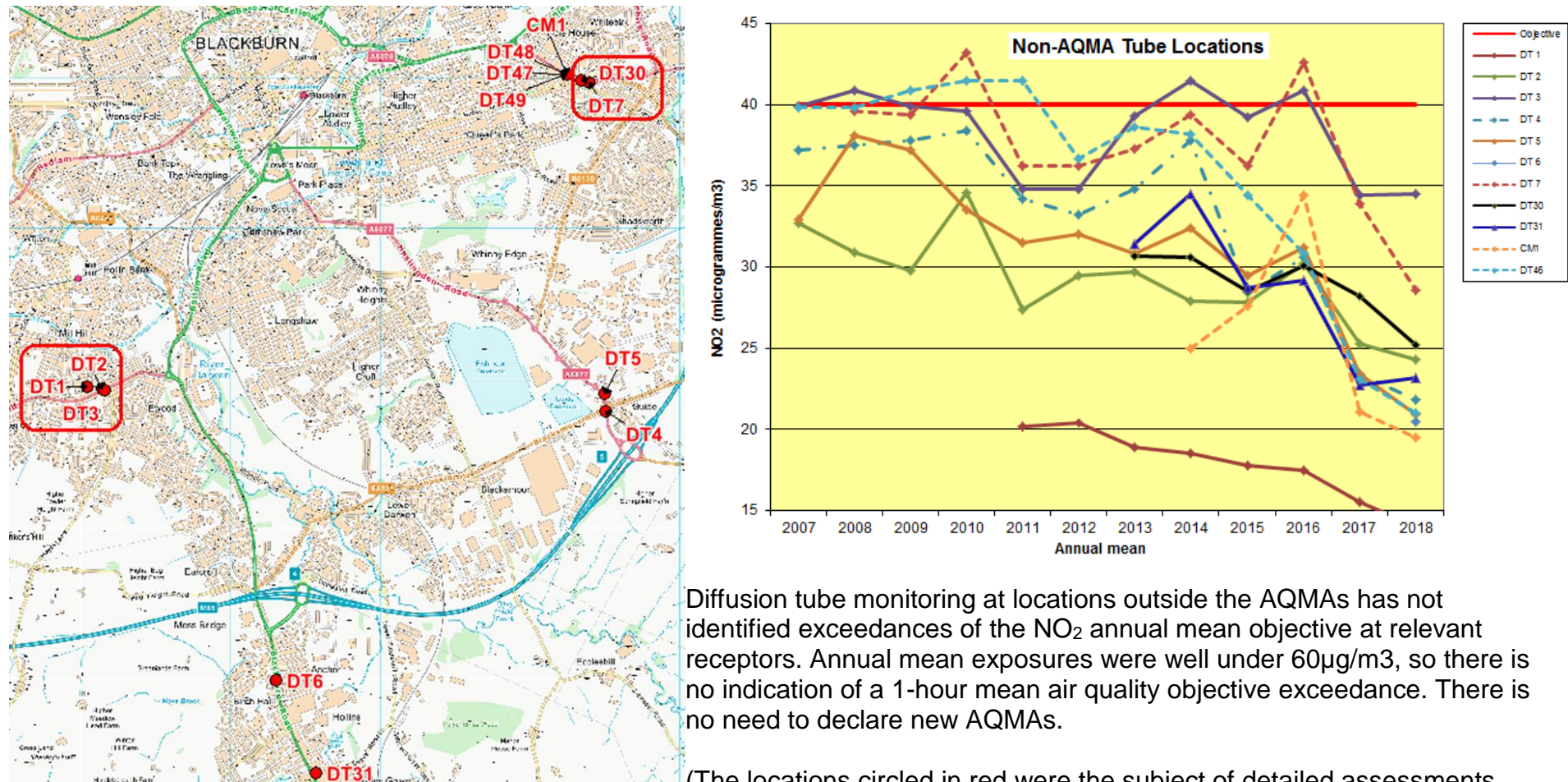


Exposure from 2012 onwards has been under the annual mean NO₂ national objective.

The junction of the A678 and A679 was moved westwards, and the section of road highlighted as a green dotted line on the above map was made into a cul-de-sac. The new junction was completed in April 2017.

Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

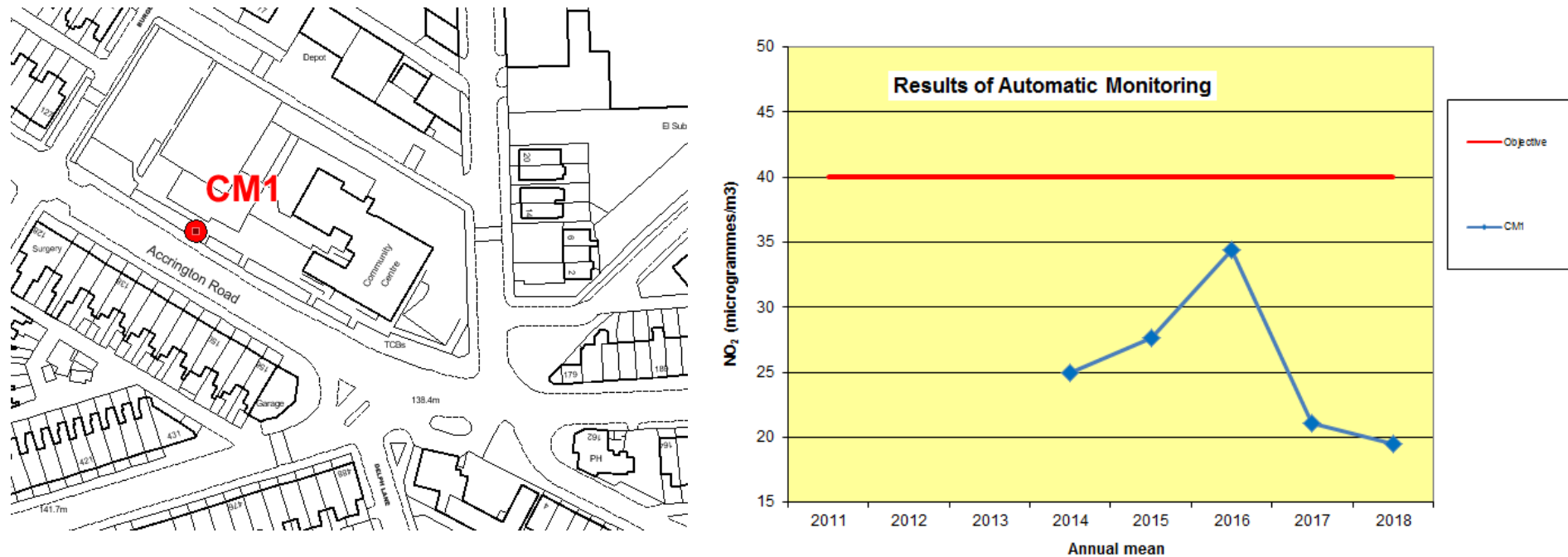
Figure A.1.9 – NO₂ Trends at NON-AQMA Diffusion Tube Sites (excluding AQMAs and former AQMAs)



Diffusion tube monitoring at locations outside the AQMAs has not identified exceedances of the NO₂ annual mean objective at relevant receptors. Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance. There is no need to declare new AQMAs.

(The locations circled in red were the subject of detailed assessments reported in the 2018 ASR.)

Figure A.1.10 – NO₂ Trends at the automatic monitor



There hasn't been an exceedance of the NO₂ annual mean objective at the automatic monitor. Annual mean exposures were well under 60µg/m³, so there is no indication of a 1-hour mean air quality objective exceedance.

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 2018 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2014	2015	2016	2017	2018
CM1	Select	Automatic	n/a	97	0	0	0	0	0

Notes:

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018

Site ID	NO ₂ Mean Concentrations (µg/m³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.78) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
DT1	18.7	20.9	26.0	15.8	14.9	12.1	13.0	14.9	15.9	20.0	17.1	26.9	18.0	14.1	n/a
DT2	25.8	35.2	35.7	27.4	32.4	26.7	30.2	25.0	31.8	34.5	33.7	35.9	31.2	24.3	n/a
DT3	37.6	49.5	51.7	40.5	40.8	43.2	41.1	36.9	41.3	46.3	46.5	55.3	44.2	34.5	n/a
DT4	15.6	36.8	34.9	24.5	22.4	23.4	28.1	24.2	26.4	31.4	38.3	29.6	28.0	21.8	n/a
DT5	19.2	31.3	28.6	22.6	24.8	23.2	31.9	27.9	27.4	29.0	22.8	33.0	26.8	20.9	n/a
DT6	18.0	29.0	29.9	25.6	25.7	22.3	21.5	20.9	20.8	31.3	34.2	36.3	26.3	20.5	n/a
DT7	29.2	37.6	39.9	36.8	34.0	30.8	33.9	36.0	38.7	37.4	40.0	45.4	36.7	28.6	n/a
DT8	29.9	57.5	45.0	47.3	47.2	44.0	45.0	41.7	38.2	45.3	47.9	51.4	45.0	35.1	n/a
DT9	20.7	37.0	39.3	32.7	36.9	33.8	30.6	28.2	35.3	35.9	25.0	38.3	32.8	25.6	n/a
DT10	28.8	42.3	47.4	40.0	43.0	40.2	42.1	39.1	37.4	49.5	36.6	50.8	41.4	32.3	n/a
DT11	18.4	42.7	45.1	31.1	34.6	31.1	31.1	33.0	30.6	37.9	32.7	41.8	34.2	26.7	n/a
DT12	20.3	25.9	27.2	24.6	24.7	24.5	24.0	21.2	23.4	32.0			24.8	19.3	n/a
DT13	16.0	22.2	25.0	16.8	16.0	13.3	15.7	17.0	29.6	22.9	21.6	23.7	20.0	15.6	n/a
DT14	20.4	29.5	32.2	28.3	32.2	31.1	31.7	31.1	32.7	31.7	19.8	33.0	29.5	23.0	n/a
DT15	35.8	44.5	47.0	40.6				35.2	31.4	40.6	27.6	43.6	38.5	30.0	n/a

Blackburn with Darwen Borough Council

DT16	34.2	41.9	38.8	40.0	40.5		31.9	32.0	22.3		27.5	39.9	34.9	27.2	n/a
DT17	27.3	36.7	36.3	27.0	26.8	27.0	22.9	23.3	17.6	27.5	35.8	35.4	28.6	22.3	n/a
DT18	17.1	24.5	22.4	19.6	16.1	13.8	15.9	17.3	31.5	22.3	28.3	27.8	21.4	16.7	n/a
DT19	23.4	29.0	34.3	23.8	26.6	22.6	27.4	27.5	30.9		28.0	40.1	28.5	22.2	n/a
DT20	21.7	43.5	41.5	39.3	44.4	43.0	35.8	31.6	21.2	40.5	27.5	41.0	35.9	28.0	n/a
DT21	26.0	30.6	30.8	24.8	24.7	21.8	23.6	22.8	14.2	29.4	22.3	31.6	25.2	19.7	n/a
DT22	14.6	22.9	18.5	15.4	11.4	10.4	12.9	13.0	11.9	19.9	18.9	19.8	15.8	12.3	n/a
DT23	15.4	22.8	22.7	16.8	13.1	11.8	11.2	11.1	26.0	18.5	17.7	23.3	17.5	13.7	n/a
DT24	22.5	35.0	33.9	27.7	26.2	23.4	25.2	25.2	28.6	29.9	31.2	36.7	28.8	22.5	22.5
DT25	26.1	43.3	44.8	39.7	37.8	34.9	33.8	30.8	18.8	33.0	33.5	43.6	35.0	27.3	n/a
DT26	14.1	27.7	27.9	24.1	22.9	21.7	20.2	18.8	20.8	23.9	14.4	24.9	21.8	17.0	n/a
DT27	21.7	27.9	32.5	26.1	24.7	22.7	24.5	19.8	24.7	26.2	22.4	27.7	25.1	19.6	n/a
DT28	19.6	27.8	35.3	25.3	32.1	27.9	27.1	24.2	28.6	29.1	30.9	34.1	28.5	22.2	n/a
DT29	26.7	37.6	40.1	37.1	36.4	32.6	33.6	29.9	31.7	37.5	34.9	39.5	34.8	27.2	n/a
DT30	24.6	34.8	41.0	32.3	28.2	29.5	32.1	34.1	22.1	35.5	31.3	42.2	32.3	25.2	n/a
DT31	22.8	36.2	27.9	31.6	27.5	34.8	27.4		34.8	30.5	21.6	31.8	29.7	23.2	n/a
DT32	43.7	50.5	52.6	49.0	46.3	44.7	39.0	35.4	26.3	48.4	39.1	51.3	43.9	34.2	n/a
DT33	22.9	42.5	38.5	33.4	36.9	35.9	32.9	28.3	32.4	34.9	27.7	35.0	33.4	26.1	n/a
DT34	22.3	34.3	35.1	30.0	31.4	34.3	32.9	29.2	33.0	34.2	28.5	42.1	32.3	25.2	n/a
DT35	19.7	32.5	34.2	28.2	28.9	28.6	33.4	32.3	19.1	30.0	23.9	34.7	28.8	22.4	n/a
DT36	13.7	23.2	23.1	20.2	18.4	17.0	17.6	16.1	17.0	23.8	25.4	29.8	20.4	15.9	n/a
DT37	19.6	25.6	25.9	17.9	14.5	13.1	13.7	15.6	40.6	21.9	23.2	22.1	21.1	16.5	n/a
DT38	42.4	44.4	45.8	43.5	45.0	46.3	42.2	41.4	43.3	44.6	34.9	52.6	43.9	34.2	n/a
DT39	30.1	47.2	50.8	38.2	41.3	40.5	43.8	41.8	29.0	46.1	49.7	49.6	42.3	33.0	33.0
DT40	24.0	48.3	47.4	38.6	45.7			31.1	35.4	39.3	43.1	35.4	38.8	30.3	n/a
DT41	28.4	44.8	44.2	37.8	41.6	42.9	35.9	32.7	26.7	40.8	35.4	40.3	37.6	29.4	n/a
DT42	24.0	38.1	34.1	29.0	29.7	30.5	36.2	24.8	38.2	34.3	20.1	31.2	30.8	24.1	n/a

Blackburn with Darwen Borough Council

DT43	24.4	55.7	51.2	43.0	46.1	45.4	44.8	40.4	17.9	43.0	45.4	48.9	42.2	32.9	n/a
DT44	19.1	29.5	25.0	19.1	15.5	12.9	16.8	17.7	27.3	21.9	25.3	28.5	21.5	16.8	n/a
DT45	45.8	47.5	51.1	43.1	41.9	41.4	41.3	43.7				50.0	45.1	35.2	n/a
DT46	15.3	33.8	34.4	23.8	25.4	22.6	24.6	25.4	26.9	27.7	27.5	35.3	26.9	21.0	n/a
DT47	22.1	29.3	36.0	25.7	23.2	20.9	22.4	23.3	24.7	27.5	23.7	33.9	26.1	20.3	19.8
DT48	27.3	34.6	34.0	22.8	22.9	20.9	23.6	21.6	25.4	31.0	23.6	22.8	25.9	20.2	19.4
DT49	25.0	31.5	34.2	26.1	23.1	17.4	22.0	21.5	17.1	25.3	20.9	36.8	25.1	19.6	20.3

☒ Local bias adjustment factor used

☐ National bias adjustment factor

☐ Annualisation has been conducted where data capture is <75 **Annualisation not required as all data capture ≥75%**

☒ Where applicable, data has been distance corrected for relevant

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 Specification

Blackburn with Darwen Borough Council monitors NO₂ levels at 47 locations. This includes a triple tube co-location trial at the Blackburn Accrington Road AURN site. The 20% TEA in water diffusion tubes are provided and analysed by Gradko Ltd.


Bias Adjustment

National Bias adjustment Factor (0.93) – See National Factor spreadsheet below

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 03/19				
Follow the steps below in the correct order to show the results of relevant co-location studies						This spreadsheet will be updated at the end of June 2019				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods						LAQM Helpdesk Website				
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.										
Step 1:		Step 2:		Step 3:		Step 4:				
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ² shown in blue at the foot of the final column.				
If a laboratory is not shown, use have no data for this method or this laboratory.		If a preparation method is not shown, use have no data for this method or this laboratory.		If a year is not shown, use have no data		If you have your own co-location study then see footnote ³ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327953				
Analysed By ¹	Method	Year ²	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2018		Overall Factor ² (30 studies)				Use		0.93

Local Bias Adjustment Factor (0.78) – See AEA Precision and accuracy spreadsheet below.

Checking Precision and Accuracy of Triplicate Tubes

 **AEA Energy & Environment**
From the AEA group

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µg ⁻³	Tube 2 µg ⁻³	Tube 3 µg ⁻³	Triplicate e Mean	Standard Deviation	Coefficient of Variation	95% CI of mean
1	05/12/17	04/01/18	37.96		37.22	38	0.5	1	4.7
2	04/01/18	1/2/208	22.11	27.33	25.01	25	2.6	11	6.5
3	01/2/208	01/03/18	29.30	34.57	31.51	32	2.6	8	6.6
4	01/03/18	29/03/18	36.04	34.03	34.19	35	1.1	3	2.8
5	29/03/18	01/05/18	25.68	22.76	26.08	25	1.8	7	4.5
6	01/05/18	06/06/18	23.19	22.90	23.07	23	0.1	1	0.4
7	06/06/18	04/07/18	20.90	20.86	17.37	20	2.0	10	5.0
8	04/07/18	01/08/18	22.45	23.62	22.03	23	0.8	4	2.0
9	01/08/18	05/09/18	23.29	21.65	21.55	22	1.0	4	2.4
10	05/09/18	03/10/18	24.73	25.37	17.10	22	4.6	21	11.4
11	03/10/18	31/10/18	27.52	30.95	25.29	28	2.9	10	7.1
12	31/10/18	05/12/18	23.72	23.57	20.93	23	1.6	7	3.9
13	05/12/18	09/01/19	33.92	22.76	36.75	31	7.4	24	18.4

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

Site Name/ ID:	Blackburn Accrington Road
Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A 0.77 (0.71 - 0.84)	
Bias B 30% (19% - 41%)	
Diffusion Tubes Mean: 27 µg ⁻³	
Mean CV (Precision): 6	
Automatic Mean: 20 µg ⁻³	
Data Capture for periods used: 97%	
Adjusted Tubes Mean: 20 (19 - 22) µg ⁻³	

Precision	11 out of 13 periods have a CV smaller than 20%
-----------	---

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 13 periods of data	
Bias factor A 0.78 (0.72 - 0.84)	
Bias B 29% (19% - 39%)	
Diffusion Tubes Mean: 27 µg ⁻³	
Mean CV (Precision): 9	
Automatic Mean: 21 µg ⁻³	
Data Capture for periods used: 97%	
Adjusted Tubes Mean: 21 (19 - 22) µg ⁻³	

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
28.9	99.7	Good	Good
25.3	95.7	Good	Good
26.0	99.4	Good	Good
24.3	99.1	Good	Good
17.4	95.7	Good	Good
16.3	95.0	Good	Good
13.6	95.2	Good	Good
16.5	94.5	Good	Good
14.7	95.6	Good	Good
17.0	96.0	Poor Precision	Good
20.3	99.6	Good	Good
21.2	100.0	Good	Good
26.6	99.3	Poor Precision	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Jaume Targa, for AEA


Version 04 - February 2019

Blackburn with Darwen Borough Council

Bias adjustment discussion - In most circumstances TG16 recommends use of a local factor over a national factor. Several factors supported the conclusion that the local factor of 0.78 was likely to be more representative:

1. The tubes were exposed monthly for the full year in accordance with Defra's diffusion tube monitoring calendar at sites.
2. The co-location trial gave "good" precision for the diffusion tubes.
3. The automatic monitor results were to national AURN standards with good overall data capture.
4. The urban roadside location of the co-located tubes was similar to the rest of the diffusion tube monitoring locations.
5. 0.78 is similar to the 0.74 local adjustment factor used to correct the 2017 monitoring data.

Distance Corrections

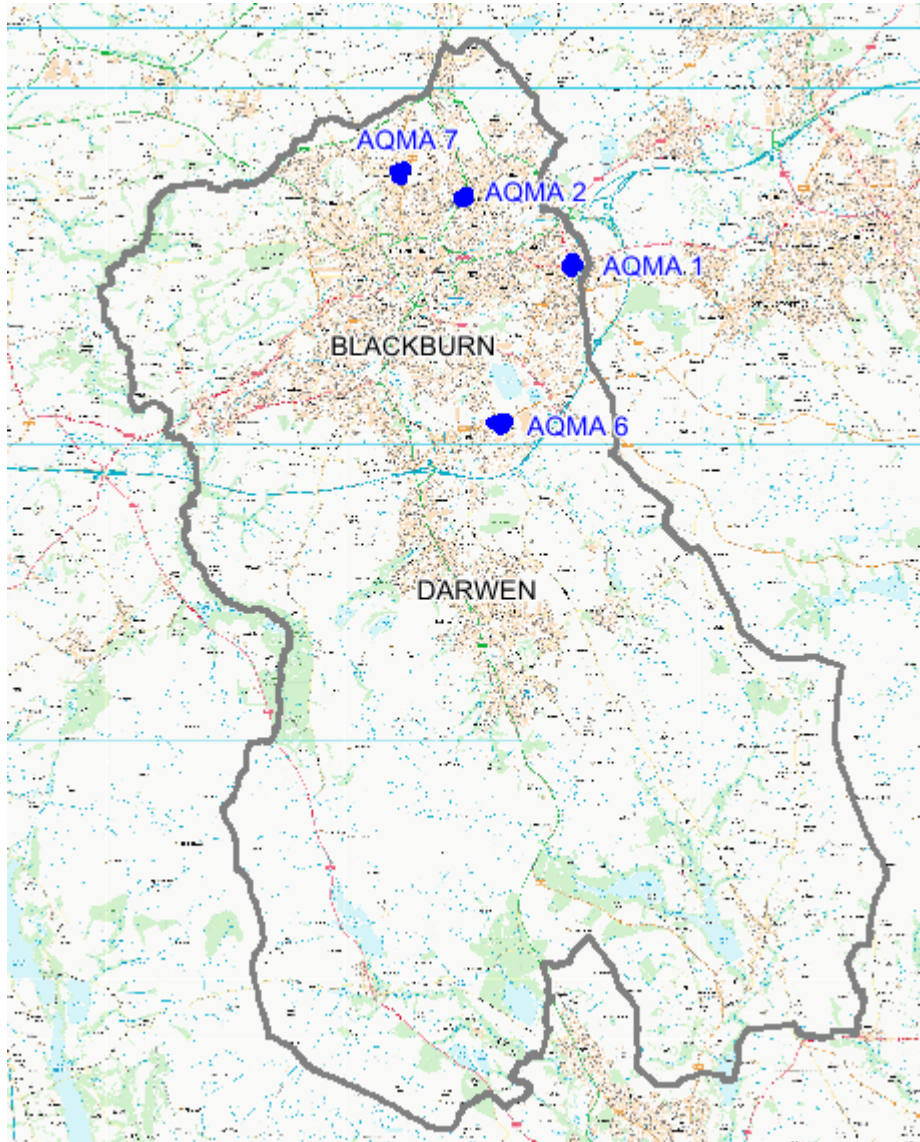
 <p>Enter data into the pink cells</p>					
Site Name/ID	Distance (m)		O ₂ Annual Mean Concentration (µg/m)		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
DT24	5.0	7.8	14.5	20.9	20.1
DT39	0.5	2.5	15.2	35.9	30.0
DT47	3.2	6.1	15.6	20.6	19.8
DT48	3.2	6.1	15.6	20.2	19.4
DT49	3.2	6.1	15.6	21.3	20.3

Annualisation

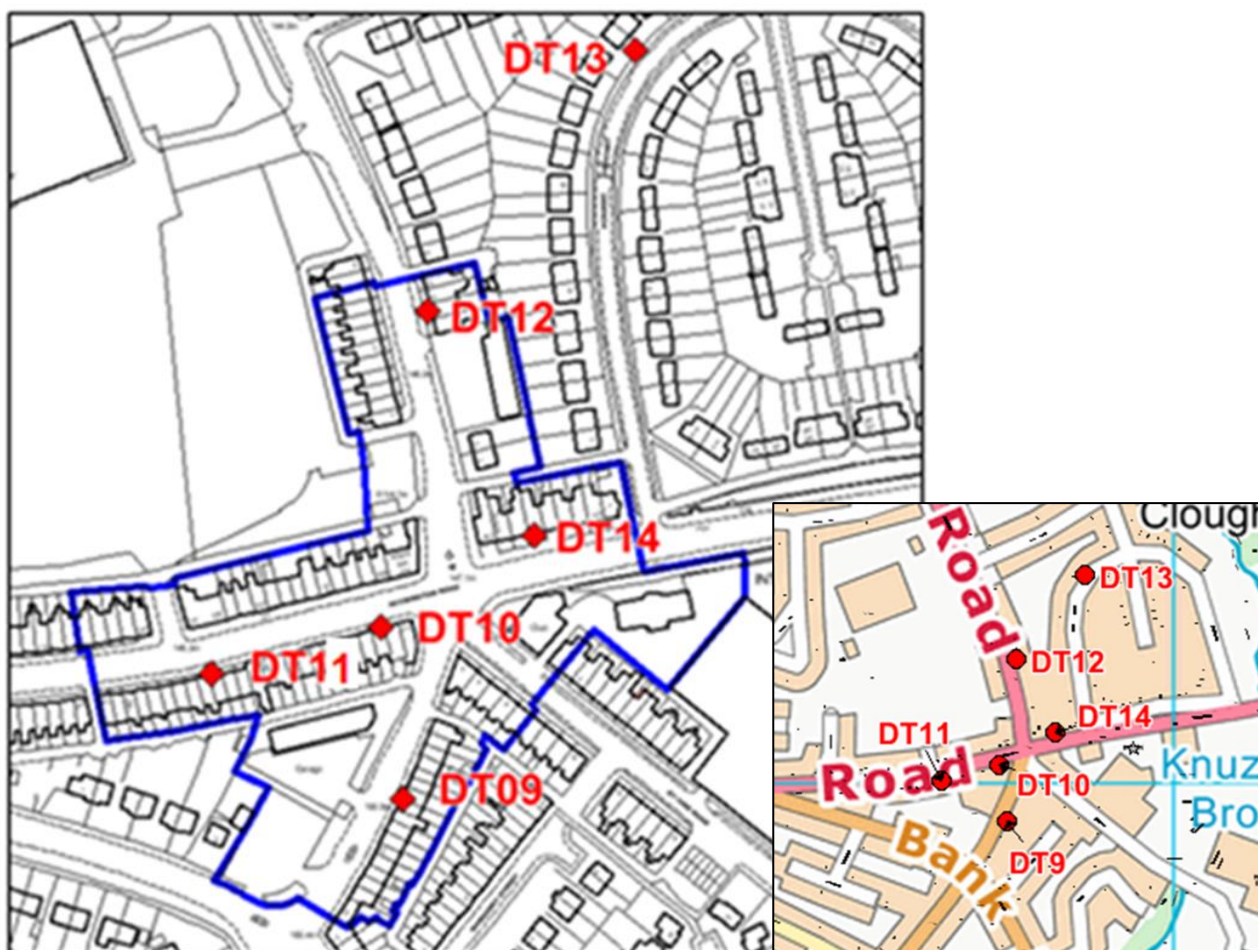
Annualisation wasn't necessary.

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

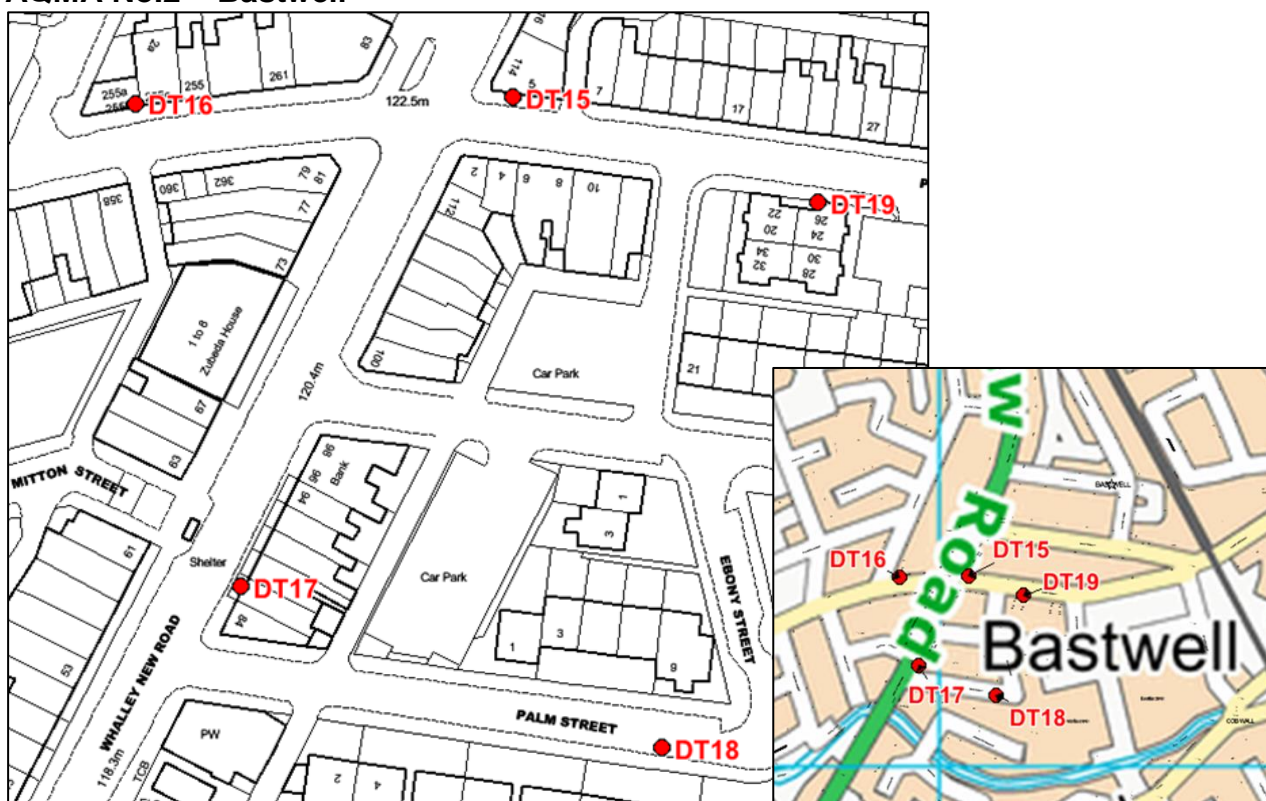
AQMAs in the Borough



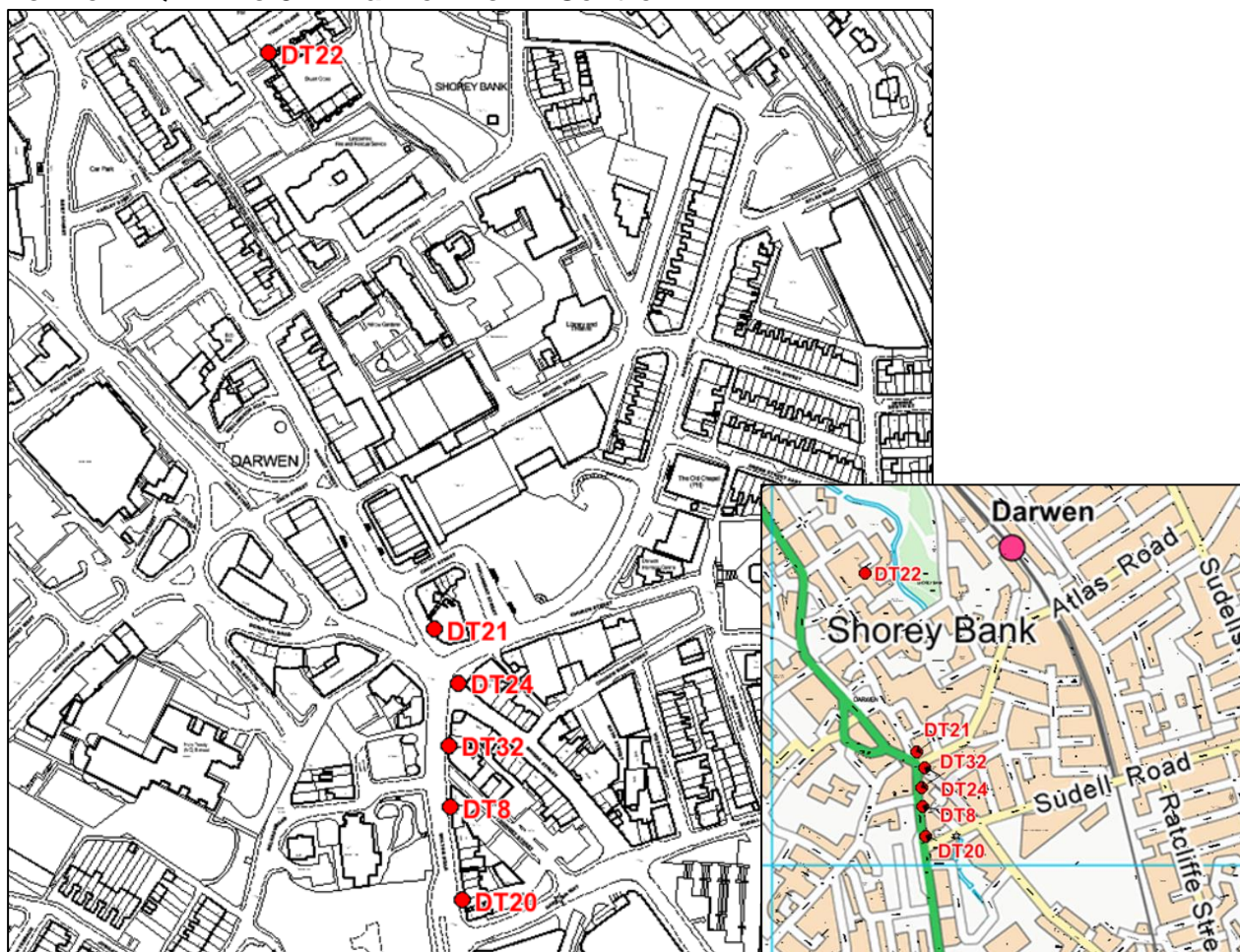
AQMA No.1 – Intack



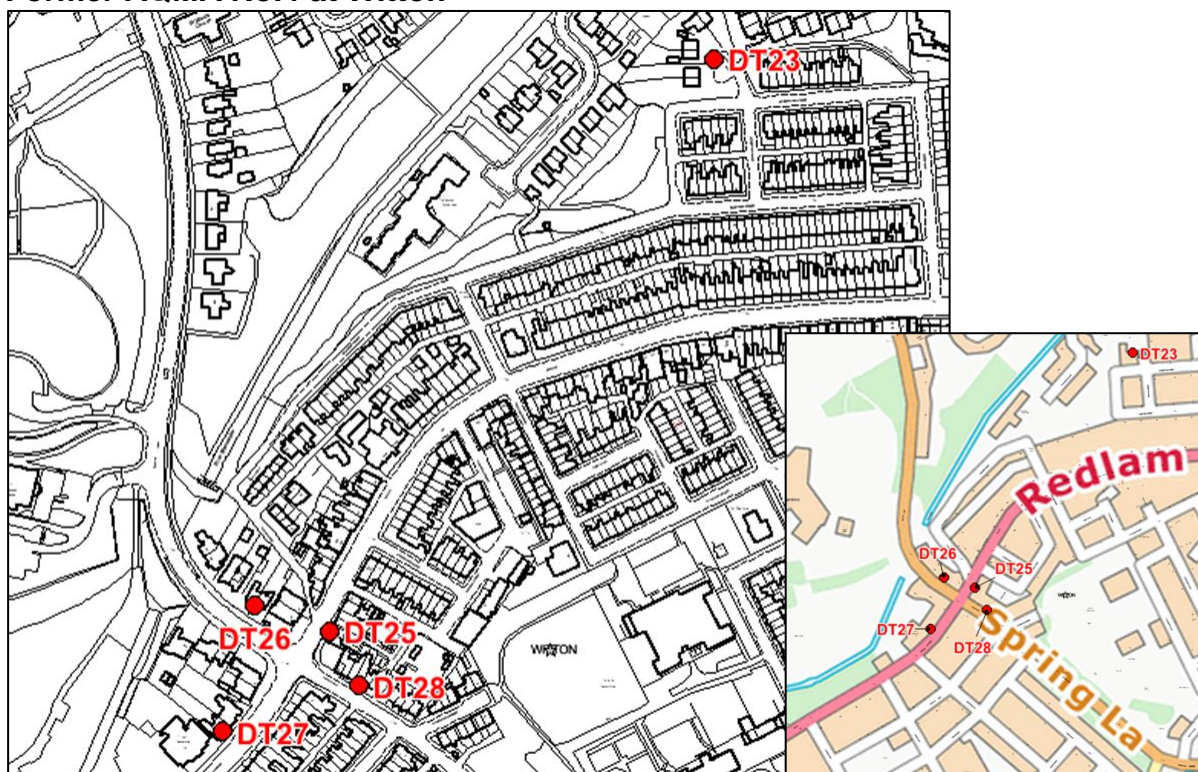
AQMA No.2 – Bastwell



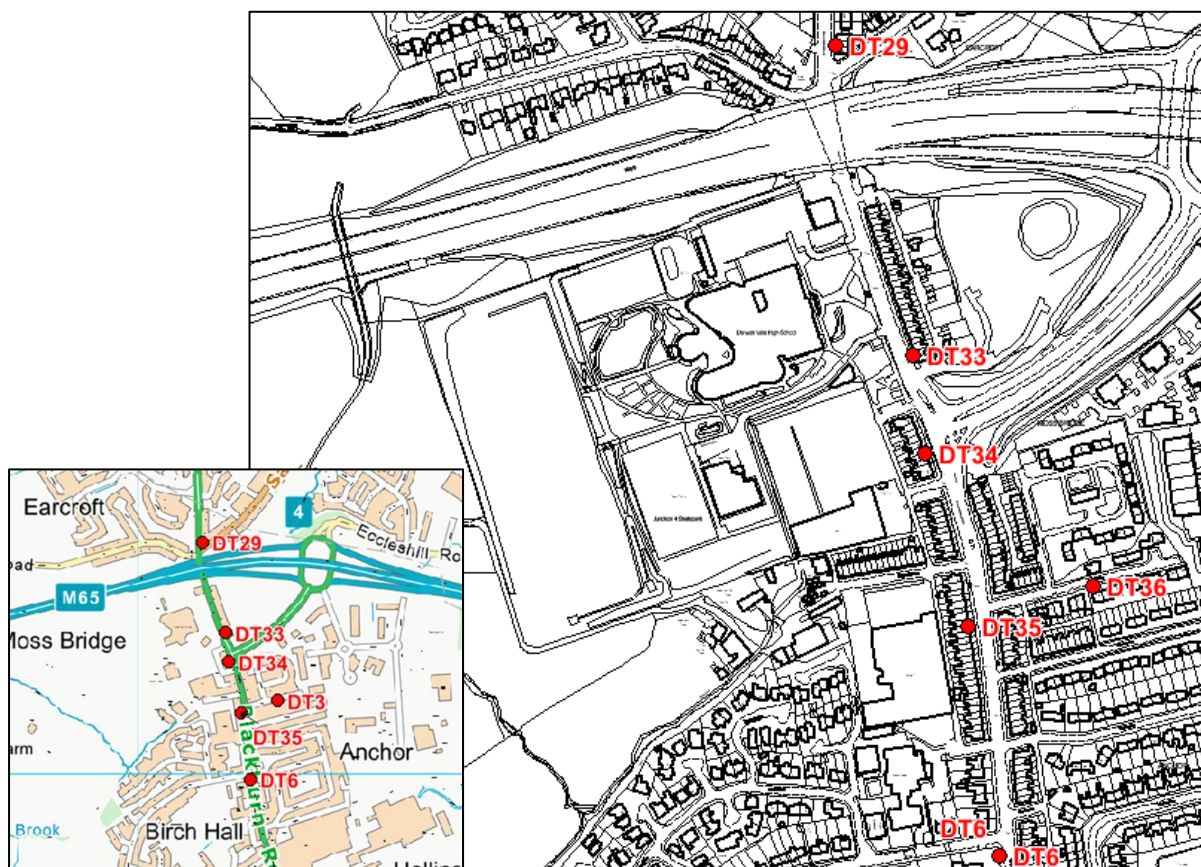
Former AQMA No.3 in Darwen Town Centre



Former AQMA No.4 at Witton



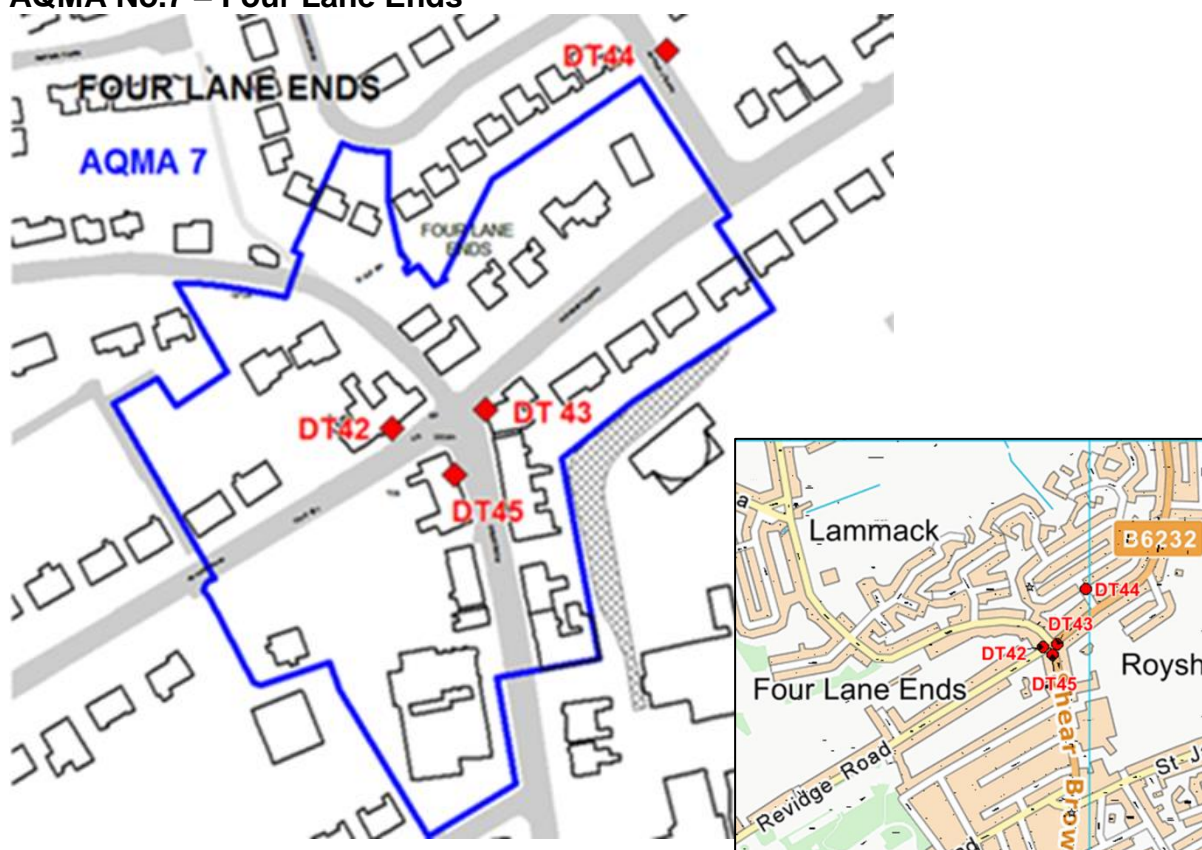
Former AQMA No.5 at Earcroft



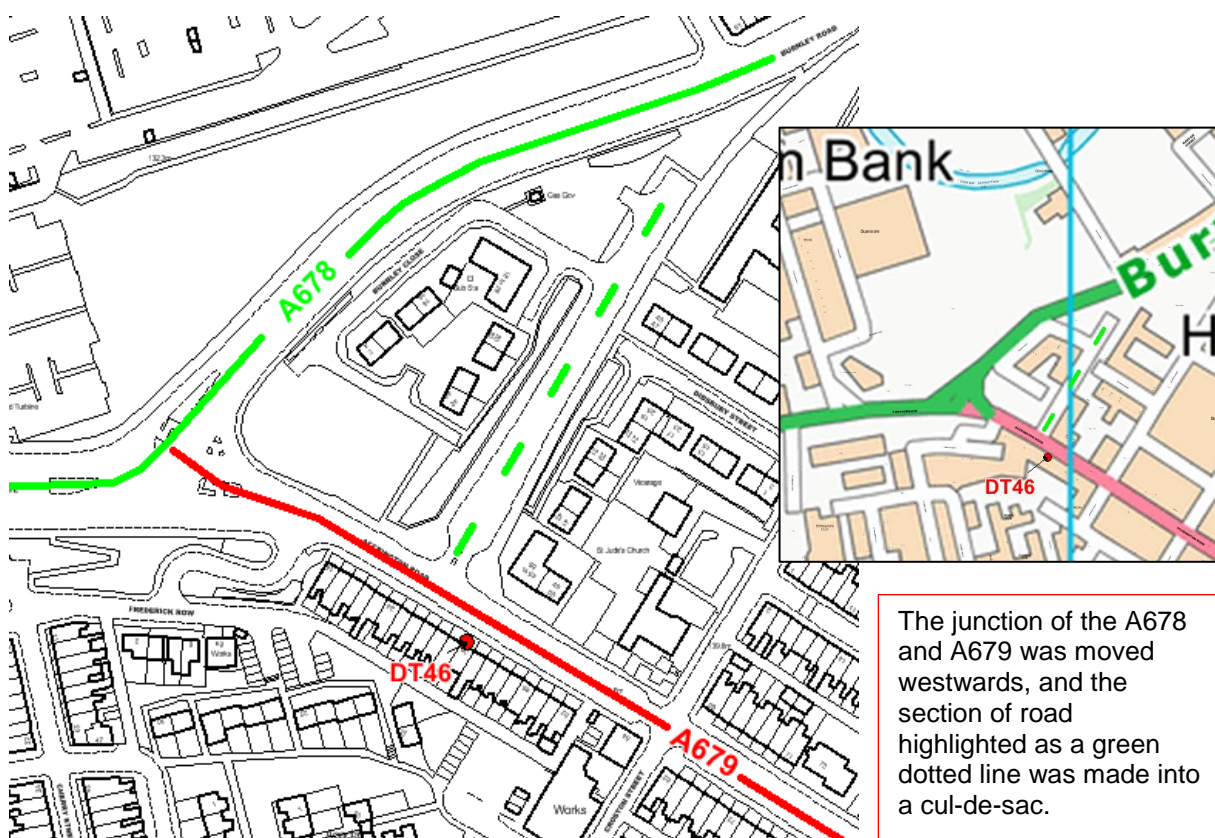
AQMA No.6 – Blackamoor



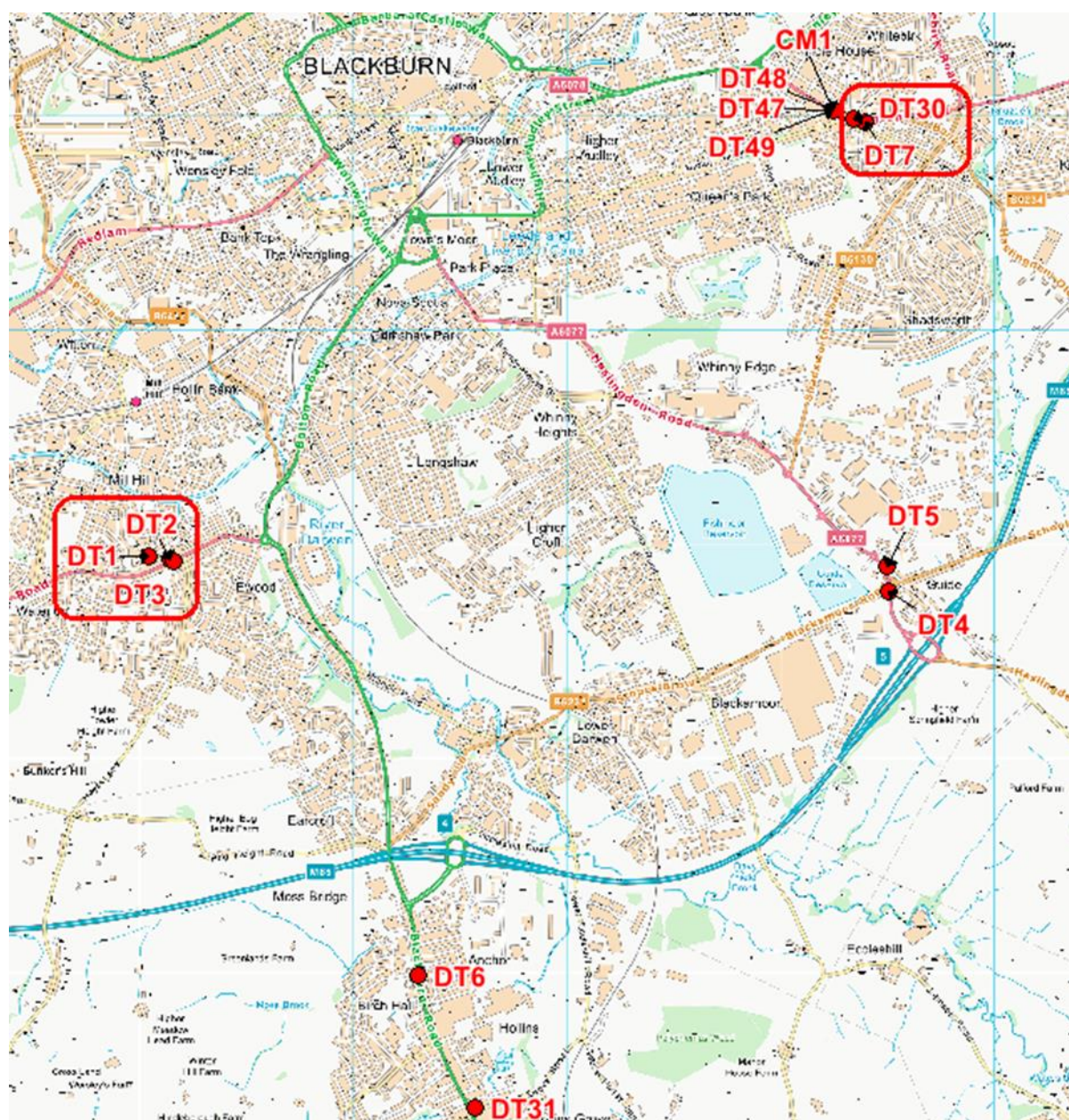
AQMA No.7 – Four Lane Ends



Former AQMA No.8 at junction of Burnley Road and Accrington Road



Other Monitoring locations (Not in AQMAs or former AQMAs)



The locations circled in red were the subject of detailed assessments reported in the 2018 ASR.

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁷	
	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

⁷ 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
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