2018 Air Quality Annual Status Report (ASR)

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

January 2018

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Executive Summary: Air Quality in Our Area

Air Quality in Preston City Council

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Within Preston, the main pollutant of concern is Nitrogen Dioxide, which is mainly related to transport sources and restricted to a number of hotspots within the Council Boundary.

These hotspots are known as Air Quality Management Areas (AQMA`s) and the location of these can be seen within table 2.1 below.

During 2017, the Council carried out monitoring within the 5 AQMA`s (results in Appendix A) and when looking at these results the only monitoring locations that exceeded the Nitrogen Dioxide annual mean objective of $40\mu g/m^3$ were within AQMA`s 3, and 4. All other areas that were monitored were in compliance. Also due to the opening of the Broughton Bypass in October 2017, there were no exceedances within AQMA 3 (PR46) of the 1 hourly mean Air Quality Objective, which was a common occurrence looking at the 5 year trend.

When looking at trends, it can be seen that AQMA 1 has had no exceedances of the objectives for the last 5 years, with the highest value of $36\mu g/m^3$ in 2013, compared to a value of $30\mu g/m^3$ in 2017. AQMA 2 has also been in compliance for the last 4 years.

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[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

Actions to Improve Air Quality

During 2017 there have been a number of actions that have progressed this year. The Council is committed to the development of a Lancashire wide air quality and planning policy and has started this process with the use of planning conditions to ensure that all new development contains electric vehicle charging points.

To address one of the most polluted areas of Preston (AQMA 3) at Broughton, Lancashire County Council continued with the construction of the bypass and it was opened towards the end of 2017. The monitoring performed during this period showed a significant improvement in the air quality and it is hoped that this will reduce the Nitrogen Dioxide levels below the Air Quality Objectives.

Conclusions and Priorities

From looking at the data obtained this year from the monitoring, the main report below contains our priorities for the coming year. The Council will be considering whether there is now a need to revoke both AQMA1 and AQMA2, following a 5 year trend of compliance.

Local Engagement and How to get Involved

Information regarding the air quality within Preston and our contact details can be found on our website below.

http://www.preston.gov.uk/yourservices/environmental-health/pollution--noise-and-other-nuisances/air-quality/

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1   Local Air Quality Management

This report provides an overview of air quality in Preston City Council during 2017. 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 Preston City 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 the AQMAs declared by Preston City 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.preston.gov.uk/yourservices/environmental-health/pollution--noise-and-other-nuisances/air-quality/

In the next year we will be looking at revoking AQMA 1 (A59 Prison Junction) and AQMA 2 (Junction of Blackpool Road and Plungington Road) (see monitoring section).

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	Declared Sept 2005,	NO2 Annual Mean	Preston	Area of residential at the Prison junction on the A59 Ringway	NO	41	µg/m3	30	µg/m3	Action Plan	2009	https://www.preston.gov.uk/yourservices/environmental-health/pollution--noise-and-other-nuisances/air-quality/
AQMA 2	Declared Sept 2005,	NO2 Annual Mean	Preston	Area of residential at the junction of Blackpool Road and Plungington Road	NO	51	µg/m3	35	µg/m3	Action Plan	2009	https://www.preston.gov.uk/yourservices/environmental-health/pollution--noise-and-other-nuisances/air-quality/
AQMA 3	Declared May 2012,	NO2 Annual Mean	Preston	Area of residential in the centre of Broughton Village (A6)	NO	77	µg/m3	41	µg/m3	Action Plan	2014	https://www.preston.gov.uk/yourservices/environmental-health/pollution--noise-and-other-nuisances/air-quality/

AQMA 3	Declared May 2012,	NO2 1 Hour Mean	Preston	Area of residential in the centre of Broughton Village (A6)	NO	77	µg/m3	41	µg/m3	Action Plan	2014	https://www.preston.gov.uk/yourservices/environmental-health/pollution--noise-and-other-nuisances/air-quality/
AQMA 4	Declared May 2012,	NO2 Annual Mean	Preston	Area of residential on New Hall Lane	NO	52	µg/m3	44	µg/m3	No Plan		
AQMA 5	Declared March 2014,	NO2 Annual Mean	Preston	Area of residential on London Road	NO	41	µg/m3	36	µg/m3	No Plan		

☒ **Preston City Council 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 Preston City Council

Defra's appraisal of last year's ASR concluded:

- An agreement that AQMA1 should be revoked and to keep AQMA 2 under review.

- A new Air Quality Action Plan should be developed as soon as possible

- The justification for the choice of diffusion tube bias, details of the annualised calculation and the need to correct a number of tube locations to the relevant exposure.

- And lastly to Improve the maps in Appendix D to include more detailed plans of the tube locations and AQMA`s.

These comments will be addressed in this report.

Preston City Council and Lancashire County Council have taken forward a number of measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in **Error! Reference source not found.**. More detail on these measures can be found in their respective Action Plans as shown above.

However, due to other Department priorities, progress on the items that were suggested for completion in 2017, namely the revocation of AQMA 1, the completion of an Air Quality Action Plan and implementation of the Lancashire wide Air Quality and Planning Guidance were put on hold.

The following items were completed during 2017:

- Broughton Bypass is now operational and early monitoring is showing a significant improvement in the air quality.

- A bid for signal improvement from the National Productivity Investment Fund was submitted.

- A joint bid between Lancashire County Council, South Ribble Borough Council and Preston City Council for the Clean Bus Technology Fund was submitted, but was unsuccessful.

- And the various measures discussed in section 2.3

Preston City Council and Lancashire County Council expects the following measures to be completed over the course of the next reporting year:

- To further progress on the adoption of the Lancashire wide Air Quality Planning Guidance document, with the aim of assisting councillors, planners and applicants to appropriately consider the air quality implications of their development and to ensure suitable mitigation measures are include.

- The revocation of AQMA 1 and 2.

- Further progress on the completion of road and public transport improvements within the City as set out in the Central Lancashire Highways and transport Masterplan. Many of which are incorporated within Action Plan 2014.

Preston City Council's and Lancashire County Councils priorities for the coming year are:

- To develop the Lancashire Wide Planning Guidance document

- To produce an Air Quality Action Plan that incorporates AQMA`s 4 and 5

- To develop further the relationships with Lancashire County Council (Public Health, Transport etc)

- The actions contained in the statement associated with $PM_{2.5}$, see section 2.3 below

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Preston City Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of AQMA`s 4 and 5.

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	Require electric vehicle recharging points on planning applications	Promoting Low Emission Transport	Alternative refuelling Infrastructure	PCC	-	01/04/2016	N/A	N/A	Standard Planning condition approved and used	ongoing	
2	Install electric vehicle recharge points to all Council car parks and buildings	Promoting Low Emission Transport	Alternative refuelling Infrastructure	PCC	30/06/2016	-	Fitting of EVR points to car parks	N/A	Initial meeting has been held to move this action forward	TBA	
3	Development and implementation of a Lancashire wide planning guidance	Policy Guidance and Development	Air Quality and Planning Guidance	Lancaster City Council, on behalf of all 14 Lancashire Authorities. PCC lead for implementation in Preston	Ongoing		N/A	N/A	Draft guidance produced and published to all LA`s in Lancashire. Central Lancs Core Strategy is due for a review. Further work held until then.	2018/2019	
4	Broughton Bypass	Transport Planning and Infrastructure	Other	LCC		Early 2016	N/A	modelled average of 60% reduction in NO2 concentrations	Completed	2017	
5	Infrastructure improvements New Hall Lane	Transport Planning and Infrastructure	Other	LCC			N/A		Completed	2017	
6	Construction of Preston Western distributor Road	Transport Planning and Infrastructure	Other	LCC	2016		N/A		Planning Phase as started.	2022	

7	To increase the length of road cycle path network in the city by 2 km a year	Transport Planning and Infrastructure	Cycle networks	LCC			Km of cycle path in 2017/18			Ongoing	
8	Construction of Cottam Park Way rail station	Alternatives to Private vehicle use	Rail based Park and Ride	LCC/Network Rail					Masterplan Stage	2023	
9	New Public Transport priority corridors along 7 routes into Preston	Transport Planning and Infrastructure	Bus Route Improvements	LCC	2016				Planning Phase, first likely to influence AQMA 4	2024	

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.

Preston City Council and Lancashire County Council are taking the following measures to address PM$_{2.5}$:

The Director of Public Health and Wellbeing report 2016 for Lancashire makes clear the need to tackle the wider determinants of health including promoting healthy living environments through for example, increased walking and cycling whilst also making clear the need for sustainable behaviour change including tackling physical activity. It also outlines the need for telecare and harnessing digital technology whilst also joining up services in neighbourhoods. Combined these actions should reduce the level of road use and therefore ultimately reduce the levels of particulate matter emitted.

Within Lancashire County Council (LCC) Public Health is taking a central role internally to ensure services are aware of the impacts of air pollution and what changes they can make to reduce pollution and exposure to pollution for our residents, working with District Council partners. In Summary the following activity is underway or in development:

Lancashire and South Cumbria Air Quality Summit

An event to raise awareness of air quality issues, share what we already know and improve engagement for action was held at Lancaster University on 28th February. The Summit was funded by Public Health England and Chaired by the Director of Public Health from Blackburn with Darwen with involvement from Public Health departments from Lancashire, Blackpool, Blackburn and Cumbria and the University. Over 60 people attended to hear presentations on the health impact of pollution, local approaches to action, including transport planning and Prof Barbara Maher from Lancaster University introduced her research, including emerging evidence of particulate matter in the brain of patients with Alzheimer's disease.

Feedback from the event is being collated to form the basis of a report to identify priorities and inform future action planning, to be published on National Clean Air Day on 21 June 2018.

Health Impact Data

Information about the impact of air pollution on health is available on the Lancashire Insights webpages. This includes an Air Quality and Health 'dashboard' published in May 2018 on the respiratory disease pages. The dashboard provides information on emissions and prevalence of health conditions that can be affected by poor air quality such as Asthma and Chronic Obstructive Pulmonary Disorder (COPD). The dashboard also provides the mortality ranking for Lancashire for PM2.5 using the methodology outlined in the Air Quality Briefing for Directors of Public Health.

A summary of emissions by source is available on the air quality pages of the Lancashire Insights page and in November 2017 a detailed emissions inventory with further analysis of road transport emissions was published. When the National Atmospheric Emissions Inventory data is updated later this year the summary will be refreshed to include a breakdown by other emission sources.

Spatial Planning

There is closer working between Public Health and both county and district planning teams to consider how future local plans can mitigate the effect of poor air quality, as well as address wider public health issues, such as improved opportunities for physical activity and access to green and open space. Public Health is supporting the adoption of Air Quality Planning Policy Guidance developed by Lancaster City Council to assist developers to support action through the planning system to improve air quality.

In the next few months Lancaster University, led by Professor Barbara Maher, will be starting a piece of research in Lancaster regarding the impact of plants on reducing particulate matter air pollution. Lancashire County Council Public Health and Highways have attended an initial meeting with Lancaster City Council to discuss and agree the research which will involve placing plants in pots on the footpath and on railings alongside the road in the area of Cable Street to measure their impact at reducing particulate matter over a period of several months. Previous initial research

by the University found a 50-60% reduction in $PM_{2.5}$ in homes of those affected when vegetation strips were used.

Lancashire County Council Public Health aims to use the evidence generated from this research, as well as evidence that already exists on this topic, to inform a public health advisory note about the use of strategically sited plants to reduce exposure to particulate matter air pollution at the end of this year.

Transport Planning

A significant number of air quality issues are a result of high volumes of traffic. Work to develop the next Local Transport Plan (LTP4) for Lancashire, Blackpool and Blackburn with Darwen is now underway and the Public Health team has submitted an evidence base to the process. It highlights transport related health challenges that affect the population of Lancashire and makes recommendations about how local transport planning policy can make a contribution to addressing these. Air quality is one of the key themes of the evidence base and will be an identified priority in LTP4. Stakeholder engagement and consultation will be carried out during 2018-19.

The Strategic Highways Planning team incorporates air quality considerations in action planning to aid in the identification of highway measures. Local Highways and Transport Masterplans have been developed in consultation and set out major changes to the highways, public transport, walking and cycling facilities and drive investment highways and transport across the County. Funding is sought from a number of sources including National Productivity Investment Fund, Lancashire Growth Fund and City Deal to enable schemes identified in the plans to go ahead.

In time the Masterplans will be refreshed to align with the priorities of LTP4, which will provide an opportunity to identify network improvements that would have a positive impact on air quality.

A number of major transport schemes identified in the current masterplans are underway or being planned, including the East Lancashire Strategic Cycleway Network, Penwortham Bypass and Pennine Reach. Recently completed schemes include the Broughton Bypass and The Bay Gateway (the Heysham to M6 link road). A future aim is to be able to measure the impact of major transport schemes on air quality in real terms.

Network Management

Reducing queues at and around junctions therefore removing waiting times, moving congestion away from junctions and smoothing the flows of traffic particularly at motorway junctions are priorities for all network management schemes that can also have a positive impact on air quality. An AQMA layer has been added to the County Council's mapping system enabling transport planners and network management to utilise this information when making decisions about the network.

In built up areas with traffic signal junctions, minimisation of start stop of traffic flow is currently achieved by the use of Intelligent Traffic Systems mostly via signal control systems. This software controls signal timings which minimises overall traffic delay (reducing start and stops) in a road network. The County Council also collects traffic count data to support district air quality modelling.

Sign-only 20mph areas have been introduced in many residential areas in Lancashire to reduce accidents and encourage walking and cycling, these will have a small effect on reducing particulate emissions. The impact of sign-only 20's has been the subject of a national DfT sponsored review and the impact on air quality is one of the elements being considered. The findings of the study are yet to be shared.

Active Travel

The Lancashire Walking and Cycling Strategy is due to be published later this year following formal approval from the three Lancashire Local Transport Authorities – Lancashire, Blackburn with Darwen and Blackpool Councils. Work has now commenced on the preparation of Local Cycling and Walking Infrastructure Plans (LCWIPs) for the five Lancashire Highway and Transport masterplan areas. With support from Department of Transport consultants, LCC are initially working to prepare LCWIPs for Lancaster and West Lancashire by the end of March 2019. The outcomes from the LCWIP preparation will be: a network plan for cycling and walking infrastructure; a prioritised list of schemes for delivery over short, medium and long term timeframes; and a robust evidence base report. The LCWIPs will then be used to guide future infrastructure decisions and funding requests and to integrate cycling and walking more effectively into local planning and transport policy.

Working in partnership with Blackburn with Darwen Council, Lancashire County Council is now in the second year of delivery of the three-year Connecting East Lancashire 'Access Fund' programme. A dedicated team of Business Travel Planners has been recruited to visit employers promoting active travel and modal shift. Grants have already been allocated to businesses, workplaces, colleges and relevant organisations in East Lancashire for showers, lockers and cycle storage etc. 'Love to Ride', an online business to business cycle challenge will be proactively promoted throughout Lancashire throughout the summer.

The County Council's Safe and Healthy Travel team work with schools, the community and workplaces to encourage sustainable modes of travel.   LCC has a duty to produce an annual Sustainable Modes of Travel (SMOT) Strategy under the Education and Inspections Act 2006.

The strategy sets out approaches to promote sustainable travel to and from school. School travel plans are reviewed as required and can be discussed with Officers from the Safe and Healthy Travel Team during meetings with the school. The DFT backed national scheme for school travel plans called Modeshift STARS is supported by LCC.

Initiatives for schools to encourage walking and cycling include: theatre productions, school gate parking 'A' boards, Walk to School resources, digital board games, local zone route maps, safety promotional literature, high visibility jackets for walking and cycling uses, a bespoke training scheme for balance bikes and ongoing safety based training schemes for walking and cycling (e.g. Right Start, Bikeability and Passport to safer Cycling). These training schemes continue to be offered to all Lancashire primary schools and uptake is excellent. Walking school buses continue to be promoted and we are currently updating our walking bus literature to enable schools to set up a walking bus with parents/carers easily and effectively.

Low Emission Vehicles

The County Council has now signed a 10 year contract with Chargemaster to provide (initially) 150 electric vehicle charging spaces across the county. The initial mix of chargers is expected to be 18 Ultra chargers (capable of charging a car from 0-80% in around 30 mins) and 66 Dual outlet Fast chargers (capable of charging 2 cars from 0-80% in 3-4 hours).

The charge points will be on the POLAR network which is a nationally accessible scheme run by Chargemaster allowing existing customers visiting Lancashire to use the machines immediately. The current timetable is to have all these initial machines installed this calendar year.   As part of the contract a basket price has been secured for the chargers to allow the purchase further machines.

Bus operators and district councils are supported in applying for funding such as 'cleaner. bus grants. LCC submitted an application to the Bus Retrofit Grant Fund, launched in September 2017 by DfT and Defra. The application was, however, unsuccessful.

Public Awareness

General information with links to the Defra national alert system and advice on what to do when pollution levels are high has been added to the County Council's "Your health and wellbeing" webpages as part of provision of information to the public on how to stay healthy and well.

Public Health continues to work with the Safe and Healthy Travel team to provide information to and engage with schools on the issues of air quality, particularly those schools close to AQMA areas, linking with existing work and resources to promote walking and cycling and inappropriate parking at school drop-off and pick-up times.

The County Council will join partners in promoting National Clean Air Day on 21st June 2018.

Public Health evidence reviews

A key role for Public Health is reviewing evidence to inform policy and intervention design. During 2018-19 evidence reviews under consideration include the impact of domestic wood burners, this is with a view to inform public behaviour and choice on the use of domestic burners, and effective actions to inform taxi licensing policy.

2.4   Summary of Monitoring Undertaken

2.4.1 Automatic Monitoring Sites

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

Preston City Council undertook automatic (continuous) monitoring at 2 sites during 2017. Table A.1 in Appendix A shows the details of the sites. Monitoring results are available at http://www.preston.gov.uk/yourservices/environmental-health/pollution--noise-and-other-nuisances/air-quality/

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.

2.4.2 Non-Automatic Monitoring Sites

Preston City Council undertook non- automatic (passive) monitoring of NO_2 at 27 sites during 2017. 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.

2.5   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.

2.5.1   Nitrogen Dioxide (NO_2)

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

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

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

During 2017, the only monitoring locations that exceeded the Nitrogen Dioxide annual mean objective of $40\mu g/m^3$ were within AQMA`s 3 and 4. All other areas that were monitored were in compliance. Also due to the opening of the Broughton Bypass in October 2017, there were no exceedances within AQMA 3 (PR46) of the 1 hourly mean Air Quality Objective, which was a common occurrence looking at the 5 year trend.

In relation to trends, it can be seen that AQMA 1 has had no exceedances of the objectives for the last 5 years, with the highest value of $36\mu g/m^3$ in 2013, compared to a value of $30\mu g/m^3$ in 2017. Due to the length of time of compliance it is proposed that the Council will look at revoking this AQMA.

AQMA 2 has also been in compliance for the last 4 years, with a highest value of 42 $\mu g/m^3$ in 2013, compared to 35 $\mu g/m^3$ in 2017. It is therefore likely that the Council will look to revoke this AQMA.

As discussed last year, AQMA 3 was one of the most polluted areas in relation to Nitrogen Dioxide within the City Council's boundary. However following the opening of the Broughton Bypass in October 2017 the air quality has significantly improved and it is hoped that this will fall below the annual mean Air Quality Objective by the end of 2018.

2.5.2 Particulate Matter (PM2.5)

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

During 2017, the $PM_{2.5}$ monitoring results at the Urban Background site operated by DEFRA has shown a slight decrease of 3 $\mu g/m^3$ over the last 5 years. The urban background at this monitoring location is therefore below the annual limit defined in the Air Quality Objectives of $25\mu g/m^3$ and is also below the World Health Organisations target value of 10 $\mu g/m^3$.

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)
PRA1	Meadow Street	Roadside	354138	429863	NO_2	NO	Chemiluminescent;	7	5	2.5
PRA2	Bootle Street	Urban Background	355250	430126	NO_2, $PM_{2.5}$, O_3	NO	Chemiluminescent, FDMS	9	N/A	2.5

CLICK HERE THEN PASTE COMPLETED DATA ROWS FROM EXCEL TEMPLATE

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)
PR1	Red Rose Radio	Roadside	354307	429769	NO_2	NO	0	3.25	NO	2
PR5	215 Plungington Road	Roadside	353072	431014	NO_2	YES	0	2.5	NO	2
PR6	347 Blackpool Road	Roadside	353085	431045	NO_2	YES	0	4	NO	2
PR7	336 Blackpool Road	Roadside	35311	431080	NO_2	YES	0	3	NO	2
PR8	240 Plungington Road	Roadside	353054	431095	NO_2	YES	0	2.3	NO	2
PR9	78 Church Street	Roadside	354555	429624	NO_2	YES	0	2.75	NO	2
PR10	11 Lychgate	Roadside	354521	429639	NO_2	YES	0	6.5	NO	2
PR11	25 Lychgate	Roadside	354477	429603	NO_2	YES	0	4	NO	2
PR12	3 Lychgate	Roadside	354481	429657	NO_2	YES	0	6.5	NO	2
PR21	Meadow Street 1	Other	354138	429864	NO_2	NO	N/A	N/A	YES	2
PR22	Meadow Street 2	Other	354138	429864	NO_2	NO	N/A	N/A	YES	2
PR23	Meadow Street 3	Other	354138	429864	NO_2	NO	N/A	N/A	YES	2
PR24	Garrison PH	Roadside	354775	431481	NO_2	NO	0	2.3	NO	2

PR25	160 Watling Street Road	Roadside	354751	431521	NO₂	NO	4.5	4.5	NO	2
PR39	7 New Hall Lane	Roadside	354841	429594	NO₂	YES	0	3.5	NO	2
PR40	23 New Hall Lane	Roadside	354880	429594	NO₂	YES	0	3.5	NO	2
PR43	211 New Hall Lane	Roadside	355701	429963	NO₂	YES	0	2.3	NO	2
PR41	St Matts Church, New Hall Lane	Roadside	355556	429906	NO₂	YES	0	11	NO	2
PR42	St Matts School, New Hall Lane	Roadside	355585	429908	NO₂	YES	0	3	NO	2
PR44	507 Garstang Road	Roadside	352467	435024	NO₂	YES	0	1.8	NO	2
PR45	503 Garstang Road	Roadside	352471	435012	NO₂	YES	0	1.5	NO	2
PR46	482 Garstang Road	Roadside	352483	435006	NO₂	YES	0	1.6	NO	2
PR38	149 London Road	Roadside	355070	429198	NO₂	YES	0	4	NO	2
PR47	181 London Road	Roadside	355124	429106	NO₂	YES	4	4	NO	2
PR48	119 London Road	Roadside	355015	429282	NO₂	YES	0	3	NO	2
PR49	24 Grosvenor Street	Roadside	354849	429437	NO₂	YES	0	13.5	NO	2
PR50	7 Moore Street	Roadside	355038	429207	NO₂	YES	5	6	NO	2

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO₂ Annual Mean Concentration (µg/m³) [3]				
					2013	2014	2015	2016	2017
PRA1	Roadside	Automatic	100	100	<u>28</u>	27	27	27	26
PRA2	Urban Background	Automatic	98	98	<u>25</u>	27	22	24	20
PR1	Roadside	Diffusion Tube	100	100	<u>39</u>	38	37	37	35
PR5	Roadside	Diffusion Tube	100	100	<u>40</u>	38	37	37	35
PR6	Roadside	Diffusion Tube	92	92	<u>34</u>	34	31	31	30
PR7	Roadside	Diffusion Tube	83	83	<u>42</u>	34	29	30	30
PR8	Roadside	Diffusion Tube	92	92	<u>33</u>	34	30	33	29
PR9	Roadside	Diffusion Tube	100	100	<u>31</u>	29	27	29	28
PR10	Roadside	Diffusion Tube	100	100	<u>36</u>	32	31	33	30
PR11	Roadside	Diffusion Tube	100	100	<u>34</u>	33	30	32	30
PR12	Roadside	Diffusion Tube	100	100	<u>35</u>	34	32	32	27
PR21	Other	Diffusion Tube	100	100	<u>29</u>	26	26	28	25
PR22	Other	Diffusion Tube	100	100	<u>29</u>	27	27	27	25
PR23	Other	Diffusion Tube	100	100	<u>29</u>	28	27	27	26
PR24	Roadside	Diffusion Tube	100	100	<u>39</u>	35	34	34	33

PR25	Roadside	Diffusion Tube	92	92	**34**	**32**	**31**	**34**	**33**
PR39	Roadside	Diffusion Tube	100	100	**49**	**47**	**44**	**46**	**44**
PR40	Roadside	Diffusion Tube	83	83	**41**	**40**	**39**	**44**	**35**
PR43	Roadside	Diffusion Tube	67	67	**30**	**35**	**30**	**32**	**29**
PR41	Roadside	Diffusion Tube	100	100	**27**	**27**	**23**	**25**	**22**
PR42	Roadside	Diffusion Tube	92	92	**34**	**32**	**35**	**33**	**32**
PR44	Roadside	Diffusion Tube	100	100	**43**	**46**	**50**	**44**	**32**
PR45	Roadside	Diffusion Tube	100	100	**42**	**36**	**33**	**37**	**27**
PR46	Roadside	Diffusion Tube	100	100	**71**	**65**	**55**	**61**	**41**
PR38	Roadside	Diffusion Tube	100	100	**38**	**38**	**35**	**39**	**35**
PR47	Roadside	Diffusion Tube	100	100	**-**	**37**	**36**	**37**	**35**
PR48	Roadside	Diffusion Tube	100	100	**-**	**40**	**41**	**41**	**36**
PR49	Roadside	Diffusion Tube	100	100	**-**	**25**	**23**	**24**	**21**
PR50	Roadside	Diffusion Tube	83	83	**-**	**30**	**26**	**29**	**26**

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

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

Notes:

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

NO$_2$ annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO$_2$ 1-hour mean objective are shown in **bold and underlined.**

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

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

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

Table A.4 – 1-Hour Mean NO$_2$ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO$_2$ 1-Hour Means > 200µg/m^3 [3]				
					2013	2014	2015	2016	2017
PRA1	Roadside	Automatic	100	100	0	0	0	0	0
PRA2	Urban Background	Automatic	98	98	0	0	0	0	0

Notes:

Exceedances of the NO$_2$ 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

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

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

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

Table A.5 – PM$_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	PM$_{2.5}$ Annual Mean Concentration (µg/m^3) [3]				
				2013	2014	2015	2016	2017
PRA2	Urban Background	94	94	12	12	10	10	9

Notes:

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2017

| Site ID | NO₂ Mean Concentrations (µg/m³) | | | | | | | | | | | | 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)
PR1	50.3	47.3	37.2	36.5	35.7	39.3	46.3	41.2	41.8	48.8	51.1	40.7	43.0	34.8	
PR5	48.3	45.3	46.6	32.7	31.6	37.3	41.9	37.8	43.8	45.9	57.3	45.2	42.8	34.7	
PR6	miss	42.62	41.86	37.45	32.7	32.7	35.99	31.75	32.02	40.21	44.23	42.65	37.7	30.5	
PR7	45.49	41.48	40.78	26.36	26.76	28.54	36.88	32.66	miss	miss	41.75	45.12	36.6	29.6	
PR8	52.73	39.14	37.89	26.4	32.41	26.03	miss	29.9	32.53	32.13	41.61	45.79	36.1	29.2	
PR9	42.38	38.48	38.94	31.12	27.17	28.24	28.57	27.71	30.64	35.92	41.08	41.37	34.3	27.8	
PR10	46.95	40.1	41.54	44.49	29.7	32.66	30.17	29.68	34.51	36.91	46.99	37.91	37.6	30.5	
PR11	43.58	43.9	37.62	32.28	31.52	31.7	29.58	31.41	32.16	37.21	45.64	42.35	36.6	29.6	
PR12	43.04	38.54	37.61	33.04	25.72	30.12	29.89	14.58	26.98	35.73	43.22	37.72	33.0	26.7	
PR21	40.99	36.72	33.46	21.98	23.67	25.4	33.84	26.45	28.33	28.31	37.73	40.65	31.5	25.5	
PR22	40.8	36.56	33.35	22.42	23.03	23.85	31.66	27.57	29.23	31.12	39.41	37.13	31.3	25.4	
PR23	43.18	35.34	32.93	23.31	24.58	22.93	33.46	28.36	23	31.71	39.42	40.6	31.6	25.6	
PR24	44.22	38.34	39.02	40.23	29.43	36.08	39.64	39.98	40.16	43.43	53.61	49.79	41.2	33.3	
PR25	43.7	44.17	44	34.65	miss	31.94	36.99	33.29	36.08	40.2	52.02	50.72	40.7	33.0	30.4
PR39	56.89	57.59	54.92	55.74	48.26	52.09	48.24	48.86	51.37	50.74	64.28	58.26	53.9	**43.7**	
PR40	49.06	miss	44.84	miss	38.82	40.75	38.5	36.99	40.01	40.86	49.38	47.97	42.7	34.6	

PR43	miss	40.32	miss	25.79	30.09	miss	27.91	28.04	25.84	37.33	40.01	miss	31.9	29.5	
PR41	38.99	30.11	28.19	19.34	20.54	19.39	21.39	22.07	23.73	29.08	33.9	36.29	26.9	21.8	
PR42	40.21	43.89	37.71	40.3	miss	35.89	34	36.35	33.71	42.96	48.52	46.57	40.0	32.4	
PR44	54.2	47.6	53.69	54.04	41.46	32.37	39.39	37.32	45.54	19.84	25.37	29.2	40.0	32.4	
PR45	45.2	39.3	34.66	31.55	33.72	47.54	31.81	32.2	31.18	18.45	26.01	29.95	33.5	27.1	
PR46	70.56	72.01	63.82	54.11	65.28	53.33	51.37	45	54.14	19.26	27.78	31.42	50.7	**41.0**	
PR38	57.39	48.87	39.78	37.03	39.07	36.19	32.41	40.26	41.64	45.17	56.86	48.74	43.6	35.3	
PR47	48.81	49.05	40.21	37.84	37.55	36.02	41.89	37.51	33.06	45.31	61.28	53.22	43.5	35.2	32.1
PR48	58.81	48.07	44.92	40.07	37.66	34.89	41.82	36.85	40.93	42.2	54.93	51.98	44.4	36.0	
PR49	36.92	27.45	24.86	21.82	19.39	20.88	26.5	22.8	24.14	25.47	34.23	33.71	26.5	21.5	
PR50	miss	35.42	33.75	miss	24.51	23.29	26.84	26.77	31.58	29.78	39.55	43.45	31.5	25.5	24.9

☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used**

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

☒ **Where applicable, data has been distance corrected for relevant exposure**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m³ are shown in **bold**.

NO_2 annual means exceeding 60µg/m³, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tube Supplier and Preparation

The NO2 diffusion tubes used for monitoring where supplied and analysed by Gradko. The preparation method is 20% TEA in water.

Diffusion Tube Bias Adjustment Factors

As the diffusion tube results were processed prior to the update of the national database, the bias used was based on the Council`s local measurements and was 0.81. (Tube precision and data quality was Good).

QA/QC of automatic monitoring

Bootle Street AURN – DEFRA through the use of its designated contractors carry out the QA/QC function for this air quality station. Preston City Council is the contracted Local Site Operative and carries out calibrations once a month.

Meadow Street – AQDM are contracted to carry out the QA/QC of the raw data and ET maintain the air quality station. Preston City Council carries out calibrations of the monitor once every 4 weeks.

QA/QC of diffusion tube monitoring

In the 2017 laboratory tests the Gradko tubes with a preparation method of 20% TEA in water had good precision.

Annualisation

In accordance with the DEFRA`s Technical Guidance TG16, any NO2 Diffusion tube data that has less than 75% data capture was annualised in accordance with Box 7.10 of this guidance.

The AURN sites used for this process were:

Preston, with an annualisation factor (Ra) of 1.14
Blackpool, with an annualisation factor (Ra) of 1.16
Wigan, with an annualisation factor (Ra) of 1.11

This then gave an average Ra of 1.14, which was then used on the tubes that had less than 75% data capture (see below)

- Diffusion Tube PR43 had 8 months of data, at a value of 31.92ug/m3 * 1.14 = 36.39ug/m3.

Distance Correction

The diffusion tube results PR25, PR47 and PR50 were corrected for distance to the nearest sensitive receptor using the "DEFRA Nitrogen Dioxide fall off with distance calculator". See link below:

https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
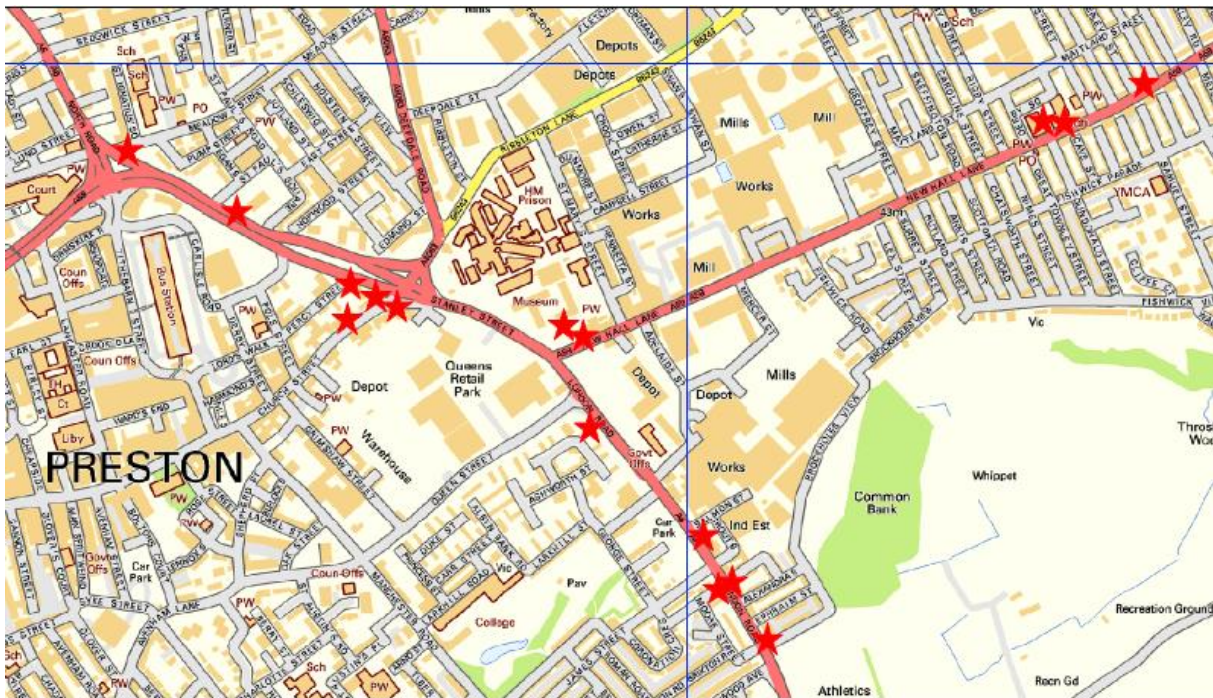
Appendix D: Map(s) of Monitoring Locations and AQMAs

The location of the monitoring sites and AQMA`s can be seen in the maps below.

Map 1, Meadow Street Automatic Air Quality Station

Map 2, Bootle Street Automatic Air Quality Station

Map 3, showing tube locations at AQMA`s 1, 4 and 5 (plus others Ringway, Meadow Street)

Map 4, showing tube locations at AQMA 2, (plus others Watling Street Road)
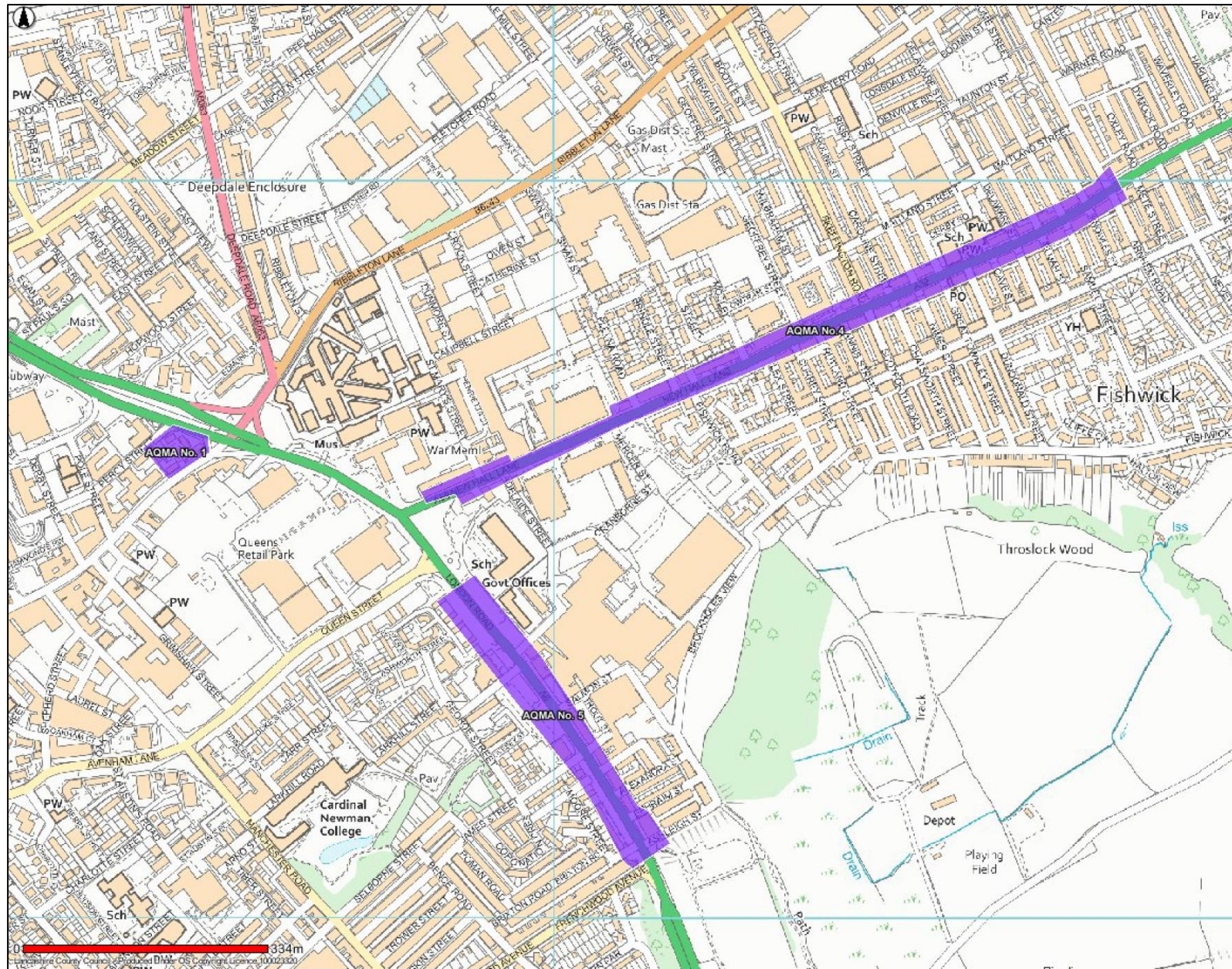
Map 5, showing tube locations at AQMA 3

Air Quality Management Area Maps

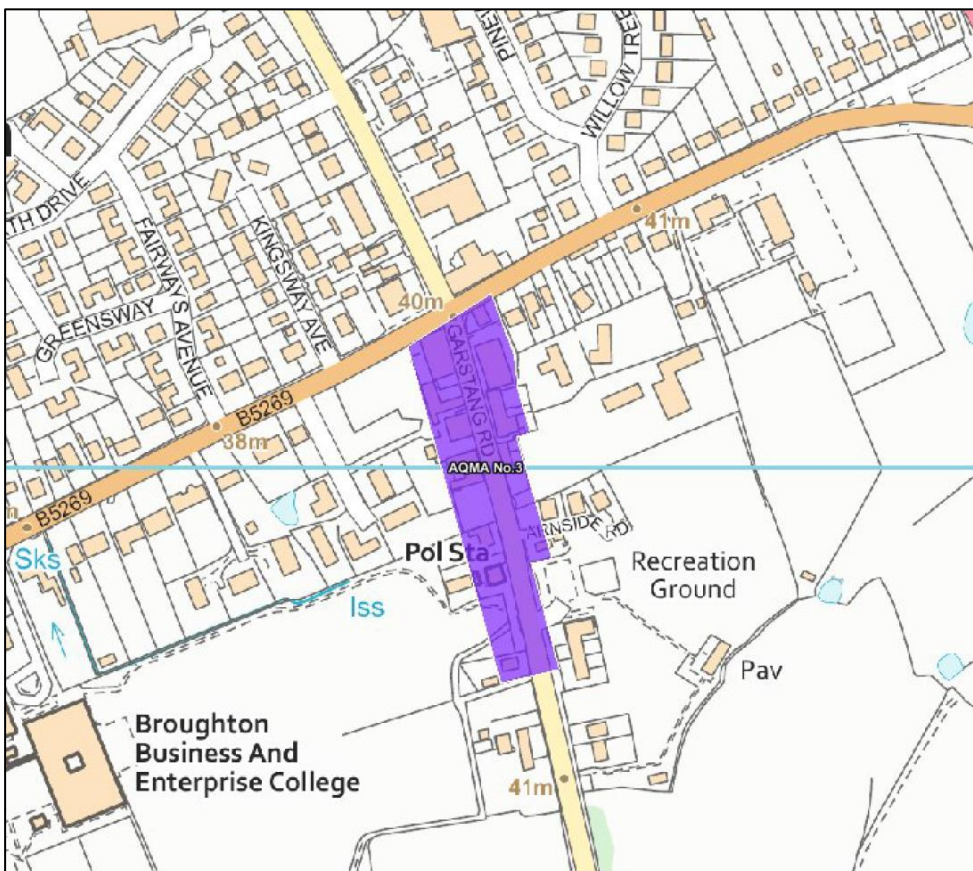Map 6, showing AQMA`s 1,4 and 5 can be seen on the next page.

Map 7, showing AQMA 2

Map 8, showing AQMA 3

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	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

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
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