# Local Plan for Lancaster District:

## Air Quality Position Statement

January 2019

Experts in air quality management & assessment

## Document Control

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# 1 Introduction

1.1 This Position Statement has been prepared to outline Lancaster City Council's current approach, and to summarise progress that has been made to date in addressing the issue of air quality, as part of the preparation of the Local Plan. This process is ongoing, and the position will evolve as further work is carried out over the coming months.

1.2 The Local Plan has been prepared with the intention of meeting the housing, employment and other needs of the District over the lifetime of the plan to 2031, in a sustainable manner. Government, through the Neighbourhood Planning Act 2017 Section 8, requires Lancaster City Council as the Local Planning Authority to identify the strategic priorities for development and use of land in the District, and to adopt policies which address these priorities in a Development Plan. Lancaster City Council has sought to do this through the preparation of the Strategic Policies and Land Allocations DPD which sets out policies for a range of needs including housing and employment up until 2031. Meeting these needs in a District where the natural and built environment presents significant constraints, combined with the need for improved infrastructure, is challenging.

1.3 This Position Statement sets out baseline (current) air quality conditions, based on monitoring undertaken by Lancaster City Council; this provides evidence of where concentrations are currently above relevant air quality objectives. This is then followed by a review of the allocations of the Local Plan (in relation to potential impact on the Air Quality Management Areas). An evaluation of potential mitigation options for the future is then provided, and a qualitative analysis conducted of the potential impacts of traffic generation and associated mitigation. It is expected that at a future date, following the conclusion of detailed transport studies, air quality modelling will be undertaken to quantify these impacts.

# 2 Context and Relevant Policy

## Air Quality

### *Air Quality Strategy*

2.1 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

## Draft Clean Air Strategy 2018

2.2 Defra launched a consultation on a new Clean Air Strategy (Defra, 2018a) in May 2018. The draft strategy sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. Responses to the consultation will be used to inform the final UK Clean Air Strategy and detailed National Air Pollution Control Programme to be published by March 2019.

## Reducing Emissions from Road Transport: Road to Zero Strategy

2.3 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018a) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.4 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades.

## Air Quality Action Plans

### *National Air Quality Plan*

2.5 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017a). Alongside a package of national measures, the Plan requires those English Local Authorities (or the GLA in the case of London Authorities) that are predicted to have exceedances of the limit values beyond 2020 to produce local action plans by December 2018. These plans are undertaken in stages and must have measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone (CAZ).

### *Local Air Quality Strategy and Action Plan*

2.6 In 2013, Lancaster City Council adopted an Air Quality Strategy in addition to existing Action Plans for Lancaster and Carnforth, to define the process and set the framework to guide air quality action planning and management. The Strategy sets out a number of steps to provide a framework for the production of an agreed, quantified AQAP, and to increase ongoing air quality awareness and support.

2.7 The new Air Quality Action Plan will ultimately replace the existing air quality action plans for Lancaster and Carnforth and will form the required Plan for the Galgate AQMA. The Action Plan will be linked to the Highways and Transport Masterplan for Lancaster, which will provide one of the implementation mechanisms for delivery.

## Air Quality Objectives

2.8 The Government has established a set of air quality standards and objectives to protect human health. The ‘standards’ are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The ‘objectives’ set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

2.9 The objectives for nitrogen dioxide and $PM_{10}$ were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m$^3$ (Defra, 2018b). Measurements have also shown that the 24-hour $PM_{10}$ objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m$^3$ (Defra, 2018b). The predicted annual mean $PM_{10}$ concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean $PM_{10}$ objective. Where predicted annual mean concentrations are below 32 µg/m$^3$ it is unlikely that the 24-hour mean objective will be exceeded.

2.10 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2018b). The annual mean objectives for nitrogen dioxide and $PM_{10}$ are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for $PM_{10}$ is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

2.11 Where air quality objectives are not met, local authorities must declare an Air Quality Management Area (AQMA) and subsequently put in place an Air Quality Action Plan setting out measures to be implemented in order to work towards achieving the objectives.

2.12 The relevant air quality objectives are provided in Table 1.

**Table 1: Air Quality Criteria for Nitrogen Dioxide, $PM_{10}$ and $PM_{2.5}$**

| Pollutant | Time Period | Objective |
|---|---|---|
| **Nitrogen Dioxide** | 1-hour Mean | 200 µg/m$^3$ not to be exceeded more than 18 times a year |
| | Annual Mean | 40 µg/m$^3$ |
| **Fine Particles ($PM_{10}$)** | 24-hour Mean | 50 µg/m$^3$ not to be exceeded more than 35 times a year |
| | Annual Mean | 40 µg/m$^3$ [a] |
| **Fine Particles ($PM_{2.5}$) [b]** | Annual Mean | 25 µg/m$^3$ |

[a] A proxy value of 32 µg/m$^3$ as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean $PM_{10}$ objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean $PM_{10}$ objective are possible (Defra, 2018b).

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

2.13 The European Union has also set limit values for nitrogen dioxide, $PM_{10}$ and $PM_{2.5}$ (The European Parliament and the Council of the European Union, 2008). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. There are, however, important differences between the requirements for assessing against Limit Values and the objectives within the Local Air Quality Management process. Table 2 summarises some of the differences between the two processes, which are important for the difference in interpretation of the outcomes of these two parallel systems.

**Table 2: Air Quality Criteria for Nitrogen Dioxide, $PM_{10}$ and $PM_{2.5}$**

| | Limit Value | Objective |
|---|---|---|
| **Obligation** | Legal obligation on UK Government. | Obligation on Local Authority to act in pursuit of the objective. |
| **Relevant Exposure** | Limit Values apply everywhere there is public access. | Annual mean objectives only apply at locations where public exposure is relevant to the averaging period, e.g. at residential building facades. |
| **Treatment of Junctions** | Monitoring is not carried out with 25 metres of a junction and the same constraint is applied to the modelling | Junctions are specifically considered in both monitoring and modelling |
| **Microscale** | Excludes micro-environments and focuses on locations representative of 100m lengths of roads | Focuses on *"hot-spot"* locations |
| **Roadside Modelling** | Modelled using the PCM model. Concentrations apply to a distance of 4m from kerbside of the national road network. Local roads are excluded from the model. | Range of models can be used. Focus is on concentrations at the building façade, whatever distance from the kerb and alongside any road. |
| **Monitoring** | Restricted to monitoring stations in the national network, operated to meet the Data Quality Objectives of the Directive | Based on both automatic and passive diffusion samplers |

## Planning Policy

### *National Policies*

2.14 The National Planning Policy Framework (NPPF) (2018) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which is an environmental objective:

*"to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".* [paragraph 8c]

2.15 To prevent unacceptable risks from air pollution, the NPPF states that:

*"Planning policies and decisions should contribute to and enhance the natural and local environment by…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality".* [paragraph 170]

and

*"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".* [paragraph 180]

2.16 More specifically on air quality, the NPPF makes clear that:

*"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan".* [paragraph 181]

*2.17* The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2018), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that *"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values"* and *"It is important that the potential impact of new development on air quality is taken into account … where the national assessment indicates that relevant limits have been exceeded or are near the limit".* The role of the local authorities is covered by the LAQM regime, with the PPG stating that local authority Air Quality Action Plans "*identify measures that will be introduced in pursuit of the objectives*".

*2.18* The PPG states that:

*"Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the*

*development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation".*

2.19 The PPG sets out the information that may be required in an air quality assessment, making clear that *"Assessments should be proportionate to the nature and scale of development proposed and the level of concern about air quality"*. It also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that *"Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact".*

### *Local Policies*

2.20 The updated Local Plan, which will guide development in the Lancaster District up to 2031, was submitted to the Planning Inspectorate on the 15th May 2018. This consisted of two documents, the Strategic Policies and Land Allocations Development Plan Document (DPD) and the Development Management DPD.

2.21 The Strategic Policies and Land Allocations DPD (Lancaster City Council, 2018) includes a specific policy relating to Air Quality Management Areas (Policy EN11), which states that:

- *Developments that are located within or adjacent to AQMAs will be expected to ensure that they do not contribute to increasing levels of air pollutants within the locality and adequately protect their users from the effects of poor air quality.*
- *Any development proposals will be expected to have regard to all relevant policies contained within the Local Plan, in particular Policy DM31 of the Development Management DPD which relates to development and air quality.*

2.22 The Development Management DPD (Lancaster City Council, 2018) Policy DM31 covers Air Quality Management and Pollution and states that:

- *All development proposals must seek to minimise the associated emission of harmful air pollutants during operational phases. They must avoid causing or worsening a breach of an air quality objective level or limit value, or exposing those who use and occupy the site to unacceptable adverse exposure.*
- *Where proposals are located within or have the potential to adversely affect an Air Quality Management Areas (AQMAs) the Council will encourage and promote opportunities for new development to deliver net reductions in air emissions through on-site or off-site measures, for instance increasing the number of electric charging points. The Council will seek to prepare a Supplementary Planning Document on the matters of Air Quality and Low Emission Vehicles which will provide further guidance and information on this matter.*

- *The developer must take these aims into account with regards choice of location, building design and transport arrangements. They are also likely to need to apply additional on-site mitigation and where the latter is not sufficient to meet the policy aim, a further financial contribution towards local air quality management off-site emission reduction measures may then be required and considered as part of mitigation / offsetting proposals. This contribution will be based on the calculated associated air pollutant damage costs.*

2.23 One of the ways that the Council will seek to minimise the impact of new development on air quality is to ensure development provides a suitable level of infrastructure for the charging of electric / plug-in hybrid vehicles. Measures such as the provision of facilities and infrastructure to enable and encourage walking and cycling and the use of lower emissions transport options, such as ultra-low emission car sharing / car hubs / fleet vehicles, will also be key mitigation measures. Opportunities to secure improvements via Travel Plans will also be encouraged. This could include the establishment of a low carbon fund to help incentivise and fund future households to buy electric/low emission vehicles.

2.24 Lancaster City Council has also published a Low Emissions and Air Quality Guidance for Development Planning Advisory Note (PAN) (Lancaster City Council, 2018). This PAN provides guidance to developers to support action through the planning system to improve air quality and lower transport emissions. It provides guidelines for the treatment of development sites through a planning appraisal, and sets out mitigation requirements for different types of development. It is anticipated that this PAN will be formalised into a Supplementary Planning Document (SPD) via the Local Plan.

### *Local Transport Plans*

#### Local Transport Plan

2.25 Lancashire's current Local Transport Plan (LTP) covers the 10 year period from 2011 to 2021. The LTP recognises that the car is the predominant mode of travel to work in Lancashire. In urban areas, reliance on the car causes traffic congestion and reduced air quality. The LTP aims to reduce congestion and delay, and increase road capacity on the most congested transport corridors, to support the growth of key economic centres such as Lancaster. The LTP has delivered the Heysham to M6 Link road, as well as a number of other schemes such as Park and Ride sites in Lancaster, and has promoted sustainable transport options.

2.26 Lancashire County Council is also looking to work in partnership to provide several locations where users can charge electric vehicles when they are in the Lancashire area. In Lancaster, these locations include sites within the City itself, at the Lancaster Park and Ride, and also in Morecambe and Carnforth.

### Lancaster District Highways and Transport Masterplan

2.27 The Lancaster District Highways and Transport Masterplan outlines a range of improvements to be developed by 2031, including a vision for a city centre less dominated by traffic, with more people using sustainable transport such as buses and cycling. The Masterplan aims to tackle problems with congestion and air pollution and create an environment which will make the District an attractive place to live, work and visit. The Masterplan contains a number of measures including:

- Position Caton Road as the main gateway into the city from the M6, from both north and south;
- Reconfigure M6 Junction 33 to support the development of South Lancaster around Lancaster University;
- Develop the 'Lancaster Reach' bus rapid transit network, incorporating the Park and Ride service from M6 Junction 34 to Lancaster city centre to create a 'Y'-shaped network of two routes, one linking Heysham and Morecambe to South Lancaster via the city centre, the other linking M6 Junction 34 to Lancaster University;
- Improve how Carnforth town centre works, making it a more attractive place for visitors to spend time, and more user-friendly for pedestrians and cyclists;
- Look at long-term sustainable alternatives to conventional public transport for rural areas, and whether solutions from elsewhere in the UK could be applied to Lancaster;
- A comprehensive plan to develop an integrated multi-use/cycling network for the district, which will support the wider Cycling and Walking Strategy for Lancashire; and
- Make Lancaster central to a countywide programme of support for Ultra Low Emission Vehicles.

### Lancaster Local Cycling and Walking Infrastructure Plan

2.28 The County Council is taking the lead on the development of a Lancaster Local Cycling and Walking Infrastructure Plan (LCWIP) and has secured technical assistance from Department for Transport (DfT) appointed consultants to assist with this work. The purpose of an LCWIP is to set out a strategic approach to identifying cycling and walking improvements at a local level. For Lancaster, the emerging LCWIP can inform infrastructure requirements relating to the proposed developments being brought forward in the emerging Local Plan.

2.29 The focus of the Lancaster LCWIP has been the identification of a Cycle Superhighway between Lancaster City Centre and the major development of Bailrigg Garden Village, within the South Lancaster Area Action Plan area. As part of the LCWIP process, the Cycle Superhighway is being designed to be a safe, fast and direct route to facilitate active travel for commuters, leisure and

utility users between Galgate, Lancaster University, Bailrigg Garden Village and Lancaster and the City Centre.

2.30 Working in parallel, as part of the LCWIP process, the Planning Policy Team at Lancaster City Council has also been considering cycling and walking infrastructure relating to other strategic sites identified within the Local Plan. This is in the form of a Planning Advisory Note (PAN) and considers sites at Lancaster North, Lancaster East and Carnforth South. Given its importance as the main trip attractor and its relationship to the Cycle Superhighway, Lancaster City Centre is also being considered as part of the PAN. The PAN considers the infrastructure required within each site and looks at the connectivity required to link the site into the existing network. Where there are gaps in provision, specific schemes have been identified and an estimated cost provided. The PAN will accompany the Local Plan through the examination process and support relevant policies within the emerging Development Management and Site Allocations DPDs.

# 3 Air Quality Baseline Conditions

3.1 Air Quality is generally good across the district of Lancaster, with air quality objectives achieved for all pollutants, other than nitrogen dioxide; the annual mean objective for nitrogen dioxide has historically been exceeded at three locations - Lancaster, Galgate and Carnforth. The locations of the three AQMAs are described in Figure 1 to Figure 3.

3.2 Air quality monitoring in Lancaster for 2017 shows general improvements at the vast majority of the Council's monitoring sites. Monitoring also indicates compliance with the air quality objectives in the Carnforth and Galgate AQMAs for the first time since declaration. This compliance outcome may be, at least in part, due to traffic changes arising from the opening of the Bay Gateway in October 2016, which diverts traffic away from these AQMAs.

3.3 Although it is difficult to separate the impact of year to year variations and the changes resulting from the Bay Gateway, in some locations monitored levels have changed significantly which, subject to further review when traffic count data becomes available, are most likely to be attributable to the traffic changes arising from the opening of the new road. The roads indicating the most significant changes (reductions of between 7-11 µg/m$^3$ annual mean nitrogen dioxide) in 2017 were on Morecambe Road/Owen Road, and on Caton Road, Lancaster. Although changes in Carnforth and Galgate were less dramatic, they still were still up to 6 µg/m$^3$, and likely to be attributable, in part, to traffic changes resulting from the opening of the Bay Gateway.

3.4 Figure 1 to Figure 3 show annual mean concentrations of nitrogen dioxide at monitored locations in 2017, focussing on each AQMA. All recorded exceedances in 2017 were within declared AQMAs. One monitoring site in Lancaster (LC10 Dalton Square) has consistently recorded levels over 60 µg/m$^3$ for the last 7 years; this suggests a risk of an exceedance of the 1-hour mean nitrogen dioxide objective at this location. LC19 (China Street) has also recorded concentrations at, or above, 60 µg/m$^3$ over the last 4 years. The site is very close to the road (1.6 m from the kerb) and is also typical of a 'street canyon' where buildings are close to the road on either side, reducing the dispersion of pollutants, causing them to build up.

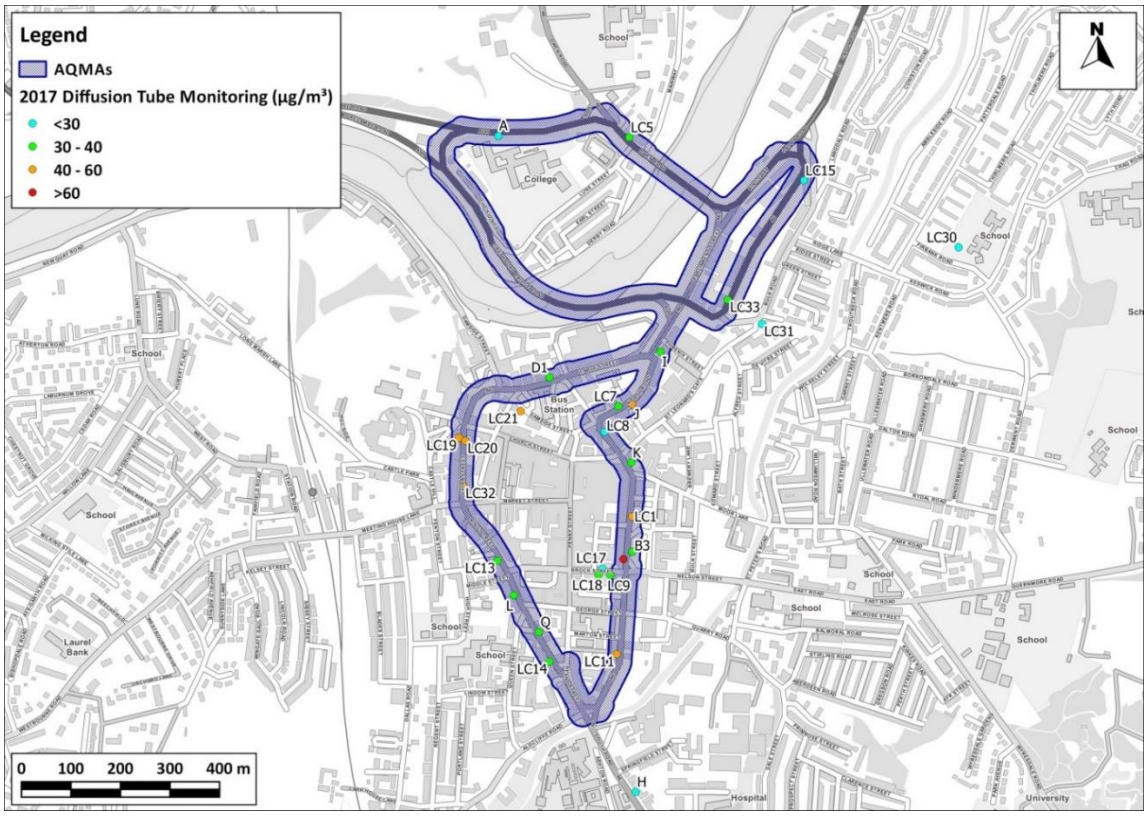


**Figure 1: Lancaster AQMA showing nitrogen dioxide monitoring**

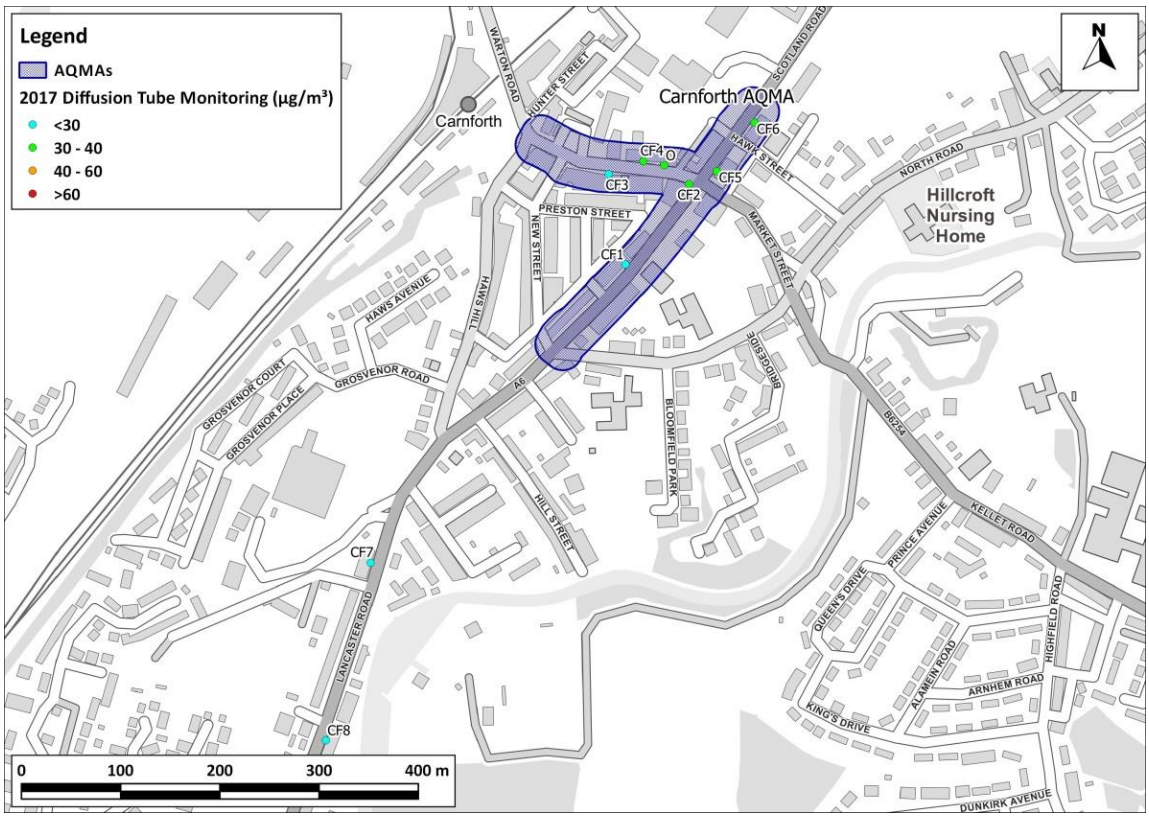


**Figure 2: Carnforth AQMA showing nitrogen dioxide monitoring**

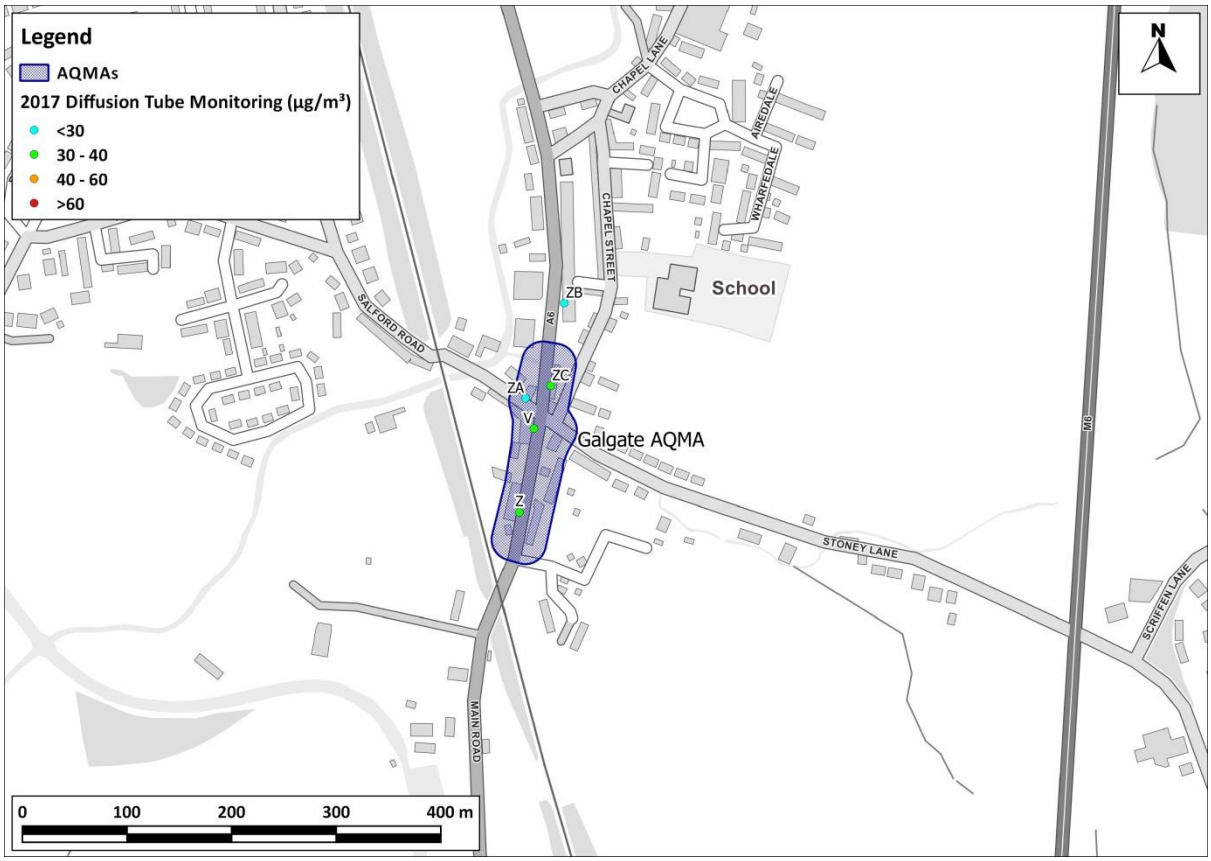


**Figure 3: Galgate AQMA showing nitrogen dioxide monitoring**

3.5 Figure 4 to Figure 6 illustrate trends at monitoring sites in the three AQMAs. It is difficult to identify a long tem trend, largely for reasons set out in paragraph 5.2, whereby expected emissions reductions in newer vehicles have not been realised in real world driving conditions. It does, however, appear from the following graphs that a downward trend in more recent years has occurred within the AQMAs.

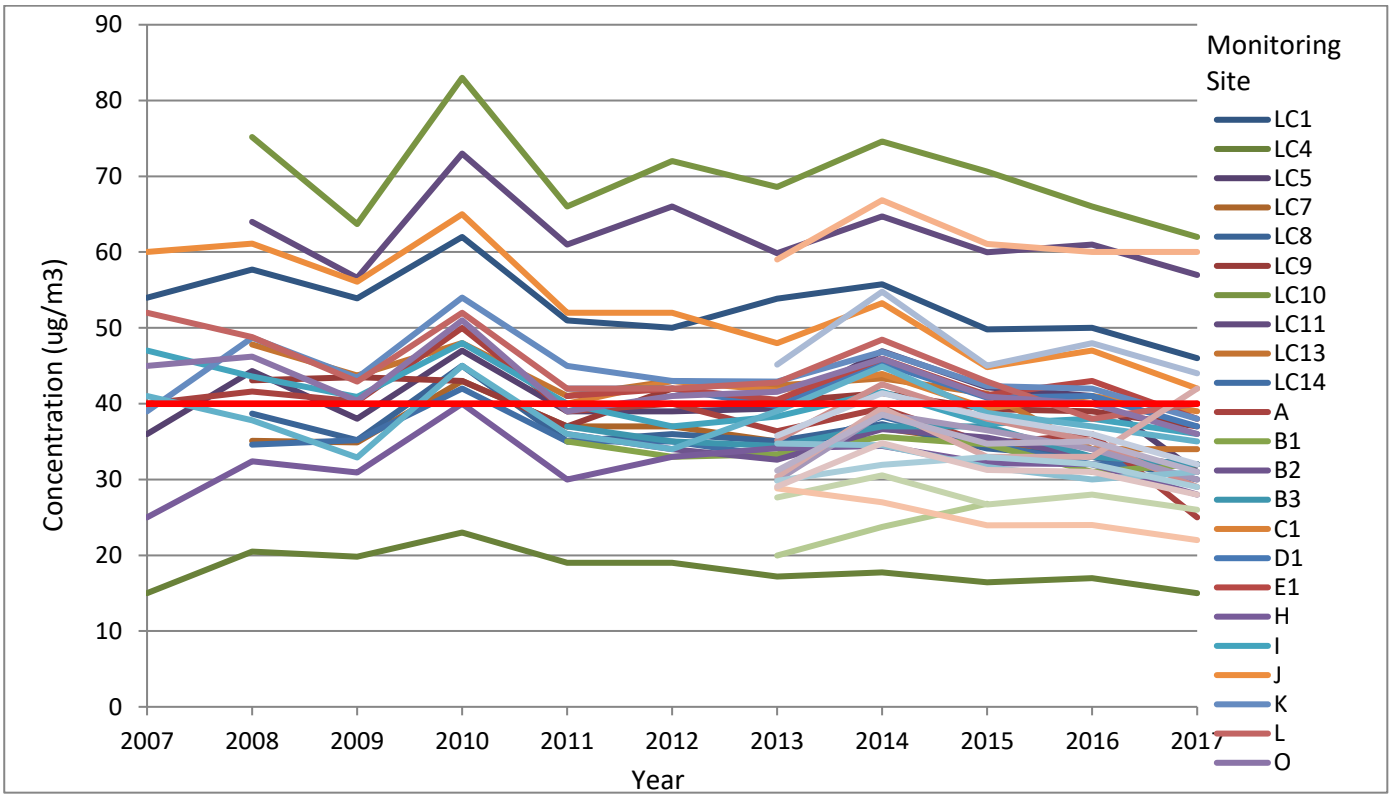


**Figure 4: Trends at monitoring sites in the Lancaster AQMA**

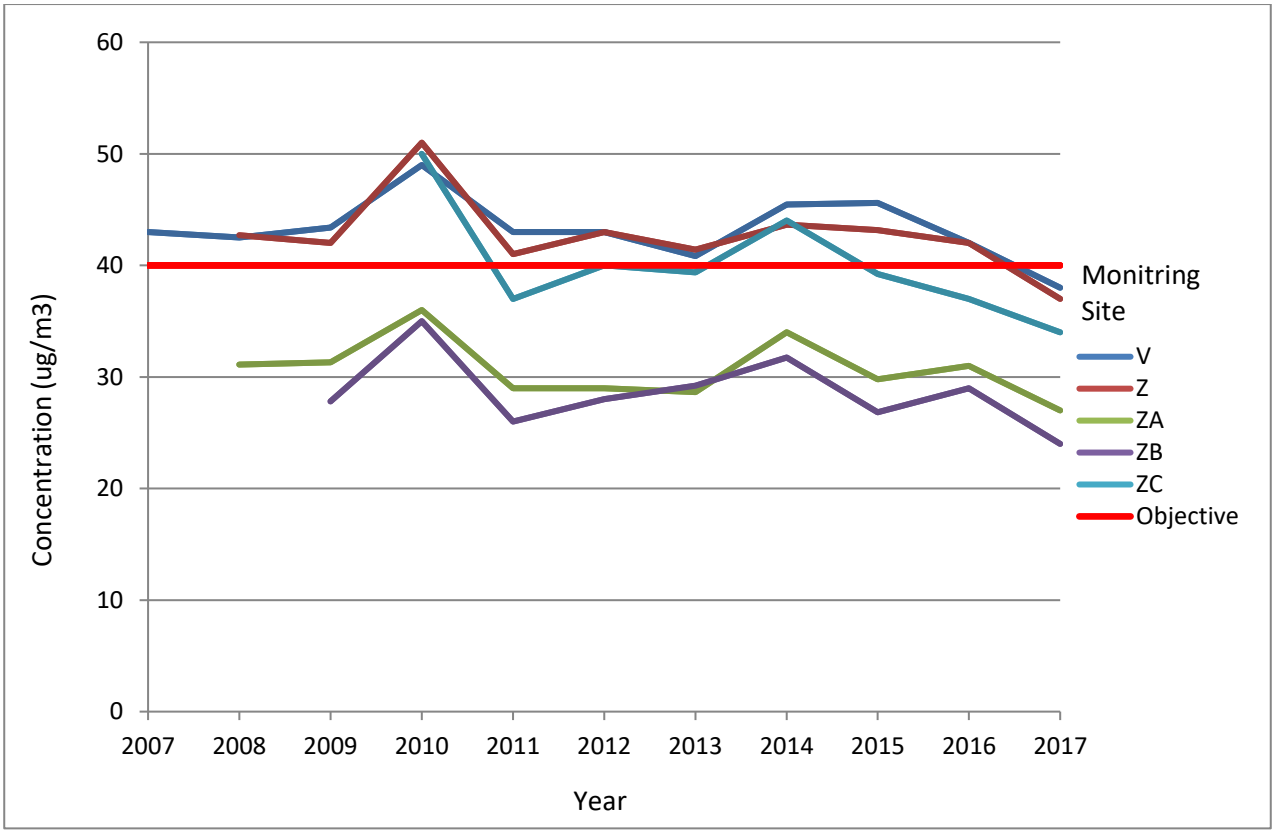


**Figure 5: Trends at monitoring sites in the Galgate AQMA**

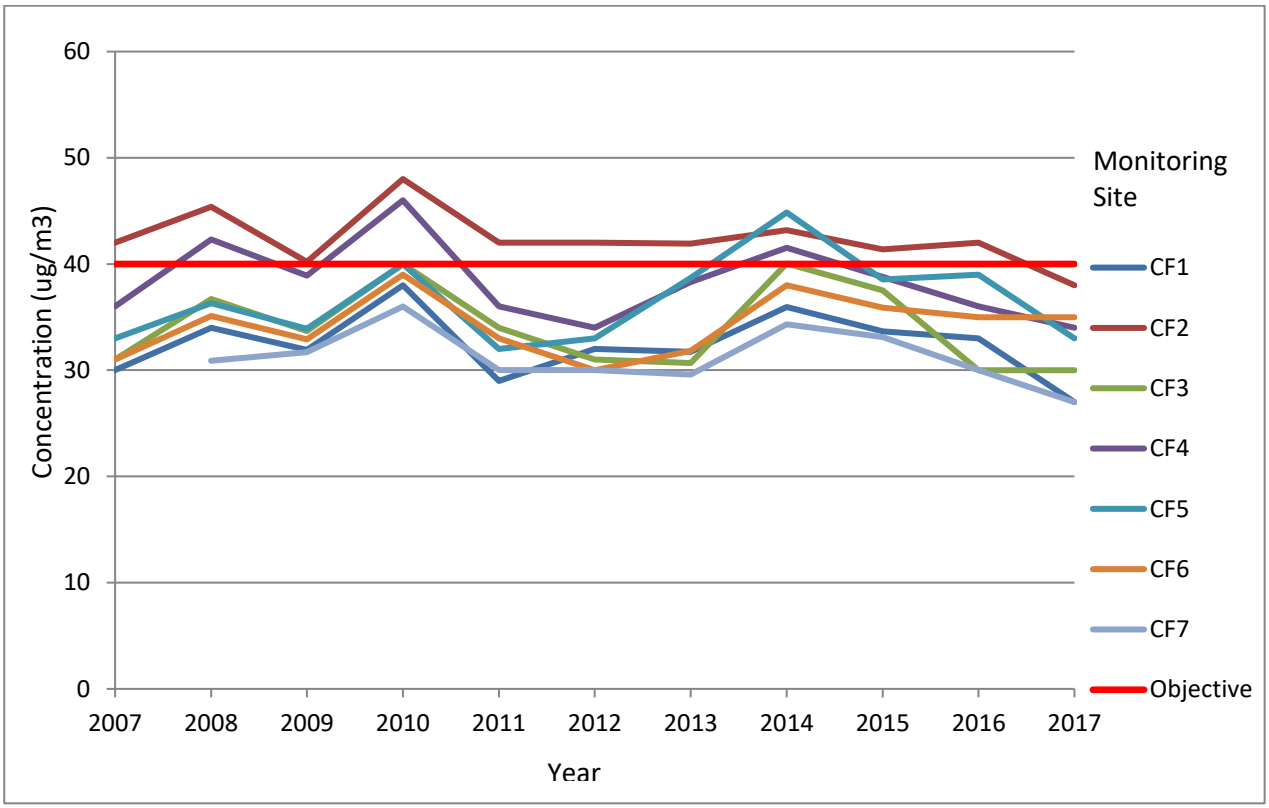


**Figure 6: Trends at monitoring sites in the Carnforth AQMA**

3.6 It is important to note that although there are high annual mean concentrations of nitrogen dioxide in Lancaster, there are no exceedances of the Limit Values within Lancaster district. Exceedances of the annual mean EU limit value for nitrogen dioxide in Lancaster have been identified using the maps of roadside concentrations published by Defra (2017b) as part of its 2017 Air Quality Plan for the baseline year 2015 and for the future years 2017 to 2030. These maps are used by the UK Government, together with AURN results, to report exceedances of the limit value to the EU. The national maps of roadside $PM_{10}$ and $PM_{2.5}$ concentrations (Defra, 2018e), which are available for the years 2009 to 2015, show no exceedances of the limit values anywhere in the UK in 2015.

3.7 For particulate matter (PM), although the objectives are achieved, health effects are still apparent below relevant threshold levels and therefore from a planning perspective, it is important to ensure that $PM_{10}$ or $PM_{2.5}$ concentrations are not inadvertently increased by development.

3.8 Measures which either reduce traffic flows, or accelerate fleet renewal, should have some benefit in reducing PM emissions, in addition to nitrogen dioxide. However, policies to encourage centralised heating plant such as biomass may increase PM locally. Combustion plant associated with standby emergency generators may also increase emissions of both PM and NOx. It should also be noted that a significant proportion of PM emissions from vehicles are brake and tyre wear, which will still be emitted from vehicles with zero tailpipe emissions (such as an electric vehicle).

# 4 Allocations in the Local Plan

4.1 The Strategic Policies and Land Allocations Development Plan Document (DPD) sets out the spatial vision and plan for the future of the district and how it will be delivered. It is also the document that identifies land to meet future development needs, and land that should be protected for its environmental, social and economic importance. The district requires new homes, jobs and infrastructure to support the needs and aspirations of people who live in this area, both now and in the future. The Local Plan describes and quantifies what those needs are, and sets out how the Council plans to meet them. It is these allocated sites which may have an impact on air quality as new homes and employment sites come into operation.

4.2 Within the Strategic Policies and Land Allocations DPD (Lancaster City Council, 2018), there are four main strategic sites allocated:

- *Bailrigg Garden Village (policy SG1)*
- *East Lancaster (policy SG7)*
- *North Lancaster (policy SG9) and*
- *South Carnforth (policy SG12)*

4.3 **Bailrigg Garden Village** will include the delivery of at least 3,500 new homes (1,655 during the Plan period and the remainder to follow in future plan periods). Furthermore the Garden Village proposes a range of commercial and business opportunities to attract business, investment and jobs (including the realisation of the Lancaster University Health Innovation Campus which is considered to be of regional economic importance to the North West). The Garden Village will explore opportunities for car-free development in some areas which can make the best use of significant investments to be made into a Bus Rapid Transit System (linking the Garden Village to Lancaster City Centre and employment areas beyond) and the proposed Cycling and Walking Superhighway network. It is also proposed that energy delivery through the role of district heating systems will be investigated, as well as the opportunities to encourage a greater role for electric vehicles via the provision of infrastructure. Transport and the movement of people are key to development within the Garden Village and beyond. There are key interlinkages and interdependencies in the transport network, particularly between Lancaster City Centre and the Garden Village which require improvements to ensure that modal shifts toward more sustainable forms of transport can be achieved. This means that the Bailrigg Garden Village Area Action Plan DPD will need to address transport in a holistic manner looking at interlinkages within the wider urban area.

4.4 **East Lancaster** has been identified as a potential area of growth in the district with the opportunity to provide significant delivery of residential development. The site has been identified as having

an indicative capacity for approximately 900 dwellings. In allocating this site for development purposes the Council recognises the significant potential that it provides in helping to meet the district's long-term housing needs through a well-planned, comprehensive development of the site. To this end, the Council will be preparing a Development Brief to supplement the content of Policy SG7 and provide detail on a range of issues that should be addressed through a Masterplan. Given the site's close proximity to Lancaster City Centre, the Council will support the improvement of strong cycling and walking links to promote sustainable travel patterns. In particular, improvements should seek to improve linkages along the towpath of the Lancaster Canal to make this route a safe and convenient route for cyclists and walkers accessing the city centre.

4.5 The shift in Green Belt designation in **North Lancaster** has provided the opportunity for the allocation of land to meet residential and employment development needs of the district in a location that has strong access to the national motorway network, key employment areas in the district and Lancaster City Centre. An indicative capacity for 700 dwellings and 2 hectares of high quality B1 employment land has been identified. Proposals for North Lancaster need to satisfactorily address air quality issues that may arise from the proximity of the Bay Gateway Link Road and the A6, which adjoin this site, and also incorporate cycling and pedestrian access with strong linkages to the existing network. This should include improving linkages to Lancaster City Centre (via improvements to the Canal towpath and along the A6), as well as pedestrian improvements along Halton Road including safe pedestrian access across Halton Road Bridge via the creation of a new footbridge across the Lancaster Canal at an appropriate location to aid movements south and north. To this end the Council will also be preparing a Development Brief to supplement the content of Policy SG9 and provide detail on a range of issues that should be addressed through a Masterplan.

4.6 **Carnforth** is the third largest settlement within the district, identified as a Market Town within the settlement hierarchy, and is considered to be the northern hub of the district, providing key services to the rural communities in the north. It also has strong public transport links that may be further enhanced via the delivery of the Lancaster District Transport and Highways Masterplan. As a result, Carnforth is considered to be a highly sustainable location for future development growth, which can build on its strong and improving transport links within the wider region. Land identified on the Local Plan Policies Map at Lundsfield Quarry, South Carnforth, has been allocated as a site for residential-led development. The Council expects that once fully developed that this brownfield site will accommodate approximately 200 dwellings and a range of infrastructure that is necessary to facilitate these new homes. In addition, land to the South of Windermere Road, Carnforth (approximately 1km from the town centre), has been identified as a site for residential development. The site covers an area of 25 hectares and has been identified as having an indicative capacity of approximately 500 dwellings. This site, whilst on the edge of Carnforth, provides good opportunities for walking and cycling links into Carnforth town centre, via the Lundsfield Quarry site to the north-west, through the delivery of a new crossing of the canal for

pedestrians and cyclists. For both sites, the Council will prepare a Development Brief to set out in more detail how development of these strategic sites should move forward.

4.7 Figure 7 to Figure 9 show these strategic sites in relation to declared AQMAs.

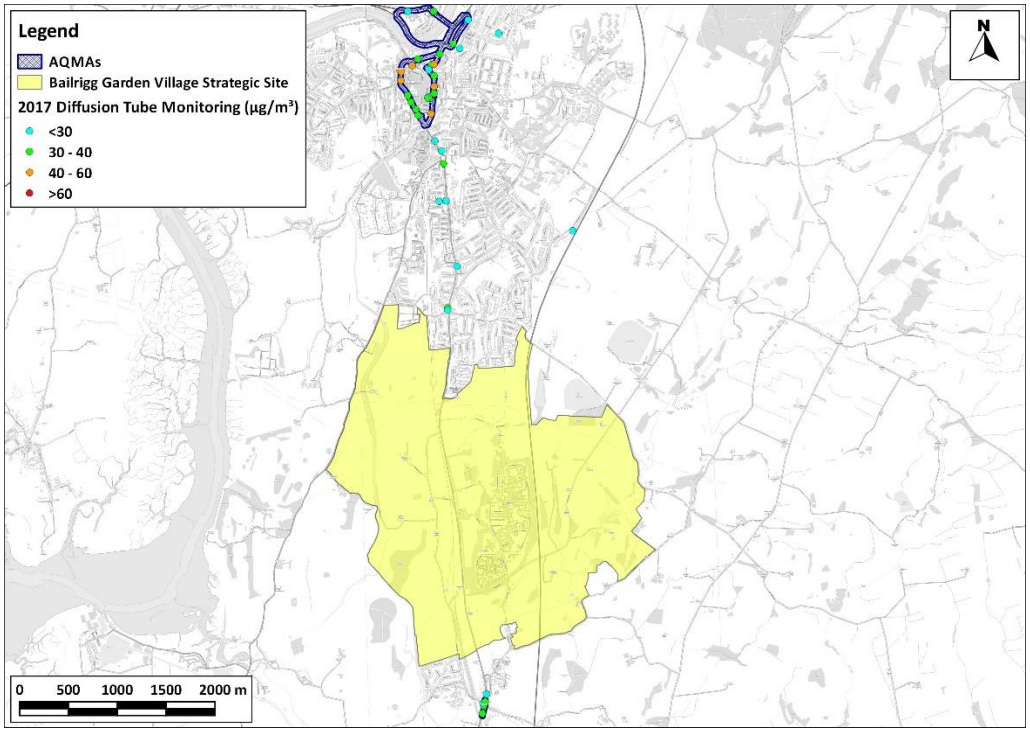


**Figure 7: Bailrigg Garden Village Strategic Site showing proximity to Lancaster and Galgate AQMAs**

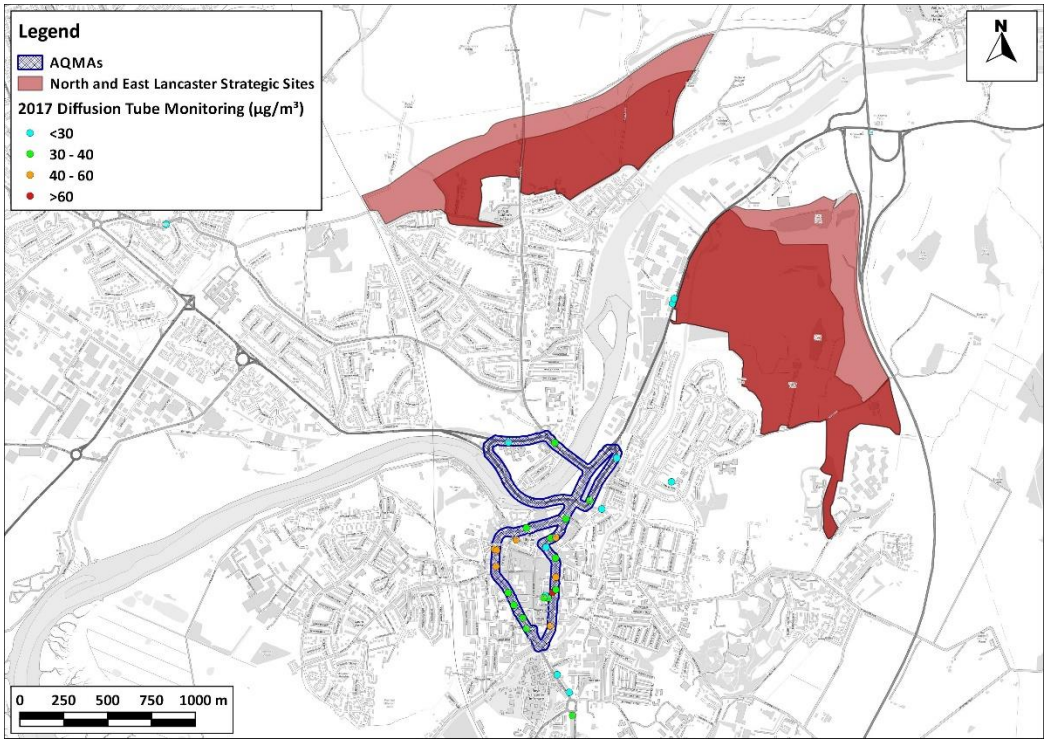


**Figure 8: Lancaster North and East Strategic Sites showing proximity to Lancaster AQMA**

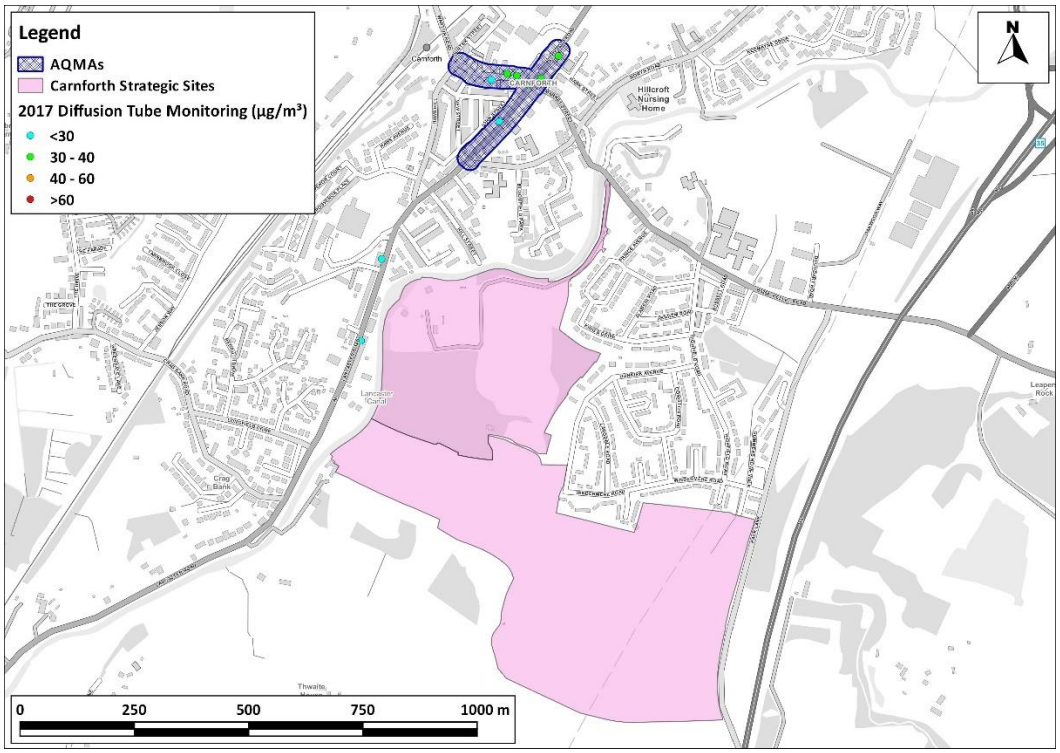


**Figure 9: Carnforth Strategic Sites showing proximity to Carnforth AQMA**

# 5 Future Air Quality and Mitigation

5.1 As part of the Local Plan process it is anticipated that full quantification of the air quality impacts up to 2031 will be completed in 2019. It is, however, expected that air quality will improve as newer vehicles enter the fleet. Type approval ('Euro') standards for vehicle emissions apply to all new vehicles manufactured for sale in Europe. These standards have, over many years, become progressively more stringent and this is one of the factors that has driven reductions in both predicted and measured pollutant concentrations over time.

5.2 Historically, the emissions tests used for type approval were carried out within laboratories and were quite simplistic. They were thus insufficiently representative of emissions when driving in the real world. For a time, this resulted in a discrepancy, whereby nitrogen oxides emissions from new diesel vehicles did not fall in line with expectations. This, in turn, led to a discrepancy between models (which predicted improvements in nitrogen dioxide concentrations over time) and measurements (which very often showed no improvements year-on-year).

5.3 Recognition of these discrepancies has led to changes to the type approval process. Vehicles are now tested using a more complex laboratory drive cycle and also through 'Real Driving Emissions' (RDE) testing, which involves driving on roads while measuring exhaust emissions. For Heavy Duty Vehicles (HDVs), the new testing regime has worked very well and NOx emissions from the latest vehicles (Euro VI[1]) are now very low when compared with those from older models (ICCT, 2017).

5.4 For Light Duty Vehicles (LDVs), while the latest (Euro 6) emission standard has been in place since 2015, the new type-approval testing regime only came into force in 2017. Despite this delay, earlier work by AQC (2016) showed that Euro 6 diesel cars manufactured prior to 2017 tend to emit significantly less NOx than previous (Euro 5 and earlier) models. Given the changes to the testing regime, it is reasonable to expect that diesel cars and vans registered for type approval since 2017 will, on average, generate even lower NOx emissions.

5.5 It is also worth noting that if the Government's ambitions as set out in the Road to Zero Strategy (see Paragraphs 2.3 and 2.4), is realised, the increase in the proportion of zero tailpipe emission vehicles in years up to and including 2030 will need to be relatively large.

5.6 However, despite predicted improvements in air quality, there is potential for air quality to worsen where there are increases in traffic on certain routes, particularly in the shorter term. Congestion (stop-start traffic) increases emissions per vehicle, which will also increase concentrations at roadside, in congested locations such as those close to junctions.

[1] Euro VI refers to HDVs while Euro 6 refers to LDVs.

5.7 In addition, care must be taken to ensure that problems are not created by introducing relevant exposure into locations which may be exceeding air quality objectives, for example by building too close to existing busy roads such as the M6.

5.8 In order to mitigate the impacts of additional development, as well as deal with existing air quality issues, a number of transport schemes are proposed across Lancashire, including those which specifically focus on Lancaster District. The Highways and Transport Masterplan for the District of Lancaster, sets outs the Council's vision for travel and transport to 2031 and beyond. With the preparation of the new Local Plan, and assessment of housing need as outlined in section 4, major improvements to the existing transport infrastructure will be needed. This need for an improvement also presents an opportunity to support delivery of a proposed set of 'once in a generation' improvements to Lancaster's transport network. The vision for 2031 for Lancaster is a vibrant and successful city centre, with no air quality issues, no gyratory congestion and no barriers to sustainable travel. The vision for Carnforth is a hub for the north of the district, with redesigned public spaces making the centre a much more attractive place to visit. The station will be integral to the town centre and improved rail links provide easy access to jobs around Morecambe Bay and across into Yorkshire. The town is also a gateway for visitors coming to enjoy the countryside and wildlife of the area, as well as its railway heritage. The vision for Galgate is a quiet village, no longer straddling the city's main link to the motorway.

5.9 In order to deliver this vision, Caton Road will become the principal Gateway into the city centre for traffic from the M6, from both north and south. At Junction 34, there is a Park and Ride/Cycle facility, with capacity for over 600 cars, intercepting traffic from the motorway and from both sides of the Lune Valley. The link road will mean that HGVs no longer need to travel through the city centre or along Caton Road and across the Lune bridges, thus reducing congestion and improving air quality. A Movement Strategy for Heavy Goods Vehicles is being prepared which will set out a number of Traffic Regulation Orders that will limit HGV movements, to ensure that HGVs make full use of the link road. The 'Lancaster Reach' bus rapid transit concept will be developed, incorporating the Park and Ride service from M6 Junction 34 to Lancaster city centre to create a 'Y'-shaped network of two routes, one linking Heysham and Morecambe to South Lancaster via the city centre, the other linking M6 Junction 34 to Lancaster University. Both routes will operate between the city centre and Lancaster University via the Royal Lancaster Infirmary, presenting us with a genuine opportunity to create a sustainable transport corridor linking the city centre and the Bailrigg Garden Village.

5.10 Changing how the gyratory system works cannot be done without detailed consideration of a number of other factors. How public transport, including the proposed 'Lancaster Reach' bus rapid transit services, will operate through the city centre is one factor, as well as how the city centre supports walking and cycling. These elements will be brought together in a Lancaster City Movement Study. This study should also consider air quality, which will be complementary to

addressing congestion in this location. A radical approach is likely to be needed to achieve air quality objectives within the Lancaster AQMA.

5.11 The Highways and Transport Masterplan also includes the reconfiguration of M6 Junction 33 to support the significant growth potential of South Lancaster. Options include relocating part of the junction further to the north to enable residents and businesses in South Lancaster to access the motorway network without having to travel through either the city centre or Galgate. The south-facing slip roads would remain where they currently are, meaning that traffic travelling between the north of Wyre district and the M6 south would not need to pass through Galgate.

5.12 Carnforth is becoming more reliant on the visitor economy, particularly given its proximity to so many outstanding natural landscapes. However, the centre of the town around the signalised A6/B6254 junction experiences heavy traffic and congestion, and has been declared an AQMA. It is proposed that in addition to the Bay Gateway which should reduce traffic in Carnforth, to implement a programme of pedestrian and traffic improvements to the centre of Carnforth, focusing on Market Street, with a view to creating a space which, whilst allowing traffic to flow, is more user friendly for those on foot or on cycle. As well as making the shopping area itself more attractive, it will help to ensure that people feel comfortable travelling by more sustainable modes.

5.13 The 'Lancaster Links' work will develop an integrated multiuse/cycling network for the district to provide a comprehensive travel network for non-motorised travel. 'Lancaster Links' will be part of a wider Cycling and Walking Delivery Plan for Lancashire, with the district developing as an exemplar of active travel for the rest of the county, demonstrating the widespread benefits that cycling and walking bring when they are the day to day choice for shorter journeys. This will build on work undertaken in Lancaster as a Cycling Demonstration Town (2006-2011).

5.14 Finally, to complement proposals for better public transport and cycling/multiuser networks, the aim is for Lancaster to become an exemplar of the use of Ultra-Low Emission Vehicles (ULEVs). Whilst ULEVs may not reduce vehicle numbers, they will be vital in reducing the emissions from residual traffic in Lancaster city centre, currently an Air Quality Management Area (AQMA). The use of ULEVs on the 'Lancaster Reach' bus rapid transit services is currently being investigated.

5.15 In addition to the Highways and Transport Masterplan for the District of Lancaster, a Transport Assessment (TA) has been undertaken to assess the likely impact on the existing highway network of committed development and proposed emerging Local Plan development sites (the TA forms part of the Local Plan transport evidence base). There are a number of constraints, not least the absence of an up-to-date Strategic Transport Model, which would enable the impact on traffic levels of potential major highway infrastructure schemes to be determined, and also to reassign traffic around the network to avoid congested links. However, the work gives a generalised assessment of the potential impact of the Local Plan on various junctions around the network. Key congestion points on the network are around Lancaster City Centre, and on the radial approaches into the city centre. Hotspots were also shown on the A6 corridor between J33 of the M6 and at

Galgate (in the morning peak) and between Bailrigg and Galgate (in the evening peak) and within Carnforth town centre. These locations of congestion align with areas where poor air quality has been identified. The outcome of this work has been to recommend improvements at a number of junctions which are predicted to operate over their capacity. These include some key junctions in AQMAs, including Galgate Cross Roads and Carnforth Cross Roads. Further work will be undertaken on Lancaster City Centre. These junction improvements will provide some interim mitigation while more radical options within the transport masterplan are being put in place.

5.16 In addition, through the Local Plan, for each strategic site there is a requirement for the appropriate provision of electric charging points and other associated infrastructure. For all of the sites which are located on the edge of urban areas, there is also a requirement to incorporate cycle and pedestrian access, with strong and positive linkages to the existing network.

5.17 Through the implementation of the Low Emission and Air Quality Planning Advisory Note, which is hoped will become formalised into a Supplementary Planning Document (SPD) via the emerging Local Plan, any development should be adequately assessed and mitigated. This is also a useful mechanism to ensure that impacts from cumulative developments do not become significant, i.e. by implementing general emission reduction measures to reduce the risk that many individual schemes, deemed insignificant in themselves, contribute to a “creeping baseline”.

# 6 Concluding Comments – Position Statement

6.1 Air quality is generally good across Lancaster district, with the air quality objectives achieved for all pollutants other than nitrogen dioxide, which has historically been exceeded at three locations (Lancaster, Galgate and Carnforth). Monitoring in 2017 has indicated compliance in the Carnforth and Galgate AQMAs, and although it is too early to say whether this will continue, this compliance outcome may be, at least in part, due to traffic changes arising from the opening of the Bay Gateway in October 2016. 2018 air quality monitoring data should be available in the next few months.

6.2 Lancaster city centre (gyratory system), has air quality exceedances of a larger magnitude. There are locations which are significantly above the annual mean nitrogen dioxide air quality objective and the 1-hour mean objective may also be breached. In Lancaster, fundamental transport measures, such as those outlined in the Lancaster District Highways and Transport Masterplan, will be required to reduce emissions to a level that would achieve the objectives. The measures required to radically change traffic in Lancaster City Centre will require significant funding, which is proposed could happen in a number of ways, through developer contributions, and also through the Housing Infrastructure Fund (HIF). Both of these are being explored and implemented through the Local Plan.

6.3 Although it is difficult to decipher a long term downward trend in air quality, largely because expected emissions from new vehicles have not been realised to the extent that was predicted, it appears from data presented in this report that there is a downward trend in more recent years; further data when it becomes available, will be able to confirm this. It is, however, acknowledged that allocations in the Local Plan have the potential to increase traffic both within the AQMAs, and elsewhere. Further technical work to support the Local Plan will identify where the impacts are likely to be, the impact of the mitigation outlined in this report, and to what magnitude these (positive and negative) impacts are likely to be.

6.4 The changes proposed in the Local Plan will occur with a continually improving fleet as vehicles with higher Euro standards become more dominant. There may be measures which would accelerate the infiltration of cleaner vehicles into the fleet, both in terms of newer (higher Euro Standard) vehicles, or Low Emission Vehicles (electric, hybrid and others). This acceleration will be taken forward through requirements for developments to implement appropriate infrastructure for low emission vehicles, and potentially through the Lancaster City Movement Study.

6.5 Although the focus for improvement is likely to be on nitrogen dioxide, this should not be at the detriment of other pollutants, especially particulate matter for which there is no threshold for health effects. Measures which either reduce traffic flows, or accelerate fleet renewal, should also have some benefit for PM emissions. However, policies which encourage biomass, may increase PM

locally. It should also be noted that a significant proportion of PM emissions from vehicles are brake and tyre wear, which will still be emitted even for a vehicle with zero tailpipe emissions (such as an Electric Vehicle).

6.6 For the four main strategic sites, it will be important to ensure that cumulative impacts do not become significant, i.e. where many individual schemes, deemed insignificant in themselves, contribute to a “creeping baseline”. This could be addressed within the Area Action Plan DPD for Bailrigg Garden Village and included in the Development Brief for East Lancaster, North Lancaster and Carnforth Strategic sites, as an issue to be dealt with in the masterplan. It is also good practice to reduce emissions and exposure for all developments at the outset, at a scale commensurate with the emissions. This is included within the Low Emission and Air Quality Planning Advisory Note, which is hoped will become formalised into a Supplementary Planning Document (SPD) via the emerging Local Plan.

6.7 In conclusion, the strategy, policies and proposals of the Local Plan and Transport Master Plan are actively seeking more sustainable means of transport and promoting innovation. It is anticipated that development will act as a facilitator of some of the measures outlined in section 5, as opposed to being solely a contributor to existing air quality concentrations. Lancaster City Council is seeking to implement the measures outlined through the policies proposed within the Local Plan. Without such development it is not clear how these measures could be funded.

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# 8 Glossary

| | |
|---|---|
| **AQC** | Air Quality Consultants |
| **AQMA** | Air Quality Management Area |
| **AQAP** | Air Quality Action Plan |
| **CAZ** | Clean Air Zone |
| **Defra** | Department for Environment, Food and Rural Affairs |
| **DPD** | Development Planning Document |
| **DfT** | Department for Transport |
| **Exceedance** | A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure |
| **EU** | European Union |
| **EV** | Electric Vehicle |
| **GLA** | Greater London Authority |
| **HDV** | Heavy Duty Vehicles (> 3.5 tonnes) |
| **HMSO** | Her Majesty's Stationery Office |
| **HGV** | Heavy Goods Vehicle |
| **IAQM** | Institute of Air Quality Management |
| **ICCT** | International Council on Clean Transportation |
| **LAQM** | Local Air Quality Management |
| **LCWIP** | Local Cycling and Walking Infrastructure Plan |
| **LDV** | Light Duty Vehicles (<3.5 tonnes) |
| **LTP** | Local Transport Plan |
| **µg/m$^3$** | Microgrammes per cubic metre |
| **NO** | Nitric oxide |
| **$NO_2$** | Nitrogen dioxide |
| **NOx** | Nitrogen oxides (taken to be $NO_2$ + NO) |
| **NPPF** | National Planning Policy Framework |

| | |
|---|---|
| **Objectives** | A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides |
| **OLEV** | Office for Low Emission Vehicles |
| **PAN** | Planning Advice Note |
| **$PM_{10}$** | Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter |
| **$PM_{2.5}$** | Small airborne particles less than 2.5 micrometres in aerodynamic diameter |
| **PPG** | Planning Practice Guidance |
| **RDE** | Real Driving Emissions |
| **SPD** | Supplementary Planning Document |
| **Standards** | A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal |
| **TA** | Transport Assessment |

# 9 Appendices

# A1 Professional Experience

## Stephen Moorcroft, BSc (Hons) MSc DIC MIEnvSc MIAQM CEnv

Mr Moorcroft is a Director of Air Quality Consultants, and has worked for the company since 2004. He has over thirty-five years' postgraduate experience in environmental sciences. Prior to joining Air Quality Consultants, he was the Managing Director of Casella Stanger, with responsibility for a business employing over 100 staff and a turnover of £12 million. He also acted as the Business Director for Air Quality services, with direct responsibility for a number of major Government projects. He has considerable project management experience associated with Environmental Assessments in relation to a variety of development projects, including power stations, incinerators, road developments and airports, with particular experience related to air quality assessment, monitoring and analysis. He has contributed to the development of air quality management in the UK, and has been closely involved with the LAQM process since its inception. He has given expert evidence to numerous public inquiries, and is frequently invited to present to conferences and seminars. He is a Member of the Institute of Air Quality Management.

## Dr Clare Beattie, BSc (Hons) MSc PhD CSci MIEnvSc MIAQM

Dr Beattie is an Associate Director with AQC, with more than 20 years' relevant experience. She has been involved in air quality management and assessment, and policy formulation in both an academic and consultancy environment. She has prepared air quality review and assessment reports, strategies and action plans for local authorities and has developed guidance documents on air quality management on behalf of central government, local government and NGOs. Dr Beattie has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has also provided support to the integration of air quality considerations into Local Transport Plans and planning policy processes. She has carried out numerous assessments for new residential and commercial developments, including the negotiation of mitigation measures where relevant. She has carried out BREEAM assessments covering air quality for new developments. Clare has worked closely with Defra and has recently managed the Defra Air Quality Grant Appraisal contract over a 4-year period. She is a Member of the Institute of Air Quality Management and is a Chartered Scientist.

Full CVs are available at www.aqconsultants.co.uk.