

Our strategy to improve air quality



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Foreword

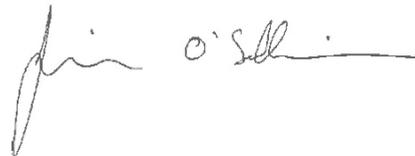
Highways England was launched in April 2015 to deliver a greatly increased road investment programme in support of our growing economy. As we do this we will ensure that all activity on our roads is delivered in a way that not only minimises harm, but ultimately improves the environment including air quality. This is a real challenge given the open access nature of our network.

In the Road Investment Strategy the government committed £100 million to improve air quality, on and around the strategic road network, through to 2021. This strategy sets out our approach and activities to achieve this goal.

These activities will draw on our expertise and knowledge to explore innovative ways to improve air quality around our network and beyond. Through this work we will deliver a cleaner network, and most importantly improve the health of our neighbours and customers.

We will make a greater difference by working in partnership with others. Throughout this strategy we set out what we can deliver ourselves and also where we need the support of others or we need to help others.

This strategy is designed to communicate our approach to key stakeholders as we drive forward our work to improve air quality. We are keen for partners to help us solve these air quality challenges and work with us as we implement the solutions. Please do not hesitate to contact us if you feel you can help us make a greater difference.



Jim O'Sullivan



Colin Matthews



*Jim O'Sullivan
Chief Executive*



*Colin Matthews
Chairman*

Air quality is of critical importance to the UK

The government recognises that clean air is essential for making sure the UK is a healthy and prosperous country for people to live and work and has committed £2.7 billion to clean up the air and reduce vehicle emissions in support of this. This strategy sets out our approach to achieving cleaner air for our customers and our neighbours who live alongside our network.

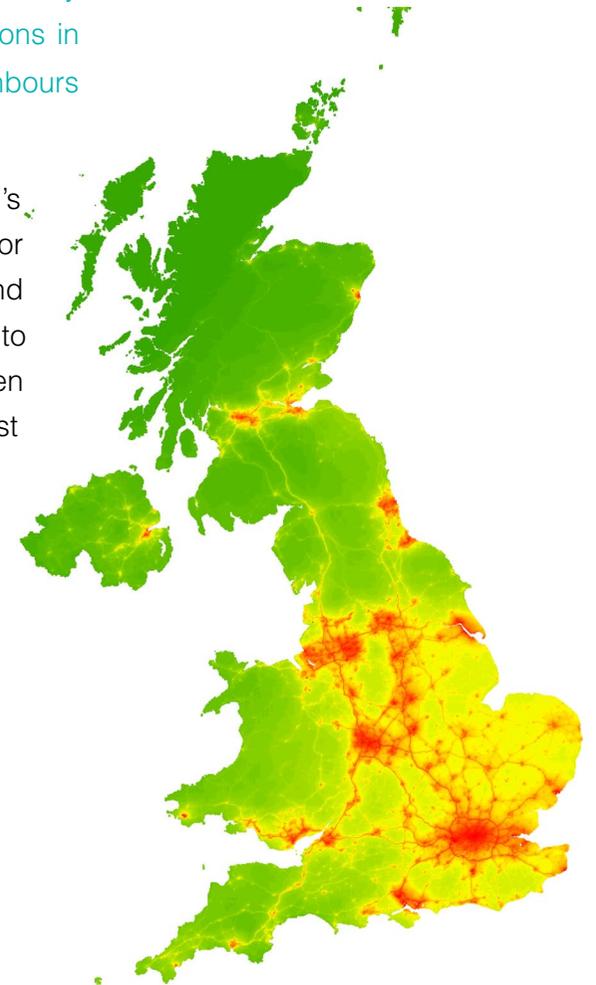
Thanks to concerted efforts over recent decades there has been an improvement in air quality across the United Kingdom. A tightening of vehicle emission standards has helped further reduce the emissions from vehicles travelling on our network and the government is working hard to ensure that vehicles meet their emission standards to deliver greater benefits.

There is more that we can do, with government and our local partners, to improve this further.

As the map on the right shows, there are currently elevated concentrations of nitrogen dioxide (NO₂) in many parts of the country including parts of our network.

This strategy sets out Highways England's contribution to support the Department for Environment, Food and Rural Affairs (Defra) and the Department for Transport (DfT) as they work to improve air quality in the UK and deliver nitrogen dioxide compliance at the roadside in the shortest time possible.

As the work progresses we will keep emerging evidence on other air pollutants under review and we will adjust our approach accordingly.



NO₂ concentrations (shown in red) across the UK (2015 projections)

Delivering economic growth without detriment to our air quality

The *Road Investment Strategy* sets out the government's vision for smooth, safe and reliable motoring, more sustainable roads, and how we should foster cutting-edge technologies.

During the first Roads Period, the five years commencing April 2015, our network will directly contribute to economic growth through, amongst other things, improved connectivity and better access to our international gateways.

We need to deliver economic growth associated with scheme delivery, that helps accommodate additional volume of traffic, without detriment to our air quality.

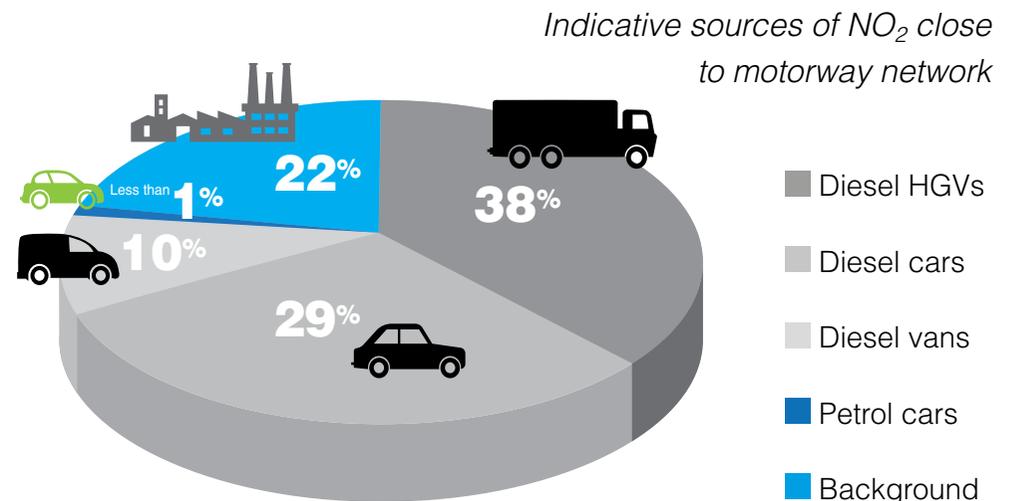
Doing this is important given we are expanding our network with over 1,300 additional lane miles between 2015 and 2020 to support the economic growth and predictions by DfT that the volume of traffic is expected to rise by up to 55% between 2010 and 2040.

Tackling vehicle emissions

Emissions from diesel vehicles are a significant contributor to the poor air quality at the roadside.

Although emissions standards have tightened over time there are still significant numbers of older vehicles, which are more damaging to the environment, on the network that take time to refresh. For example, heavy goods vehicles (HGVs) remain on the road for around 7 years before they are replaced with cleaner vehicles whilst cars typically have a 15 years life.

The pie chart illustrates how HGVs, diesel cars and vans together contribute to 77% of the NO₂ close to our motorway network that we aspire to improve.



The need for new technologies

The UK wants to be at the global forefront of ultra low emission vehicles (ULEVs) development, manufacture and use with the government committed to investing more than £600 million by 2020 to help achieve this. Government's vision is for nearly every car and van to be a zero emission vehicle by 2050 and has announced that it will end the sale of all new conventional petrol and diesel cars and vans by 2040. Registrations for ULEVs, such as electric or hybrid vehicles, are rapidly increasing and represented 1.5% of all new registrations during the year up to end of May 2017, compared with 1.1% over the previous year and 0.8% over the year before that. Our efforts to overcome the particular constraints of long distance travel for ULEVs will support their increased use on our network.

Many motorway service areas have already installed rapid charging points. We will work with operators to ensure that this becomes a comprehensive national network and are already working to ensure that 95% of our network will have a charging point every 20 miles. Wherever possible, these will be rapid charging points that can charge a ULEV in less than 30 minutes.

As ULEV costs reduce we expect significant numbers of people will decide to buy them and we are working to better understand the significant changes to infrastructure and technology required to support mass market adoption.



Accelerate the uptake of ultra low emission vehicles

We will explore new and innovative approaches to improve air quality

Highways England has historically been at the forefront of air quality research and investigation. We have previously trialled paint that 'eats' oxides of nitrogen (NOx) alongside the network and undertaken leading research on the effects of congestion on air quality.

In 2015 we started trialling an air quality barrier on the M62. This was a 100 metre long barrier initially 4 metres high and raised to 6 metres in early 2016. We then progressed to carry out a trial of a barrier incorporating an innovative material with potential to clean the air. We are using these trials to investigate if barriers can help contribute to improving air quality

for our neighbours. The results from the monitoring of such trials will help us understand if this has been a success with the potential to implement barriers on our network. We are also investigating if we can reduce the costs to construct a canopy, which is a tunnel-like structure designed to prevent vehicle emissions reaching our neighbours, to make this a viable solution.

Our new approach

The *Road Investment Strategy* marks a new and exciting period for improving air quality within Highways England. With the commitment from the government to invest £100 million to improve air quality on our network between 2015 and 2021 we have both an unprecedented level of investment and a great opportunity.

To ensure that we identify the right interventions and deploy them quickly on our network we are undertaking ten pilot studies between 2015 and 2018. These pilot studies will see us getting to the heart of the problem so as to identify appropriate new and innovative solutions to improve air quality on our network.

The location of all the pilot studies was selected to support our schemes where air quality is a concern and to support areas identified by the government as having the greatest challenges. Local authorities will have a lead role in addressing the local air quality challenges in those areas, through development and delivery of local plans to bring about reduced NO₂ levels in the shortest possible time. Through our pilot studies we will work in partnership with local authorities to tackle this problem for our joint benefit; ensuring that our pilots are focused and delivering the maximum benefits for all.

The outcomes from the programme of research will provide us with valuable knowledge in developing our approaches to improve air quality. We designed our portfolio of pilot studies to give a balanced approach to understanding the current conditions as well as identifying and designing potential innovative solutions.

The pilot studies included:

- 1** A feasibility pilot study into the use of incentives to speed up the modernisation of the HGV fleet.
- 2** A programme of geographic pilot studies. Studies on the M1 Tinsley (Sheffield), north-west quadrant of the M60 (Manchester) and A38 Derby were started before the end of 2015 and a fourth study covering parts of the M6 in the West Midlands started in early 2016. These studies will provide us with a much greater understanding of the causes of poor air quality in these areas and how we can tackle it.
- 3** A study to look at opportunities to optimise the flow of vehicles on our network and how best to deliver this with minimal impact.
- 4** A trial of a barrier incorporating a new polymer material with the potential to absorb NO₂.
- 5** A study to test the emissions from vehicles using a paraffinic fuel, which could be an alternative for all diesel engines.
- 6** An electric van demonstrator project seeking to find ways to accelerate the uptake of these cleanest vehicles.
- 7** A study to determine how we can better use information to achieve air quality improvements.

All our pilot studies will inform solutions across the whole network not just in the study location. We will look to implement solutions quickly, especially those supporting the delivery of schemes, though this will be dependent upon value for money and affordability assessment.

Actions to improve air quality

Our strategy to improve air quality to protect the health of the nation now and improve the environment of tomorrow is structured into four key areas set out below. The strategy also makes it clear where we will be working with others to improve air quality and reduce emissions and where we will be taking action ourselves.



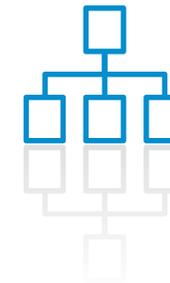
Policy

We will work with others to develop and deliver policies to improve air quality



Monitoring

We will build a clear picture of air quality across our network



Planning

We will, where appropriate, design out or mitigate poor air quality for our schemes



Operational management

We will actively improve air quality by optimising the use of the network



We will work with others to develop and deliver policies to improve air quality

External policy

Historically a large driver for change in air quality has come from international forums – where the UK has played a prominent role. For example, supporting a tightening of vehicle emissions standards and working to implement a test cycle to ensure emission standards are met in the real world for all vehicles on our network. We will continue to work with international bodies to support the government as they work to reduce concentrations of NO₂ around roads.

Our ability to improve air quality depends on policy makers and to succeed we will make our resources and expertise available to:

- 1** Support Defra and DfT as they work to deliver a step change in air quality.
- 2** We will support local authorities as they explore options for their local air quality plans.

- 3** Work with the Office for Low Emission Vehicles (OLEV) to make the UK the leading manufacturing site for more affordable ULEVs and help address any barriers, particularly on our network, to mass market uptake including through joint communication campaigns.
- 4** Develop our evidence of the contribution of diesel vehicles to poor air quality and work with OLEV and DfT to encourage cleaner vehicles.
- 5** Support the Department for Communities and Local Government to actively manage the planning framework to ensure that air quality is properly considered and consistently implemented at all stages by local authorities.



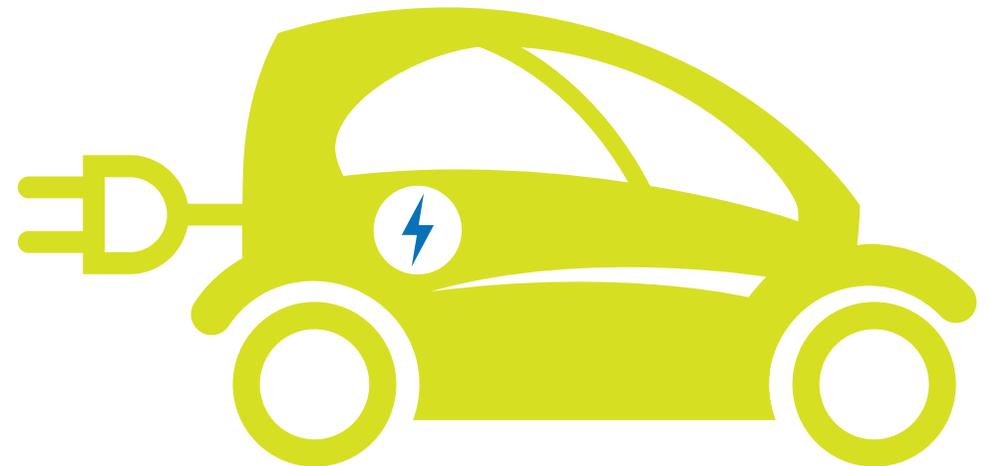
We will work with others to develop and deliver policies to improve air quality

Our policy

We will contribute to improving air quality arising from the use of our network and protect our neighbours from the health consequences of poor air quality.

To do this we will:

- 1** Support schemes by reviewing their impacts in line with legislation and work with others to develop our policies to help improve air quality.
- 2** Assess the feasibility of introducing ULEVs for our Traffic Officer Service.
- 3** Explore opportunities to promote the use of low emission vehicles by our supply chain.
- 4** Investigate the feasibility of an incentive programme for fleet operators to accelerate the uptake of cleaner ultra low emission vans and light goods vehicles especially those using the most polluted parts of our network.





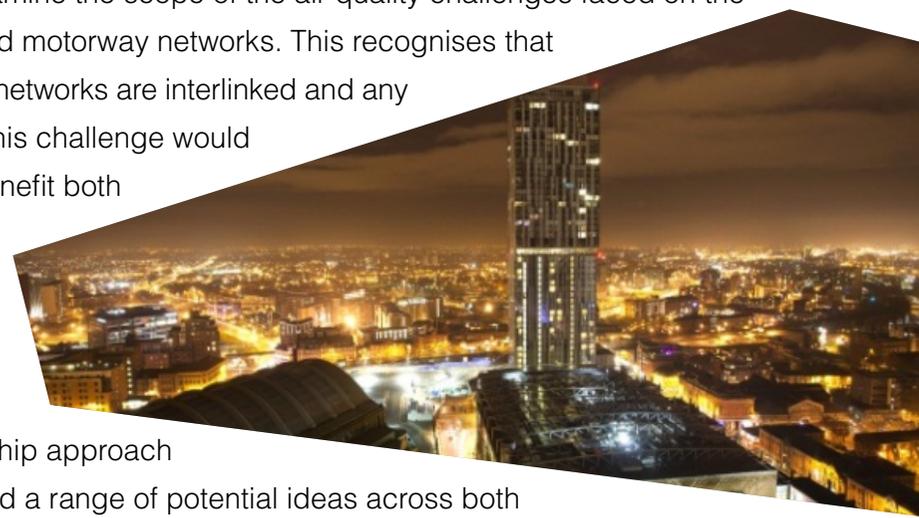
We will, where appropriate, design out or mitigate poor air quality for our schemes

As part of the Road Investment Strategy, we will deliver an unprecedented period of improvements to our network to help underpin economic growth. There will be significant investment with over £15 billion to be invested in our major roads up to 2021. Even though Britain's vehicle fleet is modernising there is always more to do to ensure air quality is addressed. This will continue to be central to our scheme design and planning consideration particularly for future strategic planning, which since April 2015 we have greater responsibility for. To support this we will:

- 1** Phase the delivery of schemes within the overall *Road Investment Strategy* programme to support activities to mitigate poor air quality.
- 2** Ensure our schemes meet the legislative and policy requirements and we will introduce additional mitigation if necessary to achieve this.
- 3** Go beyond business as usual by looking for opportunities to improve air quality across our network.
- 4** Ensure local planning decisions include steps, where required, to mitigate any impact on air quality and do not compromise either our network or local road networks.

Case study – Transport for Greater Manchester

We have been working in partnership with Transport for Greater Manchester (TfGM) to examine the scope of the air quality challenges faced on the local road and motorway networks. This recognises that the two road networks are interlinked and any solutions to this challenge would affect and benefit both networks.



This partnership approach has generated a range of potential ideas across both networks, for example exploring if freight consolidation centres might bring benefits, which we helped TfGM explore.

Future plans

As we begin our planning for the second Road Investment period, which commences 2020, air quality will be a critical factor as we decide which schemes we take forward in the future, how they should be designed and what the sequencing and phasing should be.



We will build a clear picture of air quality across our network

Current approach

To support scheme delivery and inform future risk, NO₂ is currently measured using diffusion tubes. Although this is a proven technique, appropriate for scheme assessment work, this does not give us a real-time picture of the quality of the air.

Further development – existing services

Government investment is enabling us to deliver approximately 50 continuous monitoring stations across our network to give us real time air quality information. The intelligence gathered from these sites will be used to guide the policy around future deployment of monitoring on the network. This will also ensure that as schemes are planned and developed we are able to plan for and take account of air quality at an earlier stage, ensuring that we deploy the most suitable design and mitigation if required.

The first new continuous monitoring stations were installed on the M1 through South Yorkshire and have been operating since summer 2015. Many more stations are now operating across our network and we are working to complete the network by Spring 2018.

Further development – new services

As part of our work to address air quality, we will use the monitoring data to:

- Explore opportunities to share with Defra our real-time monitoring information to enhance their reporting on the UK-Air website – which

is helping everyone to take action to improve air quality and mitigate effects on their health.

- Review and further develop the key traffic and air quality models over the period of the first *Road Investment Strategy*.
- Work in partnership with Defra to tailor our emission forecasts as well as to measure the effectiveness of our air quality interventions.

We are exploring the possibility of using other cutting edge technology, such as satellite monitoring, to support measurement of air quality along our network.



Air quality monitoring alongside the M1



We will actively improve air quality by optimising the use of the network

Current approach

Operational management of our network to improve air quality is a new area of exploration for us. Through our pilot studies we are developing interventions to meet the needs of road users and support the economy, whilst at the same time protecting and improving the environment for our neighbours.

We aspire to optimise the use of the network, whilst at the same time minimising the impact on air quality. We therefore need to explore opportunities which allow more dynamic operation of our network to help achieve this aim.

Areas we are starting to explore

We are investigating new approaches. We will:

- 1** Investigate if air quality can be improved in sensitive areas by providing customers with better information to help them make informed, environmentally conscientious decisions when planning and making their journeys.
- 2** Use the £100 million cycling fund to make our network less of a barrier to cycling. By making cycling safer and easier this will complement local authorities' efforts in this area.

Future plans (horizon scanning)

Our activities are supported by research in the UK and internationally aimed at identifying other interventions to reduce NO₂. We will:

- 1** Explore other methods to dynamically manage traffic, especially when air quality is poor, on our network and local roads to help improve air quality.
- 2** Examine the use of technology to switch low emission vehicles and ultra low emission vehicles to zero emission mode in areas of poor air quality.
- 3** Identify opportunities to work with others, including exploring using an innovation call, to support new and innovative air quality research and technologies.

The decision to implement any of these operational management measures will be informed not only by our understanding of their effectiveness to improve air quality but also by our ability to successfully deploy them.



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