

# Roads – Delivering Choice and Reliability





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Presented to Parliament by the  
Secretary of State for Transport,  
by Command of Her Majesty  
July 2008

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## Foreword

The journeys we make every day – for work, school, visiting family and friends or to the shops – are an important part of our lives. People want to make these journeys safely and reliably, and in a way that is convenient for them. It's not our role to tell people how to travel. But it is our role to help them make informed choices, and, whether that choice is to go by car, bus or bike, to make the road network safe and reliable.

Road congestion can make these journeys less predictable, leaving people frustrated, traffic stuck in stop-start conditions, and businesses less able to meet deadlines – a situation that is not good for the traveller, the economy or the environment. While there is undoubtedly a case for adding some new road capacity, we must also consider innovative options for the future. This means focusing less on new tarmac and more on the capacity and ability of existing networks to handle people and goods – in buses, coaches and cars and, for shorter trips, cycling and walking.

This year sees the 50th anniversary of the first motorway in Britain – the Preston Bypass. Those who designed and built that road would never have envisaged the environmental challenges we face today. But while I acknowledge that transport contributes to the problem of climate change, I also firmly believe it must be part of the solution.

In part that solution lies in improving the environmental performance of the vehicles we drive. We are also taking a close look at innovative ways of improving the performance of the road network itself. For example, using the hard shoulder as an extra lane on the motorway offers the prospect of easing congestion without needing more land, along with a managed, smoother, more predictable traffic flow.

I recognise that right now the cost of running a car is a real concern for people, particularly given the increases in the global price of oil. That is why we are right to focus on reducing our dependence on oil over time – by working with industry to encourage the production of cleaner cars and fuels; by working with



colleagues across Europe to bring in tighter emissions standards; by giving people incentives to buy greener cars; and by our sustained investment in public transport, to provide a quality alternative.

It is only by taking a hard look at the challenges we face, and the options we have open to us, that we can take informed decisions on these issues, give people the reliable road network they want, and a real choice about how they travel. The purpose of this document is to inform debate about what we are and should be doing to deliver roads that work for everyone in the 21st century.

A handwritten signature in black ink, appearing to read 'Ruth Kelly', written in a cursive style.

**Rt. Hon. Ruth Kelly MP**  
Secretary of State for Transport  
July 2008

# Chapter 1

## Introduction



- 1.1 Transport plays a key role in all of our lives. We are all dependent on a well-functioning, well-connected transport system to give us access to employment and education, to receive goods and services or to visit family and friends. Road, rail and air networks need to work together for the continued success of our economy, our quality of life and to reduce our carbon emissions.
- 1.2 *Delivering a Sustainable Railway*, our White Paper published in 2007, set out what we wanted to achieve from our rail network; *The Future of Air Transport*, our 2003 White Paper and subsequent progress report in 2006 set out a strategy for addressing the capacity and environmental issues on aviation; we also set out our thinking on ports last year and will publish a freight strategy later this year. This document focuses on the issues involved in getting the service we need from our roads in England, in line with our ambitions for the economy, our quality of life and the environment, and complementing our specific road safety strategy (published in 2000).
- 1.3 The purpose of this document is both to promote and inform the debate about how we might best deliver the road capacity that will support the trips people and businesses need to make, in the most sustainable, reliable way. It considers what we want from our road network and goes on to discuss the specific initiatives we are pursuing and exploring, first in respect of the local trips we make, on our city and regional roads, and then on getting around the country on our motorways. It highlights some of the choices, and trade-offs, that we are going to need to make.
- 1.4 The remainder of this introductory chapter sets the scene in terms of the significance of the road network for our economy, our environment and our quality of life.

## Competitiveness and productivity

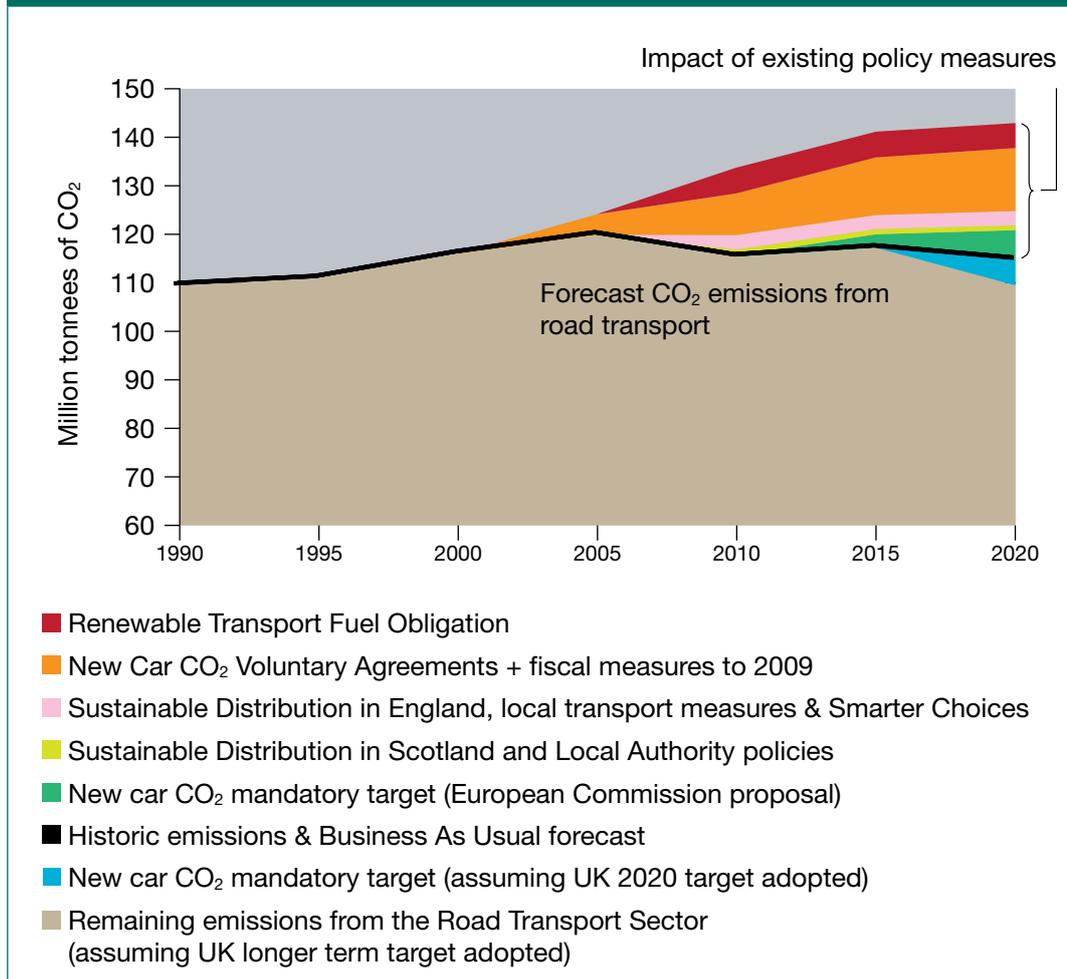
- 1.5 Our economic competitiveness and national productivity are dependent on the ability of our transport networks to accommodate the trips we need to make – as individuals, and for business purposes, including freight movement.
- 1.6 Our road infrastructure accommodates on average over 650 trips per person by car every year, over 4.4 billion passenger trips per year on buses and two-thirds of freight moved. Road traffic in Great Britain has grown by 84 per cent since 1980, from 172 to 318 billion vehicle miles. The majority of the growth has been in car traffic, which has risen by 87 per cent since 1980, from 134 to 250 billion vehicle miles.
- 1.7 Although the rate of growth has not been so high recently, evidence from the last few decades shows a steady growth of 1 to 2 per cent a year in the number of miles we drive. Based on this trend, Sir Rod Eddington, in his *Transport Study* published in December 2006, predicted congestion growth of about 30 per cent in the period to 2025. If left unchecked, the rising cost of this congestion could waste an extra £22 billion worth of time every year in England by 2025 and increase costs to business by over £10 billion a year.

- 1.8 So, although today much of the network runs efficiently for all or most of the day, as the traffic volume rises, so the stress on the network starts to show in congestion – queues, jams and unreliable journey times. In some places there are problems with peaks of demand. Elsewhere the weight of traffic stays high throughout the working day.
- 1.9 We invest substantial sums each year in the maintenance and improvement of our road network, locally and nationally. Not only do we need to be confident that our substantial investment in the road network, through local government and through the Highways Agency, is well targeted on the right locations, but we also need to think about the way we add capacity, through traffic management and giving priority to certain vehicles, as well as building new infrastructure to achieve the best all-round value for money.
- 1.10 A case could be made for building an almost infinite amount of new road capacity. We recognise that, in the longer term, further expansion of the road network will be necessary in some places, as Eddington said. However, there is a limit to how many lanes we want on our motorways not only for the environmental impact it will have, but also for the impact on the driving experience.

## Oil dependence and the environment

- 1.11 Recent rises in the global price of oil have thrown a spotlight on the problem of oil dependence for transport, in terms of the cost of living and the environmental impact of burning fossil fuels. The fact is, the supply of oil is limited and is not something we control. That is why we are right to focus on reducing our dependence on oil over time.
- 1.12 Road transport accounts for 22 per cent of UK domestic carbon dioxide (CO<sub>2</sub>) emissions – 92 per cent of the transport sector's domestic CO<sub>2</sub> emissions – at a time when the Government's commitment to tackle climate change is becoming ever more significant.
- 1.13 The UK Climate Change Bill and the EU Climate and Energy Package will both set ambitious and legally binding targets for greenhouse gas emission reductions across the economy. In moving towards a low-carbon transport system, substantial progress towards reducing emissions from road transport will be vital.
- 1.14 We are already pursuing policies expected to deliver substantial CO<sub>2</sub> savings on forecast emissions from road transport by 2020, broadly stabilising at current levels until 2015, with a gradual reduction thereafter, as shown in Figure 1.

**Figure 1: Historic and forecast emissions from the road transport sector, Great Britain**



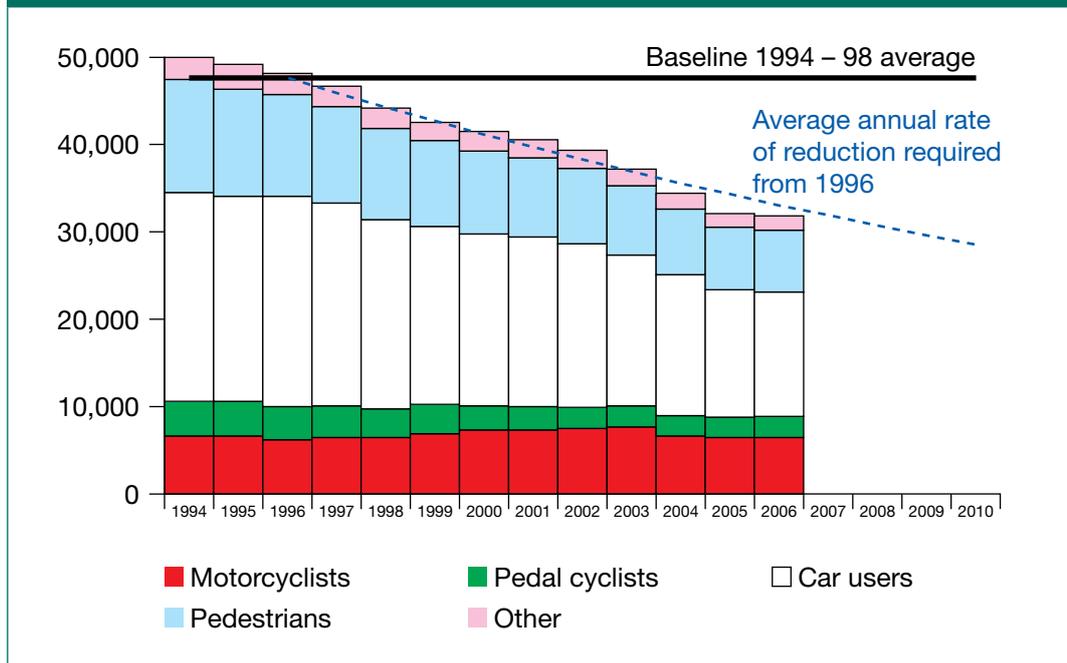
- 1.15 We are actively pushing for the establishment of a mandatory EU target of 100 g CO<sub>2</sub> per kilometre by 2020 as the average for all new cars sold, in addition to the 130 g/km target being proposed by the European Commission for 2012. This longer-term target has the potential for being the biggest single contributor to reducing road transport CO<sub>2</sub> emissions. The UK launched a consultation on 10 July, setting out its position on different aspects of the regulation and its rationale for seeking this longer term target.
- 1.16 Developing tighter Euro standards for new vehicles and fuels is also a major lever for improving national air quality. For example, emissions of air quality pollutants from road transport have fallen by 50 per cent since 1990, despite traffic increasing by a fifth and the number of licensed vehicles increasing by 71 per cent between 1980 and 2005 (from 19.2 to 32.9 million). We seek to build further on this. The EU Commission’s proposal for the latest set of Euro standards (Euro VI standards for heavy goods vehicles and buses for implementation in 2013–14) proposes an 80 per cent reduction in NO<sub>x</sub> limits and a 67 per cent reduction in PM limits compared to Euro V limits.

- 1.17 The Government is also actively supporting the development of lower-carbon vehicle technologies. Through the Low Carbon Vehicles Innovation Platform we plan to invest more than £90 million in a wide range of new technologies for delivering substantial reductions in carbon emissions from vehicles. We are developing a new programme of public procurement of low-carbon vehicles, with an initial investment of £20 million, and are also exploring the potential for plug-in hybrid and all-electric vehicles to contribute significantly to our carbon reduction and renewable energy targets over the coming decades.
- 1.18 We are mindful that an increase in traffic overall could still lead to an increase in the aggregate level of road transport emissions. Beyond the development of vehicle technology, there is an important relationship between emissions and better managing capacity and traffic flow. The worst option of all – stop-start traffic and gridlock on our roads – is bad for the economy, for the environment and for our quality of life.
- 1.19 The way we plan and deliver transport capacity also has an environmental impact: in the materials we use and the energy we consume; in the land use implications that road infrastructure has on the landscape; and in the way that opening access to new housing and business development influences the choices we make about where we live and work. While assessing the transport implications of new developments is key, we also need to make sure those lifestyle choices, and their consequences, are clear and well informed.

## Health, safety and quality of life

- 1.20 The private car has done much to improve our quality of life. Over the last fifty years, greater access to a car has transformed the way we live, giving many more of us access to a greater range of amenities and employment opportunities. Increasingly, we need to think about how to preserve the benefits of that accessibility and continue to improve our safety record as levels of car ownership continue to grow. We also need to balance the needs of car drivers with the rights of cyclists and pedestrians to a safe and clean environment.
- 1.21 Our record on road safety is one of the best in the world. It is a product of good road design, improved vehicle design and responsible driving – compliance by road users with traffic rules and regulations. The number of deaths on our roads fell to 2,943 in 2007, the lowest since records began in 1926.
- 1.22 We are on course to meet our 2010 road safety targets across Great Britain, which will see significant reductions in the number of deaths and serious injuries on our roads, particularly among children – despite rising traffic. The number of people killed or seriously injured in 2007 was under 31,000. This represents a 36 per cent reduction from the 1994–98 baseline, against the target of 40 per cent by 2010, as shown in Figure 2. And for children there has been a 55 per cent reduction from the 1994–98 baseline, against the target of 50 per cent by 2010.

Figure 2: KSI casualties resulting from PI road accidents, by road user type



1.23 There is more to do. On average, around eight people still die every day on our roads. We have started the process of preparing a new road safety strategy, looking ahead to the targets we should aim for beyond 2010. And in the Driving Standards Agency consultation paper *Learning to Drive* we recently launched new proposals on driver training and testing, to better equip novice drivers, moving away from a focus on a single driving test towards a culture of continuous learning.

## Conclusions

1.24 Our need to travel changes as we seek more flexible working hours, as we come to expect our supermarkets to be open 24 hours a day, and as our GP surgeries hours reflect our busy working days. We expect our transport system to give us ready access to these services as and when we want them.

1.25 To assess our priorities and to work out what can be done in the longer term, we have been working with local and regional authorities, business and freight representatives and transport users to understand what can be achieved from the transport network beyond 2014. *Towards a Sustainable Transport System*, which we published in October 2007, set out how this cross-modal long-term planning process will work.

1.26 Earlier this month we reported on progress, reflecting discussions held with over 250 organisations and over 600 members of the public online. It is right that we plan for the future, but it is also right that we tackle the problems we experience now. This document therefore describes what we are doing, and what options we have, to manage our roads today.

1.27 Given the limits to adding new road capacity, we need to engage people in debating the choices that have to be made, for example in promoting car sharing, public transport, walking and cycling and other practical ways of getting the most out of our road capacity. The next chapter considers what we already know about our demands and expectations of the road network.

# Chapter 2

## What we want from our road network



## Introduction

- 2.1 A road network that operates efficiently is important for the economy and productivity. It also facilitates social inclusion, providing the basis for access to employment, education and services, and allowing us to visit friends and family.
- 2.2 We know a good deal about how road users feel about the road network and network performance, from our own and other research, and from our recently established Citizens' Panel. (In February 2008 DfT commissioned consultants GfK NOP to set up an online Citizens' Panel in order to better understand public attitudes and perceptions of transport and transport policy, initially to support the DfT strategy set out in *Towards a Sustainable Transport System*.) We also know about the factors that influence the nature and pattern of trips that we make.
- 2.3 This chapter analyses the implications of what we know for our approach to managing the network.

## Context

- 2.4 The last thirty years have seen fundamental changes in the way that we choose to live our lives, and continuing change in our lifestyles will change the nature of the demand for travel.
- 2.5 Today there are more than 33 million vehicles registered in the UK, of which 28 million are cars, and nearly a third of households now have access to two or more cars – more than the proportion of households without access to a car. By 2025 we predict that there will be over 35 million cars on our roads.
- 2.6 Road transport accounts for nearly three-quarters of all trips. The car dominates travel for all distances above one mile; 68 per cent of commuting trips are made by car.

## Public opinion

- 2.7 In a survey published in May 2008, 87 per cent of respondents said they felt congestion was a serious or very serious problem for the country. Around three-quarters (77 per cent) of adults believed it to be very or quite important for the Government to tackle congestion in relation to its other responsibilities. The extent of the congestion problem is not viewed in the same way across society, with different social groups and people in different areas perceiving it to be more of an important issue than other groups and areas.
- 2.8 Among a range of concerns, two stand out: congestion makes journey times unpredictable, and it wastes time – not just the time we waste sitting in queues, but also in the extra time we have to allow to be sure of making our appointments. This is a particular concern for business and logistics.
- 2.9 Experiences of congestion appear to have worsened gradually over time, and as a result people have adapted to cope with the changes. People

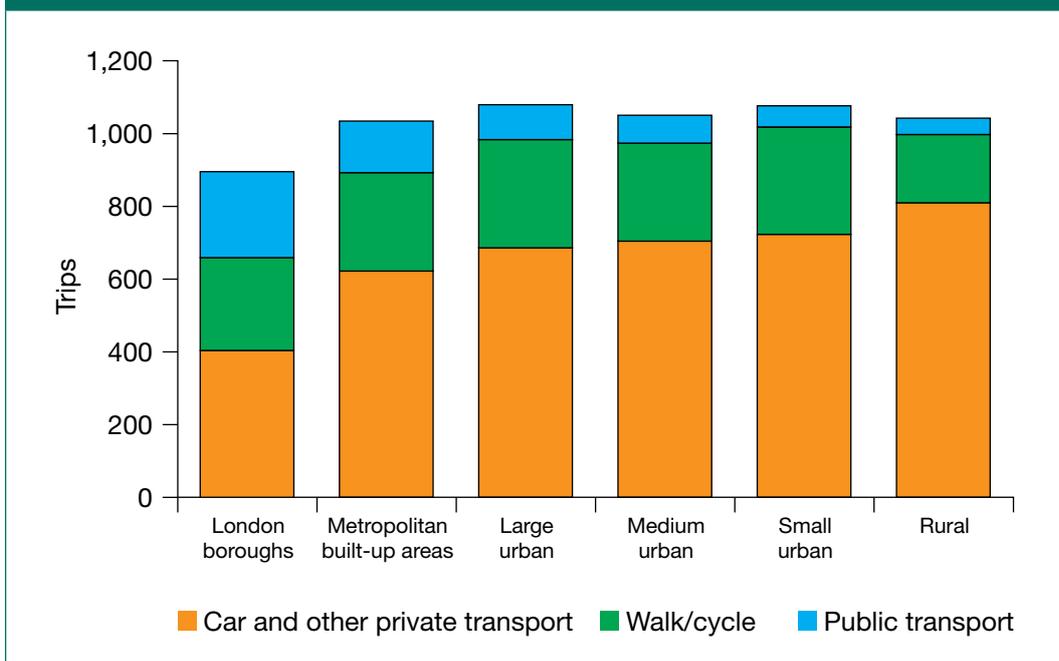
using motorways for their journeys are leaving earlier to make the same journey because of ‘unpredictable’ congestion. Many have said they feel congestion is getting worse on their usual routes and they are giving up more of their free time to make their journeys.

- 2.10 Our research shows that the public is aware of the complexity of the problem; indeed, some people remain to be convinced that the problem can be solved. Many recognise that there is no ‘magic bullet’ solution – a combination of measures is required. Public acceptance of different policy measures for reducing congestion varies considerably – for example, opinion is divided on how far increasing capacity should be part of the solution.
- 2.11 Research shows that around 80 per cent of the population are concerned about climate change, but it also shows a deep-seated reluctance to countenance significant changes in behaviour. Specifically on car use, some believe all their car journeys are necessary, there being no viable alternatives for them.

### Trips and travel patterns

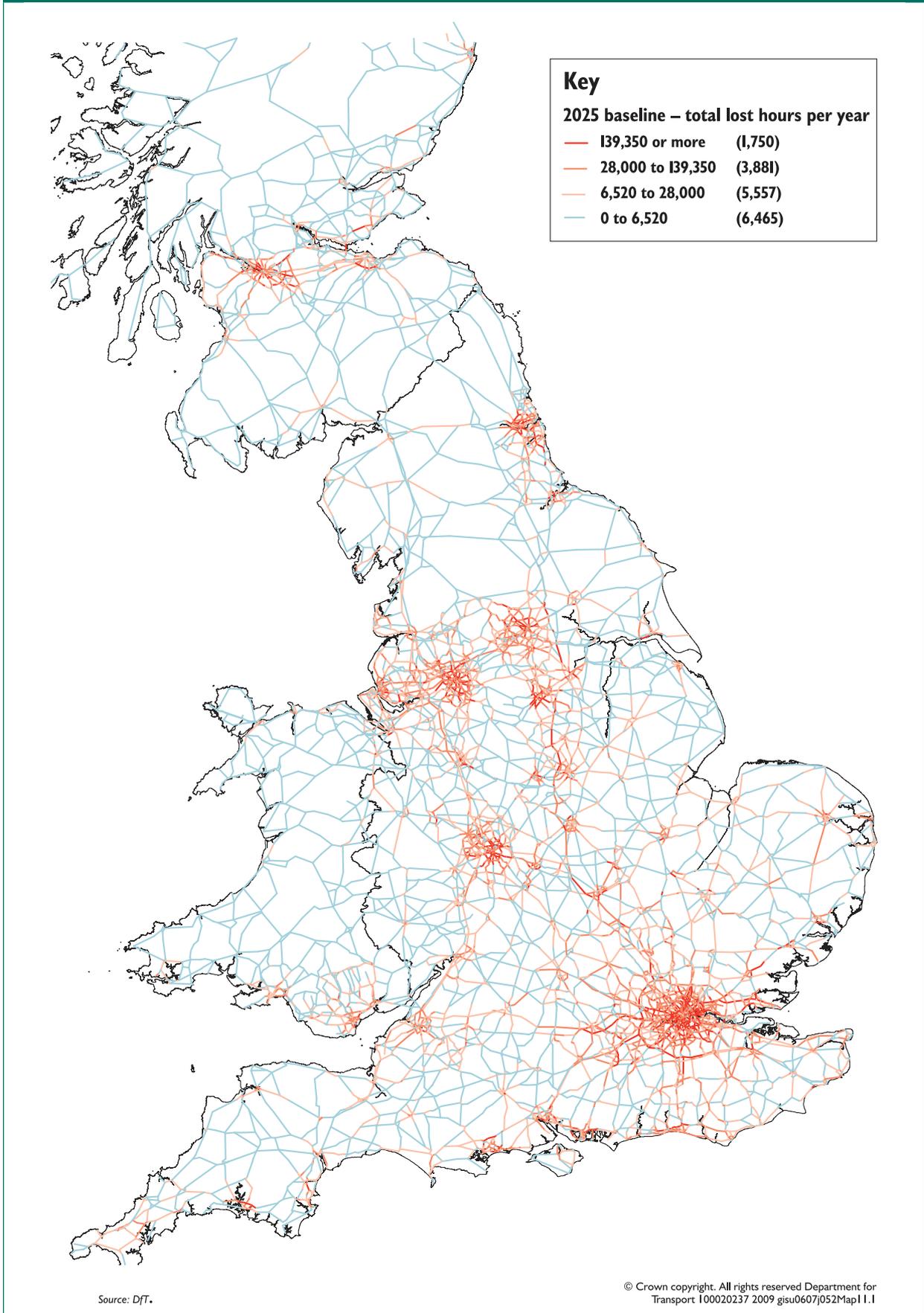
- 2.12 In 2006, car travel accounted for four-fifths of the total distance travelled. Although there is little difference in the number of trips they make, people living in rural areas travel nearly twice as far each year as those who live in London. The average number of trips made per person on public transport generally increases with the size of the urban area where they live, and is highest of all in London, although even here the car dominates (see Figure 3).

**Figure 3: Trips per person per year by main mode and area type, Great Britain, 2005**



- 2.13 Increased affluence, more affordable motoring, changes in the structure of the UK economy, the pattern of land use and changes in the working population have all had a significant influence on the pattern of commuting trips. We have a target of increasing the supply of new housing to create 3 million new homes by 2020 (240,000 net additions to the stock each year by 2016). Thinking through the location of housing and the demands that will place on the transport system will be important to the delivery of this target and a key consideration in the way we prioritise transport investment.
- 2.14 The age structure of the UK population is changing – the population profile has become older in the last three decades and is expected to become older still in the next three decades. Today’s older people are more affluent and are more likely to drive for many years after retirement. Three-quarters of men aged 70 and over still hold licences, and nearly a third of women. For women in particular, this proportion will continue to increase rapidly as women currently in their 50s and 60s carry on driving into their 70s.
- 2.15 As a nation we are buying more goods than ever before. Between 1998 and 2006, all retail sales have grown 40 per cent, and mail-order retail sales have grown 50 per cent. Internet retail sales for 2006 were estimated to be £10.9 billion, accounting for approximately 4 per cent of all retail. The strong growth in the retail sector has been a significant factor in the increase in van traffic.
- 2.16 Domestic freight movement increased by 44 per cent between 1980 and 2006, from 109 to 157 billion tonne miles. Light van traffic has also increased by 39 per cent from 1996 to 2006, and light vans have accounted for an estimated 28 per cent of all new traffic since 1996.
- 2.17 Such trends are set to continue. As we said in Chapter 1, although the rate of growth has not been so high recently as it was in the 1980s, there is still a steady growth of 1 to 2 per cent a year in the number of miles we drive, and recent forecasts predict traffic and congestion growth of about 30 per cent in the period to 2025.
- 2.18 Figure 4 shows the predicted congestion patterns on Britain’s road network by 2025, as published in *The Eddington Transport Study*. The increases in congestion are concentrated in urban areas, and also appear on key inter-urban corridors and the areas around the UK’s key international gateways.

Figure 4: 2025 predicted congestion patterns on Great Britain's road network



- 2.19** Increasingly, people speaking as residents are pressing for lower speed limits on the roads in their neighbourhoods. Survey evidence demonstrates that the public is largely supportive of lowering speed limits in residential areas, with four-fifths of people (79 per cent) agreeing that it is important to reduce speed limits on these roads to 20 mph. We encourage local authorities to adopt 20 mph zones in residential areas where appropriate.
- 2.20** We have a particular challenge on some of our key distributor roads – the roads that run past houses and shop fronts carrying a mix of shorter and longer distance traffic, where there are also many pedestrians and other vulnerable road users. Good design can help these roads work better, by recognising the needs of different types of users.

## Delivering for road users

- 2.21** With the growing pressures outlined above, we clearly need to explore how to get the best possible performance out of our roads, while balancing the competing rights of non-car users to enjoy a safe and clean environment, and at the same time deliver a good service for road users, particularly in terms of journey reliability.
- 2.22** Over the past couple of years, the debate has been running about the case for implementing a widespread road pricing scheme. Sir Rod Eddington highlighted the potential a well-designed system might have for tackling congestion, whilst acknowledging the very significant risks and uncertainties involved in delivering such a system, particularly around the technology needed for its delivery.
- 2.23** Work is ongoing across the world to explore the new technologies and systems that could make such a scheme practicable in the future. In time, this should help identify answers to the very real concerns people have about what widespread road pricing might mean for them, for example on the sort of equipment that might be involved and the way their personal privacy could be safeguarded.
- 2.24** In the meantime, while we are still a long way away from having these answers, our priority, over the next decade, must be on the things we can be doing to relieve pressure on the most overcrowded routes, to give road users greater choice over the journeys they take, and to recognise the premium they put on the reliability and predictability of journey times.
- 2.25** With more than 80 per cent of all delay caused by congestion occurring in cities, and traffic levels growing fastest on motorways, it is clear these are our two most urgent priorities. So, the following chapters discuss, in turn, the initiatives we are pursuing for our cities and for our motorway network.

- 2.26 Chapter 3 sets out what we are doing to support local authorities with the powers and the investment to get the job done. Powers in the Traffic Management Act 2004 and the Local Transport Bill (subject to completion of the remaining Parliamentary stages) give authorities more levers to manage parking and streetworks, put in bus priority measures and promote better performing bus services. We make substantial investments through local transport plans, major schemes prioritised at the regional level, and the provision of funding through the Transport Innovation Fund.
- 2.27 The remaining chapters look at how we might expand choice and cut congestion on our motorways. Through sustained investment, including private finance, we are exploring smarter ways to add and manage motorway capacity.
- 2.28 Building on the results from the hard shoulder running pilot on the M42, we are looking ahead to the prospect of a more managed motorway – offering smoother flow and more predictable journeys at a fraction of the cost of motorway widening. Where new lanes come on stream, we should think about how we can best use them. Drawing from the international experience of car-share lanes in the US, one option might be the development of lanes reserved for vehicles carrying passengers or for drivers willing to pay a toll. This would give drivers a choice, without forcing anyone to pay a toll for existing capacity.



# Chapter 3

## Local and urban roads



## Introduction

- 3.1 Ninety-nine per cent of the roads in England are the responsibility of local authorities. These local networks support our daily lives in urban and rural areas – allowing people to get to work, access services, visit friends and allow goods to be transported in sufficient time to wherever they are needed.
- 3.2 In built-up areas the cost of providing new transport infrastructure can be extremely high and the practical scope for doing so extremely limited. However, there can be scope for re-prioritising the road space to help deliver a reliable pattern of public transport, particularly local bus services, and encourage cycling or walking for short trips. And travel planning by business can also help, for example by providing secure cycle parking or arranging carpooling for staff.
- 3.3 Local authorities have the scope to create innovative packages that bring together initiatives to manage demand, manage traffic flow, and invest to give people real choices on how they travel. They also need to consider how they can create a safer road environment for everyone in the local community. This chapter sets out how we are helping to foster and support this approach.

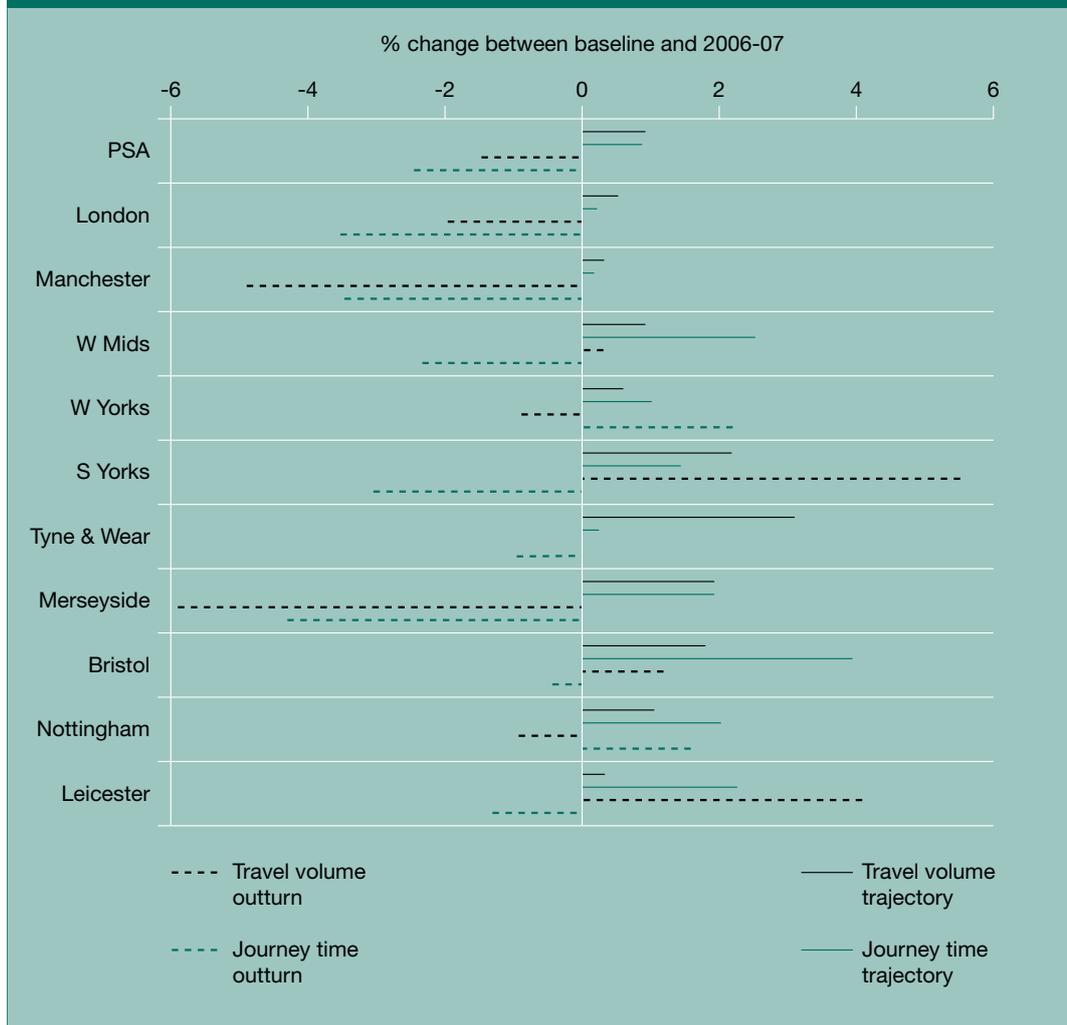
## The challenges

- 3.4 While authorities rightly have to balance different aims and objectives when managing the roads, road congestion poses a particular and urgent challenge. Congestion can constrain roads' development and economic growth and pose environmental problems. Congestion in towns and cities is viewed by the public as more of a problem than congestion on other types of roads.
- 3.5 Making the most of the existing network is key, given the constraint of working in a built-up area. Good planning and efficient operation are particularly important as economies grow and we develop plans for a real increase in housing supply to accommodate future generations.
- 3.6 Local authorities have a key influence on the environmental performance of their roads. They need to check air quality in their areas against national objectives, declare Air Quality Management Areas where these are or are likely to be exceeded and take measures to improve them. And on CO<sub>2</sub>, whilst some initiatives will be most cost-effective at a national or international level (e.g. setting standards for vehicles), there is scope for local action to play a part (e.g. by supporting the implementation of sustainable travel measures).

## Measuring the performance of the road network

- 3.7 To develop effective strategies that will deliver good accessibility, local authorities need good data and sound analysis of the pressures they are facing. Working with local authorities, we have developed improved data sources that provide journey times for a representative set of the main distributor roads in the ten largest urban areas in England. These provide a basis for thinking through the way these key routes need to function and for measuring the impact of initiatives, such as re-phasing traffic signals, on traffic flow.
- 3.8 We have encouraged local authorities to use these data as the basis for setting performance targets, looking out to 2010–11 for their routes that take local circumstances and priorities into account, backed up by introducing a Congestion Performance Fund of up to £60 million over four years, to reward authorities who are on track to deliver and beat their targets with funding that will help them develop and deliver their strategies. Up to £7 million is available in the first tranche of performance funding, based on 2006–07 performance data.
- 3.9 We have aggregated these ten local targets together to form a national target, recognising our joint interest in making our city transport networks run efficiently. The focus of these targets is on ‘person’ journey times (which account for vehicle occupancy), not just vehicle times – recognising that vehicle speed is not necessarily the right measure for routes catering for a mix of private and public transport users. And the targets take into account anticipated traffic levels associated with local economic growth.
- 3.10 The judgement that authorities are making in setting their targets is about placing the right emphasis on accommodating more people more comfortably on distributor routes, whilst minimising the resulting decrease in traffic speed, e.g. where bus priority measures can deliver a more reliable service for more people at the cost of reducing car traffic speed.
- 3.11 The first performance data against these new targets were published in May, showing an improvement in 2006–07 compared with the baseline which used a mixture of 2004–05 and 2005–06 data. Person journey times on the representative targeted routes fell by around 2.4 per cent in 2006–07 compared with the baseline, which is encouraging, although it is too early to be confident of a trend from this short run of data. Figure 5 shows performance against the trajectory that would be needed to hit the 2010–11 targets. Nine of the local areas are currently on track to meet their local targets.

**Figure 5: Urban congestion targets, percentage change between baseline and 2006–07**



3.12 This target is one of the four indicators that measure the Department for Transport’s progress in achieving our new Public Service Agreement to ‘Deliver reliable and efficient transport networks that support economic growth’. Another tracks our success in tackling reliability on the strategic road network (described in Chapter 4).

### Effective strategies

3.13 At a strategic level, local authorities and regional bodies are making good progress in ensuring that transport planning and spatial planning work together to achieve their objectives. They include measures such as investment in public transport, priority for buses and cyclists, implementing effective freight strategies and finding the right solutions to local parking problems.

3.14 Our support for capital investment to help deliver these strategies has more than doubled since 2000 for local authorities outside London and now totals some £1.5 billion each year. Of this, more than 25 per cent is allocated to the six major conurbations with Passenger Transport Authorities. This capital support is in addition to the very substantial revenue support we provide for local transport.

- 3.15 Many authorities have prepared excellent Local Transport Plans, providing an integrated view of their needs and how they will meet them. Local and Multi Area Agreements that set out the priorities for the local area provide a further opportunity to ensure that roads are playing their full part in supporting local and sub-regional priorities. We have included a congestion indicator (average journey time per mile during the morning peak) in the national framework for assessment of local authorities' performance, and it is open to authorities to report on this where congestion is a recognised local issue.
- 3.16 The congestion measure will be reported by local authorities across most of England, and approximately 40 of the local area agreements include improvement targets for congestion. Also, more than two-thirds of authorities have chosen as one of their priorities the national indicator of CO<sub>2</sub> emissions per capita, which includes emissions from road transport.
- 3.17 Initiatives such as the Government's housing growth agenda need to be delivered in a way that will minimise any unnecessary impacts on the transport network. Through developments such as eco-towns the Government is driving a radical rethink of the way towns are planned. Eco-towns must be designed to increase the proportion of journeys on foot, by cycle and by public transport, whether to work, school, shops or leisure facilities, and so promote a change in attitudes about the ways in which we chose to travel. Fifteen potential locations were put forward for consultation early in April this year. Following consultation and assessment, an announcement will be made later this year identifying up to ten successful locations with the aim of seeing the first schemes begin construction in 2010.

## Managing the network

- 3.18 Regular users of urban roads will already know that small problems can cause widespread congestion – poor junction layouts, inconsiderate parking, poorly managed streetworks. The Traffic Management Act 2004 was designed to encourage local authorities to tackle these sorts of issues, establishing a new Network Management Duty, and to help them by providing enhanced powers.
- 3.19 The Act has ensured that, from 1 April this year, local authorities have been receiving longer notice of planned works from utility companies, enabling them to improve co-ordination where multiple works are proposed in the same area. Local highway authorities may also apply to operate a permit scheme, meaning that anyone wanting to dig up a road will have to apply for a permit that will set out specific durations for the work and conditions on how and when it is carried out. Consultations have been carried out for a scheme in Kent and a London scheme to include fifteen boroughs and Transport for London.

### Keeping traffic flowing – Network Management Duty

- All local traffic authorities are under a Network Management Duty to manage the road network to keep traffic flowing efficiently, taking account of their other obligations, policies and objectives.
- The Traffic Management Act requires that a person be appointed to perform the tasks that an authority considers necessary for meeting the Duty. This is a statutory post, and all local traffic authorities must have such an appointed person, who is known as the Traffic Manager.
- In practice, the Duty means that local authorities should be putting arrangements in place to gather accurate information about planned works or events, considering how to organise them to minimise their impact and agreeing (or stipulating) their timing to best effect. They should also be establishing contingency plans for dealing with unplanned incidents so they can act quickly to minimise disruptions.

3.20 The Department for Transport works with local government in a number of ways to promote and share good practice. For example, we encourage better planning of highway maintenance works by promoting the development of asset management plans, to ensure that maintenance is carried out at the right time and in the most efficient way. And we encourage authorities to take a strategic view of parking provision – on and off street, long and short term – in particular informing motorists about what is available.

3.21 We have led the development and promotion of new technologies. Our development of the computerised urban traffic management and control system was a key step towards improving traffic management techniques. This allows authorities to link up different systems, such as those controlling traffic lights, monitoring air quality, managing car parks, so that they communicate with each other and can be reset to cope with different traffic pressures through the day.

3.22 We publish good practice guidance on a wide variety of traffic management measures, techniques and design issues. These range from the application of effective signs and signals, through designating lanes for buses, cycles and high occupancy vehicles, onto the issue of streetscape and how to avoid creating cluttered unattractive environments.

3.23 Last year we also published an updated *Manual for Streets*. The Manual promotes a new approach to the design of residential and other lightly trafficked streets; and shows how safety and quality of life can be enhanced through good design. It introduces the concept of a user hierarchy to ensure that all road user groups, including pedestrians, are considered properly in the design process.

### Fair and effective enforcement

Enforcement of on-street parking and bus lane rules can now be carried out by local authorities. This has helped free police resources for action against the most serious criminal offences.

Over the next two years, a single framework for civil enforcement of traffic contraventions will be established under the Traffic Management Act 2004, and authorities outside London will also gain powers, similar to those of authorities in London, to deal with some moving traffic offences, such as ignoring box junctions.

It is important that parking and traffic enforcement activity is proportionate and targeted on getting the right traffic outcomes. We have therefore set the framework within which local authorities can operate, which includes:

- ensuring authorities spend revenues on the costs of enforcement and to benefit road users through improvements to transport and the local environment;
- setting different penalty rates for more serious contraventions, so that authorities can focus on the behaviours that cause most disruption to traffic;
- discouraging the use of wheel clamps other than to deal with the most serious and persistent rule-breakers;
- establishing a fair and independent appeals system, with independent adjudicators deciding on appeals.

We will keep this framework, and its application by authorities, under review. In practice, relatively few authorities make a significant overall surplus from parking operations



- 3.24 Local authorities can control when deliveries of goods and services can be made to shops and businesses. It is essential that adequate access is given to these services at appropriate times. We work closely with the freight industry and local authorities to ensure that the regulatory framework reflects changing customer and commercial needs whilst limiting the potential nuisance to the local community of anti-social noise impacts.

#### **‘Silent Approach’ scheme – Wandsworth**

The Silent Approach scheme brings a unique collaboration between a local authority, residents (represented by the Noise Abatement Society) and a supermarket.

The scheme involves noise minimisation improvements to plant, machinery and equipment, as well as supervision of staff delivering and unloading. A three-month trial in Wandsworth demonstrated that night-time deliveries can be achieved without adversely affecting neighbouring residents, with reduced congestion and pollution and with financial benefits to the company. For example, the trial reduced lorry journey times by 60 minutes for a round trip.

### **Travel choices**

- 3.25 As a society we have gained huge benefit from the way that use of cars has opened up access to employment, services and leisure opportunities. For some journeys the car is the only realistic option. But we know that more people could walk, cycle or use public transport for some journeys – nearly half of people surveyed say they could walk for many of the short journeys that they currently make by car. That is why we are providing support to local authorities, schools and businesses as they invest in smarter choices, such as other modes of transport, and ways to reduce the need to travel, such as teleworking, to offer people a real choice.
- 3.26 Two-thirds of all public transport journeys are made by bus. Buses can offer a secure, reliable and affordable alternative to the car. We published *Putting Passengers First* in December 2006, looking at providing a modernised national framework for the bus network. This set out a package of measures to address the challenges faced by local authorities and the bus sector. No single approach will work everywhere, and the intention was to provide a variety of options so that local authorities can choose which solution will best help them facilitate the most appropriate bus service for their local circumstances.

**3.27** The Local Transport Bill, introduced into Parliament in November 2007, will provide the necessary legislative framework to allow more effective partnership working between local authorities and bus operators. The Bill ensures that ‘quality contract’ schemes – effectively the introduction of a franchised market – are a realistic option in areas where greater control from the local authority is in the public interest. Punctuality is crucial in delivering an attractive service, and the Bill therefore provides a new regime to ensure that local authorities as well as bus operators are held to account for their contribution to punctuality performance.

**3.28** The Bill also enables authorities to consider whether improved governance arrangements might provide a better framework to ensure that the delivery of bus services and road improvements are properly integrated. This can be an issue particularly where, as in the former metropolitan areas, different authorities are responsible for providing different services.

**3.29** We are also funding the new national off-peak concessionary bus travel arrangements for older and disabled people. From April 2008 the entitlement for free bus travel was extended to allow free off-peak travel on local services throughout England.

**3.30** Walking and cycling have significant roles to play in delivering a more sustainable transport system. Nearly a quarter of all car driver trips are less than 2 miles and 56 per cent are less than 5 miles. For some of these journeys, walking and cycling can be a real alternative. Not only does this help reduce congestion and pollution, but it can also improve our health and wellbeing and reduce obesity.

**3.31** In January this year we announced a substantial increase in our investment in cycling. Cycling England’s budget will see a six-fold increase to £140 million over three years, of which £110m is new money. That’s £20 million in 2008–09 and £60 million for both 2009–10 and 2010–11 to provide inspirational projects to get more people cycling, more safely, more often.

### Sustainable travel towns

Our sustainable travel towns project aims to demonstrate the effect a sustained package of ‘Smarter Choice’ measures can have when coupled with infrastructure improvements.

Darlington, Peterborough and Worcester were selected from more than 50 local authorities in England who expressed an interest in becoming ‘showcase’ demonstration towns in 2004. They are sharing £10 million of revenue funding over five years until April 2009.

The towns demonstrate that, where there is local commitment, results can be impressive. The towns’ interim results show that, on average across Sustainable Travel Towns (180,000 target population), car trips have been reduced by 10 per cent, walking has increased by 20 per cent, bus use by 15 per cent, and cycling by 30 per cent.

We will use the experience from these towns to inform best practice on the implementation of sustainable travel in other areas.

- 3.32 Of this new funding, approximately £47 million will provide eleven more cycling demonstration towns and the first city, Bristol, to add to the existing six demonstration areas. This provides levels of spend only seen in the best European cycling cities to around 3 million people and will allow the participating local authorities an opportunity to provide innovative programmes through best-practice provision and promotion.

### The journey to school

Over the last eighteen months we have:

- supported 3,200 state-funded primary schools in England – more than one in six – with grants to help them set up and sustain ‘walking buses’ or other school-based walking initiatives;
- launched Bikeability, the new national standard for cycle training in England, and made a commitment to give 500,000 children access to the new training by 2012; and
- supported specific projects, such as the MyBus school bus scheme in West Yorkshire, for which we provided £18.7 million of funding over three years through the Local Transport Plan settlement to fund the capital cost of 150 dedicated school buses.

## Managing demand – innovative packages

- 3.33 It is estimated that 89 per cent of current delay caused by congestion is in our urban areas. We have already made clear that, as part of a broader strategy, a well-designed local road charging scheme, alongside complementary improvements in local public transport, has the potential to reduce congestion, deliver better accessibility in a local area and, depending on scheme design, reduce emissions of air pollutants and greenhouse gases.
- 3.34 London has led the way in developing an area-wide congestion scheme that has seen measurable benefits. Transport for London’s figures indicate that, since introduction, the congestion charge has reduced traffic entering the charging zone by around 20 per cent. The benefits of this were initially seen in much reduced delays for private vehicles, but, over time, some of the benefits of lower traffic levels have been used to improve accessibility through such steps as more priority measures for pedestrians and cyclists and improvements to public spaces.

### London's congestion charge

Congestion charging was introduced into central London in February 2003. In February 2007, the original central London congestion charging zone was extended westwards, creating a single enlarged congestion charging zone.

The congestion charge was part of a package of measures to reduce congestion, make radical improvements to bus services, improve journey time reliability for car users and make the distribution of goods and services more efficient.

In 2006 traffic entering the charging zone was 21 per cent (some 70,000 cars every day) lower than in 2002. This has created opportunities over this period for reuse of a proportion of the road space made available, for example bus priority and cycle lanes.

Alongside this there has been substantial investment in public transport. The scheme itself generated net revenues of £123 million in 2006–07 (provisional figures) which has to be spent on transport improvements.

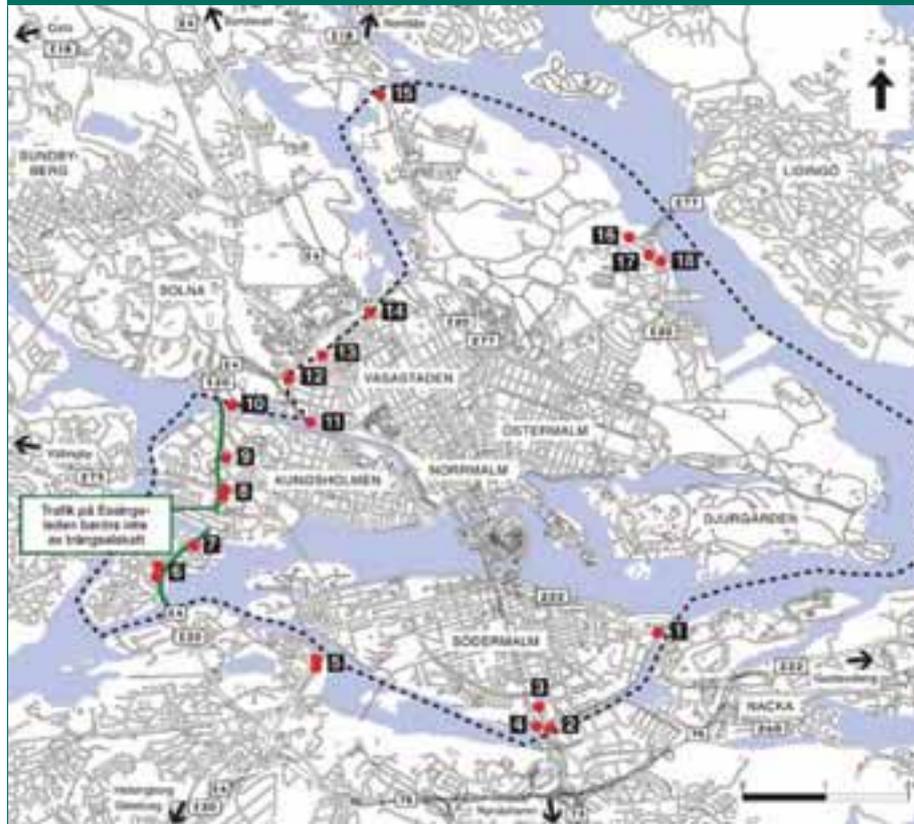
This package of measures has resulted in an increase in public transport usage. In particular, bus passenger numbers entering central London increased by 18 per cent and 12 per cent respectively during the first and second years after charging and has remained stable since then.

The introduction of the scheme also resulted in a 16 per cent reduction in CO<sub>2</sub> emissions between 2002 and 2003 and caused a reduction in air quality pollutants particulate matter (PM) and oxides of nitrogen (NO<sub>x</sub>) by 6 per cent and 8 per cent respectively.

The London Low Emission Zone (LLEZ) went live on 4 February 2008. Vehicles (excluding cars, motorcycles and small vans) that do not meet the LLEZ emissions standards must pay a daily charge of £100 or £200, depending on the vehicle classification.



Figure 6: Map of Stockholm road congestion scheme



Other cities around the world have also introduced forms of charging for road use, for example, in Stockholm, Sweden. A differing charge is levied on drivers entering or leaving the city of Stockholm, as shown in Figure 6, between the hours of 6.30am and 6.29pm, which varies according to the time of day. The scheme has proved successful in reducing congestion levels in the city. After the first month of operation, traffic at cordon points had reduced by 25 per cent.

- 3.35 We believe that congestion charging could have a substantial part to play in other places. We are working with local authorities as they consider how congestion charging could effectively manage demand on their roads, as part of a wider package of measures, including significant investment in public transport, to promote accessibility and manage the road network.
- 3.36 Through the Local Transport Bill we are seeking to make changes to the existing legislative framework for road user charging to provide greater freedom and flexibilities to those local authorities wishing to develop local congestion charging schemes while ensuring consistency and interoperability for the road user.

- 3.37 The Transport Innovation Fund is available to support those authorities looking to implement ground-breaking packages of measures to tackle local congestion problems through demand management, including charging, with investment in public transport alternatives.
- 3.38 We announced, in 2005, that we were making available up to £200 million a year between 2008–09 and 2014–15 to support investment in such packages of measures, and that if high quality schemes of a higher value emerge then further funding could be made available.
- 3.39 In addition, we made pump-priming funding available for authorities interested in developing these packages and the business cases to support them, recognising that considerable analysis is needed to assemble the relevant information and pull the packages together. We have been supporting ten areas through pump-priming funds since 2005 to help fund some of the necessary analytical and development work.
- 3.40 The response has been encouraging and, whilst we never expected every authority to see the process through to a formal bid straight away, it is clear that the development work has played an important role in highlighting the need to address the tension between congestion and economic growth, and consider how, where and when demand management, through pricing, would be appropriate.
- 3.41 In June this year we awarded Programme Entry to the first such package, which has been developed for Greater Manchester. This gives scope for a £2.8 billion investment package for Greater Manchester up to 2014 – £1.5 billion from our Transport Innovation Fund, and a further £1.3 billion of local funding, largely from the congestion charge. For the first time a city outside of London is proposing to integrate road pricing with an unprecedented level of investment in public transport including trams, buses and trains. The charge would carefully target those journeys that are causing the greatest congestion problems, at peak times and in peak directions, while ensuring that appropriate alternatives are in place to allow people to access jobs and services.
- 3.42 Greater Manchester’s analysis shows that congestion could threaten up to one in seven future jobs in one of our key cities. Tackling congestion through a combined package of investment and charging would bring benefits for the economy, the environment and quality of life – far greater benefits than could be achieved by investment or charging alone. And the benefits will be felt more widely. There is much we can learn about charging and local transport from these proposals that can be applied elsewhere. This includes how we can best focus charging on the worst congestion problems, how we can ensure that schemes operate fairly and consistently, and that people’s privacy is protected.
- 3.43 The Association of Greater Manchester Authorities and Greater Manchester PTA are in the process of carrying out further work, including a full three-month consultation, on the proposals. Subject to the outcome of consultation, they will submit material to the Department for the next financial approval stage (Conditional Approval) later this year.

3.44 We continue to work with other areas – including Cambridgeshire, whose package integrates charging with better buses, trains and walking and cycling. And further pump-priming funds have been made available for Bristol, Reading and Leeds to develop their strategies. We have also extended our commitment to earmark up to £200 million a year of the Transport Innovation Fund, to ensure that funds are available out to 2018–19, in line with our long-term funding profile for transport.

### Trialling new technologies

3.45 There are several ways that urban congestion charging schemes can be configured – by linking the charge to driving within a defined area (like London), or for crossing a cordon or boundary, where the charge might vary depending on the direction of travel (like Stockholm and the proposed scheme in Manchester). The most advanced approach would be to charge for the distance a vehicle is actually driven on what would otherwise be particularly congested roads. But basing such a system on currently available technology would require a large amount of roadside equipment.

3.46 That is why we advised local authorities designing schemes now to focus on proven, simpler, approaches. Meanwhile, over the next two years we will be carrying out a research programme that will run a number of ‘demonstration projects’ to establish how best a more advanced approach might be made to work in practice.

3.47 We have invited companies to propose how they would run an effective road charging system, calculating charges on a pay-as-you-go basis depending on the time of day and route chosen. Our challenge to them is then to demonstrate that system in practice, through recruiting a number of volunteers to take part in on-road trials.

3.48 In particular, we want to see that the proposed technologies work accurately and reliably in a range of conditions, and check that they can be built into an efficient and fair billing system in a way that ensures motorists’ privacy is properly protected.

3.49 It is clearly important that the nature and extent of this research is such as to provide a sound foundation for future decisions. So, we have established an advisory forum to act as a sounding board for this work, and we are liaising closely with the Information Commissioner to ensure that we apply the right tests for personal data security.

3.50 The output from this research should lead the way to developing better systems that could support urban schemes, possibly over a wider area than have been developed to date, as well as informing our thinking on managing motorway capacity.

## Next steps

- 3.51 We will maintain our support for authorities by giving them the right powers to carry out their roles, providing good practice guidance and making unprecedented levels of funding available.
- 3.52 We will continue to encourage local authorities to adopt wider use of 20 mph limits and zones where appropriate, especially where children are present.
- 3.53 We will continue to monitor how local authorities perform and ensure that we provide them with the most appropriate support, so that road users get the choice and reliability they want from the road network locally.
- 3.54 From the encouraging results we are already seeing from the sustainable travel towns we have supported, we are seeking to showcase their work as an example of best practice to other towns.
- 3.55 We will continue to work with those authorities who are developing proposals for congestion charging to tackle local congestion problems. We have also announced further pump-priming funding to help other local authorities who are interested develop proposals, and we are extending funding from the Transport Innovation Fund up to 2018–19 to support schemes.



# Chapter 4

## National networks



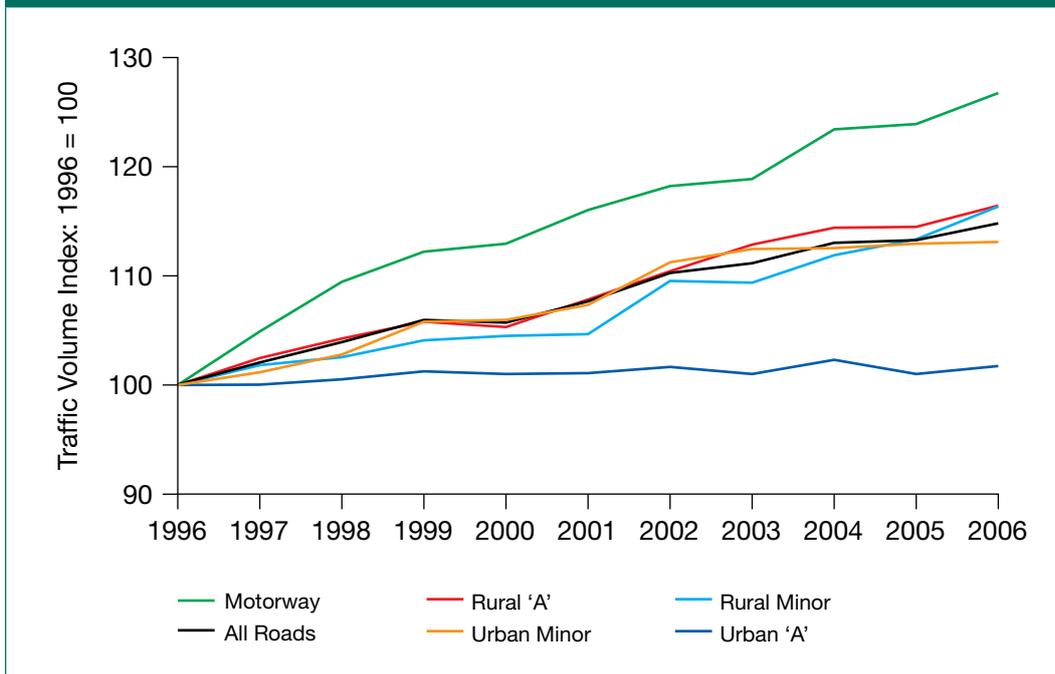
## Introduction

- 4.1 The national networks – road and rail – that connect our cities, regions and international gateways play a particularly significant part in supporting economic growth and productivity. We need sustained investment in both, so that people and freight operators can choose the right mode for the job.
- 4.2 Our July 2007 White Paper, *Delivering a Sustainable Railway*, set out our plans to achieve our ambition for a national railway that:
- can handle double today’s level of freight and passenger traffic;
  - is even safer, more reliable and more efficient than now;
  - can cater for a more diverse, affluent and demanding population; and
  - has reduced its own carbon footprint and improved its broader environmental performance.
- 4.3 This chapter discusses our strategy for the strategic road network, which is based on investing in the physical capacity of the strategic network and innovation in the way that capacity is delivered and managed. There are real gains to be made from better management of traffic flow, better management of road works, better strategies for managing incidents, and providing better information to help journey choices for getting around the country.

## The challenges

- 4.4 There is a defined network of over 4,350 miles of motorway and major ‘A’ roads in England, which are the direct responsibility of the Department for Transport, built, maintained and operated by the Highways Agency. The Highways Agency’s motorways account for approximately 1 per cent of the total road length in England, but carry 20 per cent of all road traffic and 44 per cent of all heavy goods vehicle traffic.
- 4.5 Motorway traffic has grown faster over the last ten years than on any other type of road (27 per cent), illustrated in Figure 7.

Figure 7: Motor vehicle traffic growth by road class, 1996–2006



- 4.6 This growth in traffic raises challenges for the environment including for roadside biodiversity, noise, local air quality and, nationally, on CO<sub>2</sub> emissions and climate change. A large part of the answer here is in improved vehicle technology – cleaner and more efficient engines that return better fuel economy. That is why we are supporting implementation of more stringent Euro Standards on vehicles for air pollutants and are arguing for strong mandatory targets for new car CO<sub>2</sub> emissions at an EU level. We are also developing a Carbon Accounting Framework, to understand better the carbon footprint of our construction, maintenance and operational activities on our strategic roads.
- 4.7 From a congestion perspective, it is not growth in the total number of miles driven that matters so much as when and where that growth is happening. As the volume of traffic starts to approach the design capacity of a road, so we start to see breakdown in the traffic flow, resulting in stop-start conditions, delay and unpredictable journey times. This unpredictability is a concern for all road users, and a particular issue for business, the haulage industry and coach operators.
- 4.8 We will set out our thinking on how to support improvements to the movement of freight in a strategy to be published later this year. Express coaches potentially provide a more efficient way of getting the best out of network capacity than single- or low-occupancy cars, although they currently account for less than 0.5 per cent of traffic flows on motorways. We will explore further with the industry and other stakeholders, as part of our wider programme of work on future strategy, the role the coach could play, building on the benefits of delivering a more reliable road network and installing priority measures such as the M62/M606 high-occupancy lane (see Chapter 5).

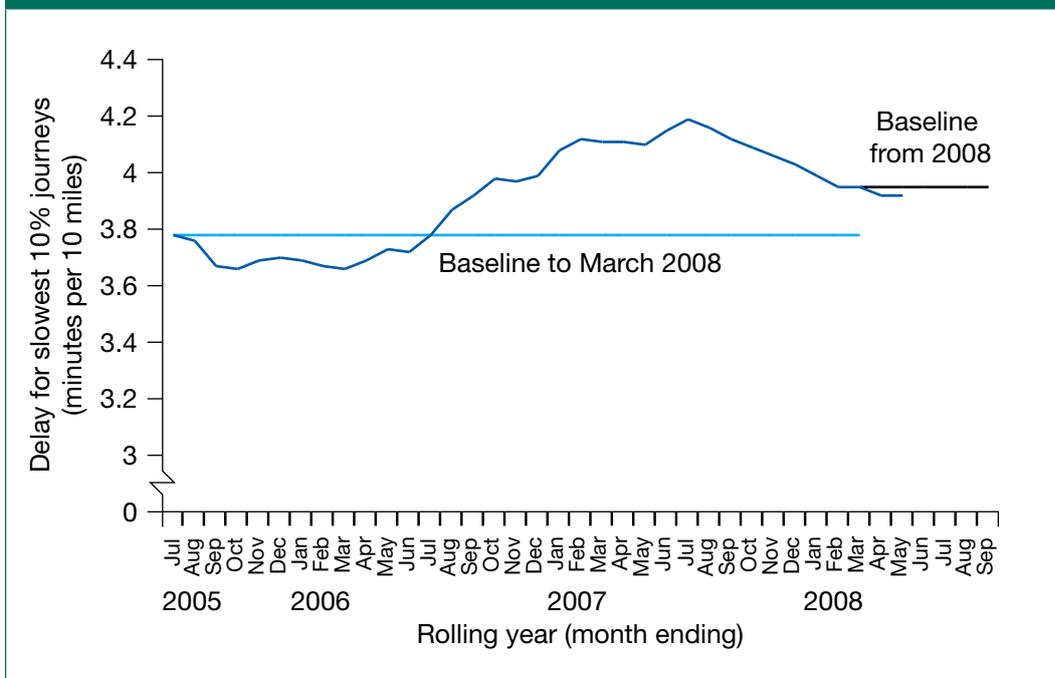
## Measuring strategic road performance

- 4.9 The Highways Agency has developed a database that holds the average journey time and traffic flow for every 15-minute time period of the day for each of the 2,500 junction-to-junction links on its network. These data are derived from several sources, including loops set into the road, anonymised data from Automatic Number Plate Recognition cameras, including those operated by the Agency's National Traffic Control Centre, and data, also anonymised, sourced from companies providing traffic information and navigation services.
- 4.10 The product of having all these data is that they enable the Highways Agency to identify where delays are happening, identify the causes and do something about them. These data form the basis for a journey time reliability performance measure. They allow us to track the amount of delay experienced in the slowest 10 per cent of journeys on the strategic network by comparison with a reference journey (the time that could theoretically be achieved when the traffic is free-flowing). This measure is one of the four indicators used to measure our progress towards our Public Service Agreement target for 2011, as discussed in Chapter 3 above. Reliability performance will be assessed in the context of an expected increase in traffic of 1–2 per cent per year (in terms of total distance driven by vehicles on the network).
- 4.11 Tackling the causes and consequences of the worst delays should improve journey experiences overall, since problems pre-empted, pinch-points tackled and incidents cleared swiftly are good for all traffic. Reducing the severity of delays on the worst journeys compared with most journeys also makes for more predictable journey times, and will help people plan ahead.



- 4.12 Figure 8 shows performance to the year ending May 2008 for the slowest 10 per cent of journeys across the strategic road network throughout the day. The measure reflects the slowest journeys experienced on all types of routes on all days at all times of day.
- 4.13 Exploring the data further, we see the relationship between traffic volume, accidents, severe weather, the effectiveness of measures to improve operational management and the impact of road works that limit carriageway capacity.
- 4.14 It is clear that achieving better flow and greater reliability in the locations under most stress poses a considerable challenge. Of the 91 routes monitored, the most congested 20 per cent of routes travelling in a single direction contribute about 55 per cent of the delays, compared to the least congested 20 per cent, which only contribute 3 per cent.

**Figure 8: Delay on the slowest 10 per cent of journeys July 2005 – May 2008**



- 4.15 The routes having the greatest impact on total delay against free-flow speeds for the slowest 10 per cent of journeys are typically the busiest and longest – for example, junctions 23 to 30 on the M25 (delays of about one minute per vehicle per mile), 8 to 20A on the M6 (delays of around 40 seconds per vehicle per mile) and 19 to 32 on the M1 (delays of about 25 seconds per vehicle per mile).

## Better management

- 4.16 Better data is key to the development of a more effective strategy for managing the network. The availability of data also means we can provide far better information to road users about the journey times they are likely to encounter and, indeed, the real-time performance of the network, so allowing them to make more informed choices about their journeys.
- 4.17 For example, over half a million people now visit the Traffic England website every month to plan their journeys ([www.trafficengland.com/TCC/](http://www.trafficengland.com/TCC/)). Information on delays and incidents is also provided through the Transport Direct website, part of a wider initiative to help people plan their journeys across all transport modes ([www.transportdirect.info/](http://www.transportdirect.info/)). A digital radio station – Traffic Radio – has been introduced to provide continuous traffic information supplementing the Highways Agency Information Line, which provides assistance in journey route planning, as well as providing up-to-date information on delays. (Traffic Radio is broadcast on local Digital Audio Broadcasting. You can also listen to it via the website at [www.trafficradio.org.uk](http://www.trafficradio.org.uk) and via short-term (28-day) localised FM and AM transmission during some major roadworks and special events.)
- 4.18 In addition to traffic warnings, current travel times are also starting to be displayed on roadside variable message signs, giving motorists a realistic idea of how long a journey will take.
- 4.19 Around a quarter of all congestion is caused by accidents and incidents such as collisions, broken-down vehicles or debris blocking the carriageway. So we have established the Traffic Officer Service, along with National and Regional Traffic Control Centres, to monitor conditions on the motorway network, assist with vehicles on the hard shoulder, and respond quickly when incidents do occur, liaising closely with the emergency services to deal with the incident and get the carriageway clear and open as soon as possible. The Traffic Officer Service is routinely taking the lead at around 850 incidents per day on the strategic road network (see Figure 9) that do not involve injury or loss of life, reducing the growth of incident-related congestion, while enabling the police to focus their time on core policing activities.



4.20 We have also invested in new technology to help get traffic moving more quickly after serious collisions or incidents on the road. GPS equipment is now being used to survey and record the details of accident sites. The average time saved by the eleven police forces who have been trialling the equipment – that is, the time saved in getting the road re-opened – is 40 minutes per incident. At one incident on the M11, police were able to survey and collect enough data from an accident scene in ten minutes, where previously the road could have been closed for two hours.

To improve the efficiency of roadworks, a new Quick Movable Barrier system has been developed. This involves using a machine to put substantial concrete safety barriers in place (rather than cones). The machine allows the Highways Agency to change the layout of the works quickly and keep more lanes open for drivers during peak periods, while importantly providing a higher level of safety protection for both workers and road-users. It has been used to good effect on the A2 widening scheme in north Kent, saving five months of construction time.



## Adapting to changes in the climate

- 4.21 To ensure the network continues to perform in the future, we need to take account of the range of impacts the changing climate could have on the roads and take steps to understand and manage the risks at an early stage. Hotter, drier summers, milder wetter winters, and more frequent extreme weather events such as flooding and heatwaves could all have serious implications for the roads.
- 4.22 We are already doing much to reduce the impact of these conditions. For example the Highways Agency has already improved drainage and road surface standards to increase resilience. We will continue to take steps to ensure that our infrastructure is planned, designed, maintained and managed to be resilient to future climate impacts, through the application of tools such as the Highways Agency's climate change adaptation strategy. We will work with others, including local authorities, to ensure that they know of the tools available to them for assessing and addressing the impacts of climate change.

## Major projects

- 4.23 The Highways Agency's major schemes programme is focused on addressing pinch points on the network, rather than developing entirely new lines of route. This accords with Sir Rod Eddington's conclusion that the basic national network, in terms of route corridors, is broadly right.
- 4.24 We have invested over £5.4 billion in major schemes since 1997, delivering 405 lane miles across the strategic road network, and in 2007–08 completing a major programme to re-engineer 85 key junctions to improve traffic flow.
- 4.25 Regional Funding Allocations were introduced in 2005 and bring together capital financing for major transport schemes under the Local Transport Plan system and for major schemes on about two-thirds of the strategic road network managed by the Highways Agency, which, although they still form an important part of the strategic network, on balance have a more significant role as regional distributors. Thus it makes sense to seek regional advice on relative priorities for development and funding.
- 4.26 In the light of concerns over increases in the cost estimates of the Highways Agency's major schemes programme, we commissioned Mike Nichols, Chairman and Chief Executive of the Nichols Group, to review the Agency's approach to cost estimation and project management. The Nichols Review was published in March 2007 and made recommendations in three areas: the nature of the roads programme; strengthening and clarifying the relationship between the central Department and the Highways Agency for the management of major projects; and improving the Highways Agency's cost estimating and project management capability. We fully accepted the recommendations of the Nichols Review and, in April 2007, established a dedicated team to deliver the recommendations.
- 4.27 A key factor in the unreliability of the cost estimates is the inherent difficulty of predicting the cost of schemes at an early stage, before options and designs are fully developed – in some cases up to ten years before a scheme would be delivered. The principal single reason identified in the Nichols Review for the increase in cost estimates was the high rate of inflation experienced by the construction industry. This higher rate of inflation has been driven by higher costs for raw materials, such as aggregates, concrete and steel, driven by the current significant global demand for construction, particularly in rapidly developing countries such as China and India. The higher rate of construction inflation is predicted to continue, until at least 2012, and that has obvious implications for the affordability of major construction schemes.

### Better performing Highways Agency

By the end of March 2008, we had implemented the majority of the recommendations in the Nichols Report. We have:

- replaced the Targeted Programme of Improvements with groups of schemes in three phases (Options, Development and Construction) with budgets provided only for the progression of a scheme through a phase;
- clarified and strengthened the governance of major projects, with the establishment of a dedicated division of project sponsors in the Department, and the Highways Agency's role as deliverer more clearly defined;
- developed a new Project Control Framework to manage and control the development of a scheme through its lifecycle;
- designed new methodologies and processes for cost estimating and risk assessment based on cost ranges;
- developed better measures to track the Highways Agency's performance in delivering major schemes, included in their 2008–09 Business Plan; and
- strengthened the organisation and capability within the Highways Agency, with an emphasis on project management and commercial skills.

The Highways Agency is continuing to seek opportunities to further improve the value for money it delivers in the future, such as through the managed motorway programme described later, and learning from best international practice. This follows on from the Government-wide Public Value Programme which the Chancellor announced in the Budget and the successful implementation of the Nichols Report.

- 4.28 We continue to seek best value from our investment in Highways Agency roads, for example through the development of the managed motorways concept: adding capacity does not necessarily mean constructing additional lanes through conventional road widening. Following experience of piloting advanced traffic management techniques on the M42, including the opening of the hard shoulder as a running lane, we commissioned a study to explore how far those techniques could be applied across the network. The *Advanced Motorway Signalling and Traffic Management Feasibility Study* published in March 2008 showed that hard-shoulder running offered the potential to deliver the majority of the benefits of conventional widening at a considerably lower cost and with fewer environmental impacts.

- 4.29 The managed motorway concept is discussed further in the next chapter. In the meantime, hard-shoulder running is now being actively considered as an option for all motorway widening, and will be pursued where it represents the best value for money, in particular taking account of the relative speed of delivery and environmental impact. It is likely that hard-shoulder running will form a significant part of the Highways Agency major roads programme henceforth, leading to a fundamental change in the way the motorway network is operated.
- 4.30 When deciding whether to increase road capacity to improve traffic flows and reduce congestion, we will take account of any impact this will have on the overall level of CO<sub>2</sub> emissions from transport. In cases where we decide to go ahead with increasing capacity, we will build the CO<sub>2</sub> impacts into our plans to keep CO<sub>2</sub> emissions within the carbon budgets set under the Climate Change Bill. Our appraisal framework also takes into account other environmental concerns, including the protection of the water environment, the support of biodiversity, the reduction in noise and the improvement in local air quality.

### National Roads Programme

- 4.31 Over the next six years to 2014 we plan to invest up to £6 billion in major improvements to the strategic roads network in a programme that has an important role to play in supporting delivery of a wide range of priorities: supporting economic growth, improving inter-urban journey time reliability, supporting housing growth and improving road safety.
- 4.32 For example, the programme for the next three years includes adding capacity to the M25 and to the A14 between Ellington and Fen Ditton in Cambridgeshire – schemes that support our ambitious targets for new housing, as well as being key for access to employment and economic growth; and the widening of the A1 between Dishforth and Barton in North Yorkshire – a scheme that will complete the improvement of this key strategic link to the north east and delivers significant safety benefits.
- 4.33 We will continue to ensure that the programme minimises any adverse impacts on the environment and, where possible, provides environmental improvements.

### The period 2008–09 to 2010–11

- 4.34 In the next three years the following schemes on the strategic roads network will open to traffic, adding 80 lane miles of extra capacity to the road network (see Table 1).

**Table 1: Schemes that will open in the next three years – strategic roads**

<b>Scheme</b>	<b>Type of scheme</b>	<b>Location</b>
A1 Bramham to Wetherby	Upgrading trunk road to motorway standard	Yorkshire, between Leeds and York
M1 Junctions 6a–10	Motorway widening	Hertfordshire
M1 Junctions 25–28	Motorway widening	Nottinghamshire
M6 Carlisle to Guardsmill	Upgrading trunk road to motorway standard	Cumbria
A14 Haughley New St to Stowmarket	Trunk road widening	Suffolk
M25 Junctions 1b–3	Motorway widening	Kent
M40 Junction 15 (Longbridge Roundabout)	Junction improvement	Warwickshire
M62 Junction 6	Junction improvement	Liverpool
A5117/A550 Deeside Park Junction	Junction improvement	Cheshire

4.35 In addition, over this period a number of schemes are already planned to enter construction, subject to the completion of statutory processes and confirmation of value for money, including:

- upgrading of the A1 to motorway standard between Dishforth and Barton;
- widening the M25 between Junctions 16 and 23, and Junctions 27 and 30;
- widening the A14 between Ellington and Fen Ditton;
- implementing hard shoulder running on the M6 around Birmingham.

### Looking out to 2014

4.36 The Highways Agency is also actively progressing the options for addressing capacity issues on many other parts of the strategic network (see Table 2). A significant proportion, though not all, of these projects are likely to enter construction before 2014, subject to the completion of statutory processes and confirmation of value for money.

4.37 The Highways Agency's work includes detailed scheme-by-scheme assessment for the potential hard-shoulder running locations identified in the *Advanced Motorway Signalling and Traffic Management Feasibility Study*, in place of planned widening and in additional locations where hard shoulder running could alleviate known traffic pressures.

**Table 2: Schemes being considered for implementation before 2014**

M1 Junctions 10–13* (Hertfordshire/Bedfordshire)	M1 J13–19* (Bedfordshire/ Buckinghamshire/Northamptonshire)
M1 Junctions 19/M6# (Warwickshire/Leicestershire)	M1 Junctions 21–30 (Phase 2)* (Leicestershire/Nottinghamshire)
M1 Junctions 30–31* (Sheffield)	M1 Junctions 31–32 Northbound dedicated lane to M18 (Sheffield)
M1 Junctions 32–34* (Sheffield)	M1 Junctions 34–37* (Yorkshire)
M1 Junctions 37–39* (Yorkshire)	M1 Junctions 39–42* (Wakefield)
M3/M4 approaching M25* (west of London)	M4/M5 around Bristol*
M5/M6 around Birmingham*	M6 Junctions 11a–19* (Birmingham to Cheshire)
M6/M60/M62/M56 around Manchester*	A14 Kettering ~ (Northamptonshire)
M20 J3–5* (Maidstone)	M20 Junction 10a# (Ashford, Kent)
M23 J8–10* (Gatwick)	M25 Junctions 5–7* (Kent/Surrey)
M25 Junctions 23–27* (Hertfordshire)	M25 Junction 30# (Essex)
M27/M3 around Southampton* (Hampshire)	M40 Junction 9# (Buckinghamshire)
M62 Junctions 25–30* (Bradford/Leeds)	
*Motorway capacity enhancement – options include widening or hard shoulder running	
#Junction improvement	
~Trunk road capacity enhancement	

- 4.38 An important aspect of this work, over the remainder of this year, will be to identify the scale of any additional infrastructure works that should sensibly be undertaken as part of a wider scheme encompassing a hard-shoulder running solution, such as reconstruction of the hard shoulder, new drainage, resurfacing, and provision of concrete central barriers, lighting and junction improvements. Packaging work in this way could minimise disruption to traffic over time and deliver a better outcome, but clearly has implications for delivery timescales and scheme costs.
- 4.39 Schemes that are not prioritised to enter construction prior to 2014 and other emerging pressures will be assessed as part of our exercise to establish the spending priorities for transport after 2014.

## Regional Funding Priorities

- 4.40 Decisions on the Highways Agency's regional roads programme are made through the Regional Funding Allocation process, through which the regions advise Government on the allocation of around £8 billion

to 2015–16 between the regional Highways Agency schemes and local authority major projects.

- 4.41 Schemes are currently being progressed in accordance with the advice provided by the regions in 2006. Over the next three years (2008–09 to 2010–11), the regional schemes shown in Table 3 will open to traffic, adding almost 50 lane miles of additional capacity to the regional network:

**Table 3: Schemes that will open over the next three years – regional roads**

Scheme	Type of Scheme	Location
A1 Peterborough – Blyth	Grade separated junctions	Cambridgeshire/ Nottinghamshire/ Lincolnshire
A2 Bean – Cobham	Trunk road widening	Kent
A3 Hindhead improvement	Trunk road widening	Surrey
A27 Southerham to Beddingham improvement	Bridge/widening	Sussex
M27 Junctions 11–12 Climbing Lanes	Climbing Lanes	Hampshire
M27 Junctions 3–4	Motorway Widening	Hampshire
A38 Dobwalls Bypass	Bypass	Cornwall
A69 Haydon Bridge Bypass	Bypass	Northumberland
A419 Blunsdon Bypass	Bypass	Swindon, Wiltshire
A595 Parton to Lillyhall improvement	Trunk road widening	Cumbria

- 4.42 Beyond this, the composition and size of the regional roads programme up to 2016 will be reconsidered through the refresh of the Regional Funding Allocation prioritisations. In part to inform this exercise, revised cost range estimates for the national and regional HA schemes in Development and Construction have been published on the Department’s website. These estimates have been produced following the new processes recommended following the Nichols Review.

## Private finance

- 4.43 The M6 Toll Road was financed and is now run by the private sector. This 27 mile stretch of motorway links the M6 and M42 to the south of Birmingham with the M6 north of Birmingham. It bypasses a heavily congested section of the M6, giving motorists a choice of routes.
- 4.44 On 9 July, the Connect Plus consortium were confirmed as preferred bidder for the first stages of the planned M25 widening project. This will be one of the biggest private finance projects that the Government has undertaken. The first stages of this Design, Build, Finance and Operate contract will see 36 miles of some of the busiest sections of the M25

widened to four lanes. The contract as a whole will deliver enhanced capacity over more than 60 miles of the M25 and include future maintenance of the M25 for 30 years.

- 4.45 We are committed to exploring the scope for private finance and private sector involvement to help sustain and deliver the significant levels of investment to enhance our strategic road network. We are also interested in exploring the packages that might be developed to encompass active traffic management and the possibility of managed lanes, discussed in the next chapter.

## Next steps

- 4.46 We will continue to explore ways of providing better information to motorists to assist them with their journey planning and allow them to make travel choices based on real-time road conditions.



- 4.47 We will continue to identify and put in place measures to improve the way that the flow of traffic, incidents and road works are managed through the Highways Agency. This will include delivering more through the Highways Agency's Traffic Officer Service. We have planned £0.8 billion investment to deliver these types of traffic management improvements over the next three years.
- 4.48 As the pressures increase on our national networks, we need to understand how alternatives to traditional road building can deliver a more reliable network that is affordable and has a limited impact on the environment. It is also important to keep assessing how we manage our motorways and ensure that we continue to use the latest technology and techniques to provide more reliable and safer journeys for road users. Chapter 5 looks at how we are moving towards a managed motorway.



# Chapter 5

## Towards the managed motorway



## Introduction

- 5.1 The previous chapter focused primarily on the use of information, addressing interruptions to traffic flow, the scope for adopting conventional engineering solutions, and the implications that adopting active traffic management and hard-shoulder running could have on the shape of our Highways Agency investment programme. This chapter focuses specifically on the options for adopting these innovative measures to add and manage capacity in new ways.
- 5.2 The pressure on our strategic road network is significant. For financial and environmental reasons we cannot address this through a traditional ‘predict and provide’ approach. So, while it is likely there will remain the need, particularly in the long term, for further expansion of certain parts of the strategic road network, the case for delivering a more reliable, better managed road network is clear, and the development and wider deployment of more innovative approaches appears to offer a sensible way forward.

### The M42 pilot scheme

- 5.3 Advanced network management techniques and technologies – such as monitoring of traffic flows and incidents, control rooms, co-ordination of signal equipment, and variable signing – can help to achieve smoother and more efficient traffic flows and reduce overall journey times. Such ideas have long been used to manage city centre traffic, and have more recently been applied to the strategic road network.

Figure 10: M42 hard shoulder running pilot



- 5.4 For example, systems installed on parts of the M25 monitor the traffic and automatically set variable speed limits displayed on overhead gantries. And at junctions on the M6, M60 and M62 we use traffic lights to manage the flow of vehicles joining the main carriageway, 'metering' access to avoid interrupting the main flow (a technique known as 'ramp metering').
- 5.5 The term 'active traffic management' refers to the application of a mix of traffic management techniques that are set to respond in real time to accommodate the level of traffic on a route without allowing the flow to break down, principally by reducing speeds to avoid queues building up.
- 5.6 Since September 2006 we have been piloting a mix of active traffic management measures, including the opening of the hard shoulder as a running lane, on the M42 (between junctions 3A and 7) south east of Birmingham (see Figure 10). A 12-month monitoring report is available on the Highways Agency's website, [www.highways.gov.uk](http://www.highways.gov.uk).
- 5.7 On this stretch, when the traffic levels are high, the hard shoulder is opened as an extra lane. The whole route is managed through gantry-mounted signs at regular intervals, indicating which lanes are open and displaying the speed limit (see Figure 11). Emergency refuges were built along the route, to provide for breakdowns.

**Figure 11: Stretch of M42 where using the hard shoulder as an extra lane was trialled**



5.8 Although average journey times increased slightly, users of the route have welcomed the fact that the pilot has been successful in reducing congestion, improving the predictability of journey times and increasing capacity, with consistent results throughout the six-month trial period. On average, over all weekdays, the variability of journey times was reduced by up to 34 per cent, compliance with the speed limit has been high and no evidence has emerged from the pilot to suggest that using the hard shoulder as an extra lane has resulted in an increased safety risk.

5.9 Road user surveys found strong support for extending active traffic management to other areas of the motorway network, with particularly strong support among drivers with experience of driving on the M42 with the hard shoulder open as an extra lane. Sixty-eight per cent of drivers felt more informed about traffic conditions.

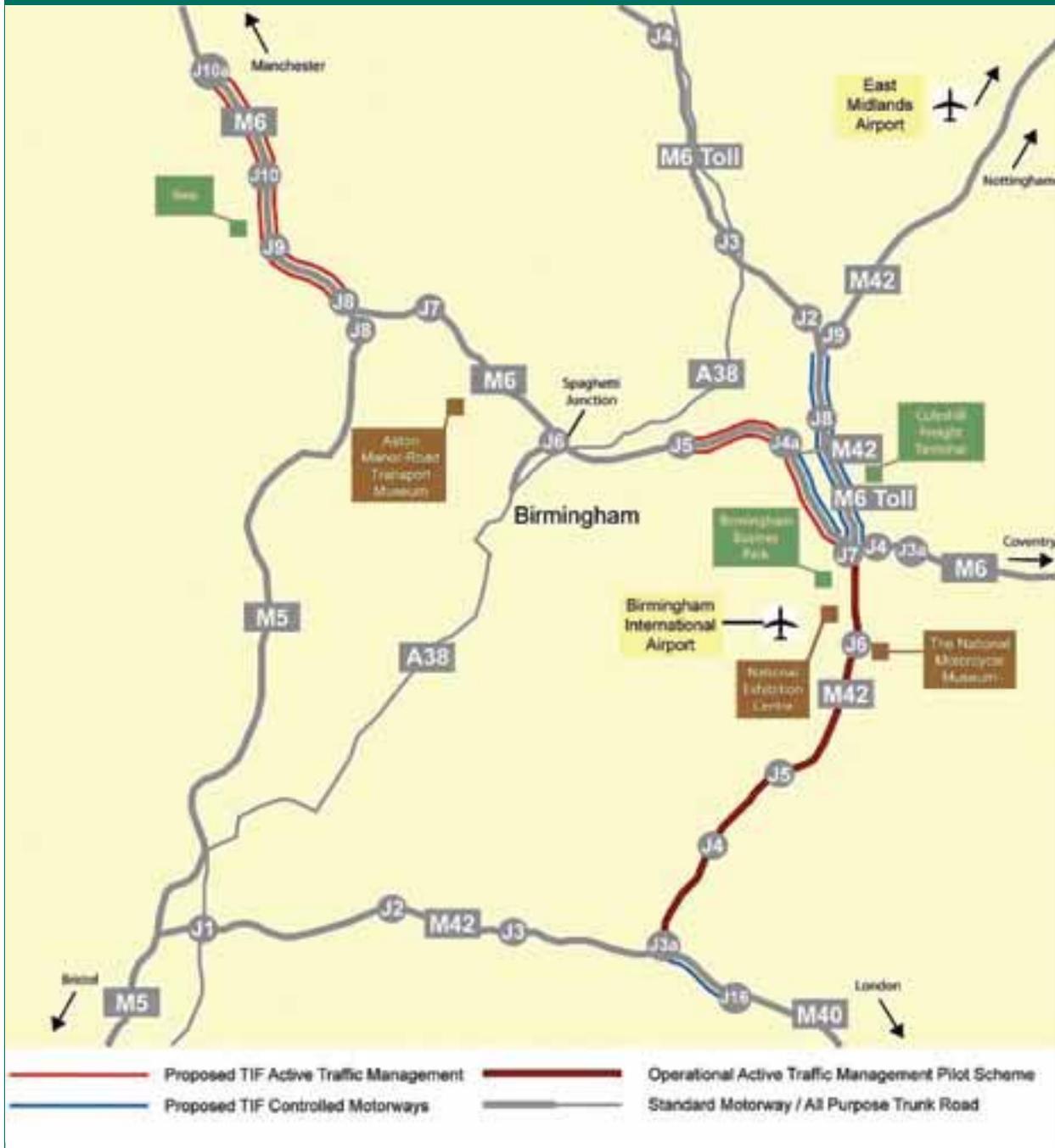
5.10 Given the success of the pilot scheme, in October 2007 we announced:

- the extension of hard-shoulder running to the north east section of the Birmingham motorway ‘box’ (see Figure 12); and
- a study into the feasibility, costs and benefits of deploying these sorts of advanced signalling and traffic management techniques more widely across the motorway network.

### Driving on the hard shoulder – international experience

- There are 17 schemes involving driving on the hard shoulder in the Netherlands, and six in Germany (covering 124 miles). These schemes differ in detail from the M42 scheme, but generally they show similar benefits.
- The Netherlands schemes have increased capacity by between 7 and 22 per cent. Journey time reliability has improved significantly, and there has been no negative impact on road safety.
- Results from Germany similarly show no negative impact on road safety, and improvements in journey times and traffic flows.
- France is exploring the scope to implement driving on the hard shoulder.

Figure 12: The proposed expansion of the M42 pilot to use the hard shoulder as an extra lane



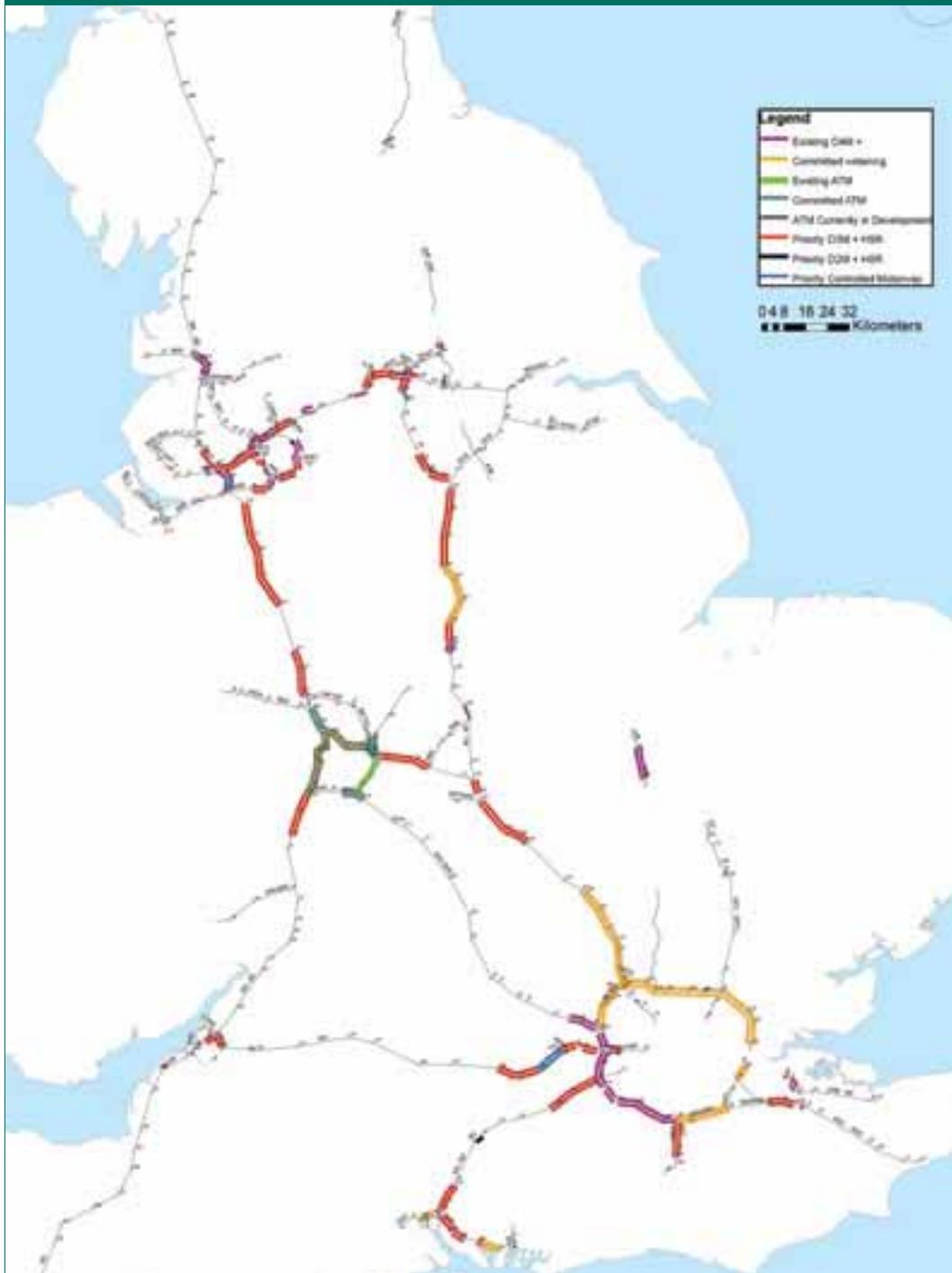
5.11 The study, published in March, was informed by consultations with a stakeholder advisory group, including road user organisations, environmental groups, safety groups, emergency and law enforcement services and others, led by officials from the Department. Its focus was on identifying ways in which targeted capacity might be added cost-effectively to congested routes in order to achieve the best possible levels of service and more reliable journeys for road users. Priority was therefore given to identifying motorway links where implementing driving on the hard shoulder during congested times would be beneficial within a relatively short timescale.

- 5.12 The study assessed the impacts of introducing driving on the hard shoulder at the priority locations we had identified, using the Department’s National Transport Model. This suggested that both using the hard shoulder as an extra lane and widening would provide high value for money: the main benefit coming from time savings – or relief of congestion – marginally offset by a small rise in emissions, although smaller than would otherwise have been the case with conventional widening.
- 5.13 The analysis shows that, in the medium term at least, most of the benefits of planned motorway widening could be achieved at significantly lower cost through using the hard shoulder. The analysis also makes a case for deployment of hard-shoulder running and other elements of the active traffic management package on additional stretches of road where widening was not already in prospect.
- 5.14 This assessment is based on some further development and refinement of the M42 design, which included: varying gantry spacing, through-junction running on the hard shoulder and increasing the operating speed from 50 to 60 mph when hard-shoulder running is in operation.
- 5.15 Of course, this type of strategic analysis cannot substitute for the detailed appraisal of options on a case-by-case basis. There is more work to be done, for example to consider the implications of adopting the technique over significantly longer stretches of road. That work is under way, as described in Chapter 4 above.
- 5.16 Nevertheless, based on the modelled approach, Figure 13 shows in red those stretches of motorway likely to deliver the best value for money return from using the hard shoulder as an extra lane.

The map in Figure 13, taken from the *Active Traffic Management Feasibility Study*, illustrates the assumptions *at the time* the study was commissioned about planned motorway works that informed the basis of the locations the study investigated. It shows existing and assumed planned widening to four-lane motorway in purple and orange, respectively. The parts of the network shown in green or black and yellow stripes around Birmingham are where hard-shoulder running is already in operation, development or planning. The stretches shown in blue are where some infrastructure for managed motorway without hard-shoulder running would be justified.

- 5.17 Comparing the potential locations for driving on the hard shoulder with schemes in or approaching the Highways Agency’s major schemes programme unsurprisingly shows a significant overlap. But there are differences. Notably, the analysis suggests a case for early action on the M4 and M3 approaches to London, and on the M4 and M5 around Bristol and the M27 approaching Southampton. And, of course, the analysis is not relevant to schemes on the Highways Agency’s ‘A’ roads, where there is no hard shoulder.

Figure 13: Locations on the motorway network identified by the active traffic management feasibility study as priority locations for further investigation of using the hard shoulder as an extra lane



- 5.18 Detailed, route-specific assessments – including detailed engineering design – would be needed to give absolute confidence about the costs and benefits. But the business case is clear for looking urgently at deployment of the elements of active traffic management and, particularly, the case for instituting driving on the hard shoulder in place of conventional widening.
- 5.19 In addition to addressing the specific business case for hard-shoulder running, the study highlighted two issues for particular consideration:
- the importance of compliance with safety regulations, in particular speed limits and lane closure signs; and
  - the scope to manage lanes and earmark lane capacity.
- 5.20 Following the Feasibility Study, we have set up a programme of work to investigate all these areas.

## Compliance

- 5.21 A key element of the success of the M42 trial and of variable speed limits on the M25 has been the level of compliance with the key, safety-critical, traffic management measures – in particular, observance of speed limits and (on the M42) lane closure signals. This success has been delivered through effective communications accompanying the launch of the pilot and the very clear signing on the route. But it was also delivered because motorists appear to understand the rationale for the regime, enjoy the improved reliability it delivers, and accept the need for high levels of monitoring and compliance that are needed to make the package work.
- 5.22 While it is clear to road users that compliance is necessary to create a smoother-running, safer environment, experience tells us that effective enforcement back-up is also needed to maintain high levels of compliance when the hard shoulder is open as a running lane in the longer term. So, we need to look at the arrangements that would have to be put in place.
- 5.23 The equipment needed to open the hard shoulder through a ‘managed motorway’ solution involves installation of the gantries and cameras that could, potentially, enable a move toward ‘average’ speed measurement and control when the hard shoulder is in use or a lower variable speed limit is set. This would be akin to the approach already in use to manage speed through roadworks, which has promoted better safety through achieving a very high degree of compliance.
- 5.24 As part of the work following the Feasibility Study, we are exploring the benefit and the practicalities of moving to an average speed enforcement approach.

5.25 Traffic policing is a clearly recognised strand of policing activity, with links to the achievement of wider policing goals. That said, we need to consider the balance of policing priorities. We will therefore work with the Home Office and the Association of Chief Police Officers to identify the most appropriate way to enable additional police resource to be provided for motorway traffic enforcement purposes where that proves necessary, possibly through developing a new standard ‘framework’ agreement.

## Managing new capacity

5.26 The discussion above has been about better managing the strategic network and smarter ways to generate new capacity. What about smarter ways to manage new capacity? The benefits delivered by new capacity in terms of reliable journey times can be quickly eroded if traffic levels rise unfettered to the point where congestion becomes a problem.

5.27 A number of options are being explored for our motorways, some of which have already been put in place with successful results for example on the M25, M1, M6 and M42 (see Table 4). But, even with these controls in place, new capacity can fill up quickly – at the top end of the scale, traffic levels can increase by up to 8–10 per cent every year. This is why we are exploring other options, including lane reservation for certain classes of vehicles or users.

**Table 4: Examples of traffic management tools and where they are currently in use**

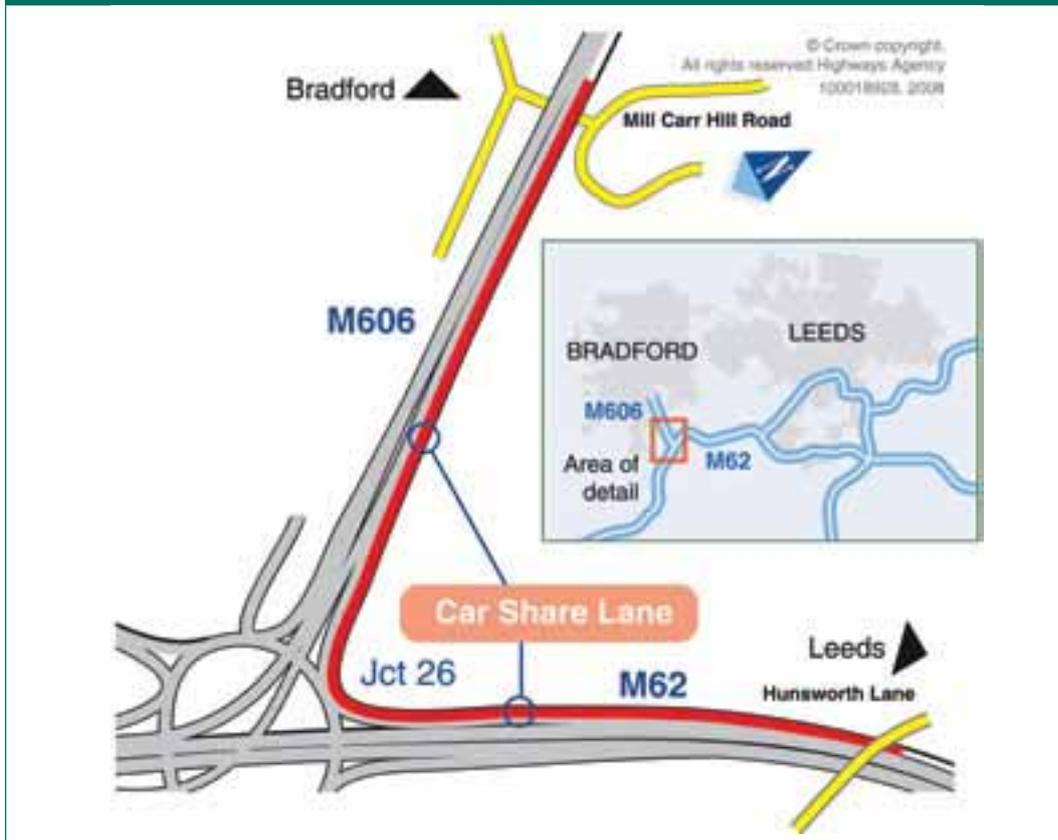
Traffic management tool	Locations in UK
<i>Traffic flow management</i>	
Mandatory variable speed limits	M25, M1, M42
Controlled traffic signals at motorway on-ramps (‘ramp metering’)	M1, M6, M42
<i>Lane reservation</i>	
HGV lanes	Scheme in construction on M27
High-occupancy vehicle (HOV) lane	Junction between M606 and M62 near Bradford
Tolled lanes	No scheme in the UK
High-occupancy vehicle or tolled (HOT) lanes	No scheme in the UK

## Car-share lanes

- 5.28 Car-share lanes (known by traffic engineers as High Occupancy Vehicle – HOV – lanes) have been used on local roads in the UK since 1998, when the A647 car-share lane in Leeds opened. This was followed by three further car-share lanes on local authority roads: in Birmingham, South Gloucestershire and North Somerset.
- 5.29 These local authority schemes have proved successful. One year after introducing the Leeds scheme, journey times fell by 4 minutes in the morning peak on a journey normally taking 10 minutes. Even single-occupancy vehicles saw a 1 minute 30 second journey time saving when using the adjacent non-car-share lane. Car sharing also helps to reduce CO<sub>2</sub> emissions. If more people share cars, the CO<sub>2</sub> emissions per passenger mile are reduced. This means people can go where they want to go, but with lower overall CO<sub>2</sub> emissions.
- 5.30 The first car-share lane on the motorway network in England opened in March this year on the junction between the M606 and M62 south of Bradford (Figure 14). This has provided a 2-mile dedicated inside (left-hand) lane for vehicles carrying at least one passenger, allowing them priority access to the eastbound M62 and rewarding them with considerable journey time savings of around 8 minutes per vehicle at peak time on a journey normally taking 11 minutes.



Figure 14: Plan of the M62/606 car share lane



- 5.31 Car share lanes have also been used in the United States of America. Since the early 1990s, over 100 such lanes have been introduced on US highways. For the most part, these lanes have been successful, but critical to the success of car share lanes in the US has been the on-road presence of dedicated law enforcement personnel.
- 5.32 For the UK motorway HOV lane in place on the M62/M606, the Highways Agency is working in partnership with West Yorkshire Police, who will enforce the lane alongside their enforcement of other traffic offences. The success of further HOV lanes will depend on similar partnerships with local police forces.
- 5.33 Successful car-share lane enforcement requires emergency refuge areas where the police can safely pull over those who violate the car-share lane. The key to the successful enforcement of the M62/M606 car-share lane lies with the careful design of the road layout carried out in partnership with the West Yorkshire Police.
- 5.34 Another key design feature of the M606/M62 scheme is the fact that the car-share lane occupies the inside – left-hand – lane, which allows vehicles to be pulled over to the refuge areas safely. For possible schemes where the car-share lane is on the outside (right-hand) lane there may be a safety issue with the police pulling over vehicles across several lanes of fast-moving traffic.

## High occupancy or tolled lanes

- 5.35 Several High Occupancy or Tolled (HOT) schemes have been put in place in the US and have been more successful at managing congestion than car-share lanes alone. Car-sharers can continue to use the lane for free, but non-car-sharers can choose to pay to use the lane as well. In some cases, car-sharers also pay a toll, but at a cheaper rate than non-car-sharers.
- 5.36 Users who choose to use the lane and pay the toll typically get an electronic tag that makes an automatic payment when the vehicle enters the lane. This is similar to the electronic tags already used at UK tolled undertakings like the Dartford–Thurrock river crossing and the M6 Toll road.
- 5.37 While the HOT lane approach has proved very successful in the US – experience suggests that it is the tolled element that offers greatest flexibility for managing congestion. Consequently, new schemes tend to be developed with a toll-only lane (i.e. dropping the concession for vehicle occupancy).

## Tolled lanes

- 5.38 The aim of a tolled lane is to offer motorists the choice of a more reliable journey that can be provided year in, year out. This has been the experience in the United States. The I-394 toll lane in Minneapolis, Minnesota opened in 2005 and has maintained traffic flowing at the speed limit in the toll lane 95 per cent of the time. This is done by setting the right price and changing it over time in response to demand.
- 5.39 Could that be delivered here? We have started to think about the design of a tolled lane – be it tolled or ‘managed’ (reserved for people paying, plus defined categories of vehicle). No decisions have been taken – we are at the earliest stage of exploring this idea, which would need to be the subject of detailed consultation and ultimately would require new statutory powers. The discussion in the rest of this chapter is intended to set out some of the important questions that will need to be addressed, and give some illustration of the sort of avenues that might be pursued, in order to inform debate.

## Setting the toll

- 5.40 The price for using a toll lane needs to be calculated by taking account of the existing and predicted levels of traffic and the desired level of service. In the United States, prices vary throughout the day in response to changing traffic levels. In some schemes, prices can change up to every 3 minutes in response to changing traffic conditions. In practice, prices do not generally change this frequently – typically it is hourly. A roadside variable message sign informs motorists of the current price for the link they are driving on.
- 5.41 On the I-394 express lane in Minneapolis, the tolling operates on weekdays between 6am–10am and 2pm–7pm. The average toll for driving the 11 miles of the tolled lane eastbound is \$1.44, and for the 8 miles westbound the average is \$0.79. The I-15 FasTrak in San Diego,

California, operates 24 hours a day, 7 days a week and costs between 6 cents and 50 cents per mile.



Picture courtesy of Texas Transportation Institute

## Making payments

- 5.42 There are two key elements to this process. The road user needs to know that a payment is due, how much is due, and have some means of paying. And the scheme operator needs to detect the user, to check that a payment has been made or arrange for payment.
- 5.43 Options for informing road users can include roadside information points, signs and a variety of on-line and other sources. Options for payment include contacting a call centre (as with the London Congestion Charge) or registering with the tolled lane scheme and making an arrangement for automatic payment, much like direct debit payments of utility bills. There are a number of options for managing a user account with the scheme, such as online billing, paper billing, automatic payments and so on.
- 5.44 The scheme operator would know that a payment is due by detecting a user in the tolled lane. This could be done with automatic number plate recognition cameras, electronic tags (like those used at the Dartford–Thurrock Crossing and the M6 Toll), or a combination of the two. Electronic tags are more reliable than automatic number plate recognition cameras, as they are much less susceptible to fraud, but they do require the vehicle to be equipped before it can use the tolled lane. Devices using the Global Positioning System could be used in the future, but right now they do not generally deliver the accuracy to detect use of a particular lane.

## How would we ensure security of personal data?

- 5.45 Any scheme involving in-vehicle and on-road electronic equipment would need to be designed so as to ensure secure handling of data and appropriate protection of personal privacy. This has implications for the nature of the data that need to be generated, where they are brought together, and the safeguards to be applied to their use. We will work with the Information Commissioner to ensure that our exploration of these privacy issues properly addresses public concerns and conforms with the Data Protection Act

## How would a tolled lane look?

- 5.46 In the UK, the carriageway is likely to be too narrow to have bulky physical separation such as concrete barriers. There are also important safety concerns with having a single lane segregated by a solid, immovable barrier. Not all tolled lane schemes in the US are distinguished from the main carriageway by hard physical barriers. For example, plastic pylons that collapse on impact are used on the SR-91 express lane in Orange County, California. However, these also are unlikely to be suitable in the UK, requiring high maintenance and raising potential safety issues.
- 5.47 It is therefore likely that any managed lane on a UK motorway would need to be distinguished from the rest of the carriageway by road markings. This approach is also used on some existing US schemes, such as the I-394 in Minnesota.
- 5.48 Too much weaving in and out of any lane is likely to reduce safety and reduce the benefits of a tolled lane. An option to address this is to limit tolled lane access to certain designated zones along the route. These would have to be of a suitable length to allow users enough time to enter and exit the toll lane safely. To allow safe departure from a tolled lane, it is likely that a zone before a junction will need to be longer than the one after a junction for people joining the lane.
- 5.49 Our thinking is based on using road markings that would be intuitively recognisable to users. There are several options for using single or double white lines, which may be dashed or solid. For most of these options, new legislation would be required to give the line markings the required status in law.
- 5.50 One of the simplest options might be to use a solid white line, which drivers will already recognise as meaning ‘do not cross’. A dashed-line section can be used to indicate the access zones where vehicles are permitted to exit or enter the tolled lane.
- 5.51 There is clearly a great deal of work to be done to take these ideas through from concept to practical propositions for implementation. We will continue our dialogue with stakeholders in the motoring and engineering worlds as our thinking develops.

## A greater role for the private sector

- 5.52 We already have long experience of private finance and private sector involvement in high profile schemes, such as the M6 Toll road, and also in lower profile but nevertheless significant initiatives such as the Highways Agency's maintenance contracts.
- 5.53 The Highways Agency's Managing Agent Contractors are responsible for designing and planning the maintenance work in their area, as well the day-to-day management of the network, with responsibilities including traffic management and roadworks co-ordination.
- 5.54 There are other models internationally. For example Fluor Daniel is proposing adding high occupancy/toll lanes to Capital Beltway – a 64 mile long Interstate freeway that encircles Washington. This project would tackle congestion and would be supported from finances from the toll income.
- 5.55 In certain circumstances, private sector participation in the development and operation of the road network can bring benefits in terms of performance, value for money and incremental investment. If, subject to the further development work discussed above, lane tolling was shown to be a practical proposition for better managing motorway capacity here, this could open opportunities to involve the private sector in the delivery, financing and operation of this capacity.
- 5.56 We will be discussing the potential for the development of such models with potential operators and financiers.

## Next steps

- 5.57 We will consider the scope for pursuing active traffic management, from smoothing traffic flows in busy periods using variable speed limits to opening the hard shoulder as an alternative to the conventional widening schemes. We will work with industry to simplify designs and minimise the costs of operation.
- 5.58 We will review the overall balance of the Highways Agency's investment programme, based on the latest cost estimates, to ensure that we are targeting and prioritising our action in the most appropriate way to deliver the best outcomes swiftly across the network.
- 5.59 We will take forward to deliver a better managed motorway system, including the detailed design that will be needed to establish a practical proposition for managing and tolling lanes.
- 5.60 We will also continue to explore the role that private finance and private sector management could play in developing and managing strategic roads.
- 5.61 And we will continue to discuss the emerging picture with stakeholders in the many organisations that work with us, most recently on the active traffic management feasibility study.
- 5.62 In due course, we will need to consult on the plans for particular routes and at the point our further exploration allows us to put forward firmer proposals for the ways these techniques could be applied generally, in particular where this would require new legislation.



# Chapter 6

## Conclusions



- 6.1 Roads play a vital role in our competitive economy, and their performance impacts significantly on our quality of life. We face challenges in meeting the rising expectations that people have from the road network, not least the environmental impact of road journeys. But we do have choices in how we should address them.
- 6.2 We need to focus now on relieving pressure on the most overcrowded routes, and to give road users greater choice over the journeys they take. With more than 80 per cent of all delay caused by congestion occurring in cities, and traffic levels growing fastest on motorways, it is clear these are our two most urgent priorities.
- 6.3 In our cities, we will maintain our support for local authorities, ensuring that best practice can be replicated across the network. In particular, we will continue to support innovation, both in sustainable travel and in using demand management alongside significant developments in complementary transport.
- 6.4 On our strategic road network we will continue to develop ways to better manage the existing network and make use of new services, such as the Traffic Officers and new technology as it becomes available. We support the joint working of the Highways Agency and local authorities and will continue to find ways to improve the way they work together to ensure that the whole road network is utilised as effectively as possible. We recognise the need to continue to invest in major projects, but we also understand that we need to deliver improvements in an affordable way without damaging the environment.
- 6.5 Therefore, we will pursue active traffic management schemes, including driving on the hard shoulder, along with the full range of options for reserving the new capacity created. This document has set out further details about how tolled lanes could work in conjunction with stretches of the road where capacity is increased, and we will consult on the options.
- 6.6 We will continue to discuss our proposals as we develop them with the many representative groups that already meet to advise us on a range of topics. On our priorities for beyond 2014, we will continue to discuss our options with people, including through the online Citizens' Panel that we set up following publication of *Towards a Sustainable Transport System*.
- 6.7 And we will also be looking to explain our strategy and extend the debate more broadly with the business community, the haulage sector, fleets, and the motoring public over the coming months.



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