OXFORDSHIRE COUNTY COUNCIL

County Council
Tuesday, 12 July 2016

ADDITIONAL PAPERS

10. Connecting Oxfordshire Update - Local Transport Plan (LTP4) 2015-2031 (Pages 1 - 424)

LTP 4 Document and previously published SCIA.

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Connecting Oxfordshire: Local Transport Plan 2015-2031

Volume 1: Policy & Overall Strategy

CONNECTING OXFORDSHIRE

OXFORDSHIRE COUNTY COUNCIL

CONTENTS

Other documents forming part of *Connecting Oxfordshire*

Document	Status
Mode Strategies • Science Transit • Bus • Rail • Active and Healthy Travel (including walking and cycling) • Freight	Published alongside this document
Area Transport Strategies • Banbury • Bicester • Carterton • Oxford • Science Vale • Witney	Published alongside this document
Corridor Strategies • A40 • A420	Published alongside this document
Network Strategies • Oxfordshire Rights of Way Management Plan • Highways Asset Management Plan	Adopted November 2014, available from www.oxfordshire.gov.uk Adopted September 2014, available from www.oxfordshire.gov.uk

1. Foreword

Oxfordshire is a prosperous and vibrant county, combining a successful, thriving economy with a high quality environment. It is the most rural county in south east England, and yet is a world leader in innovation and enterprise in areas including life sciences, space technologies, electronic & sensors, creative & digital and automotive

Current forecasts are for over 85,000 new jobs and 100,000 new homes in the county by 2031. Major development areas identified include Science Vale and Oxford, while Bicester and Didcot have been awarded 'Garden Town' status. We are now working with seven partners to develop our England's Economic Heartland alliance, to seek devolved powers from the Government that will help us grow further and faster. Together, this growth will have a significant impact on our transport network, with an ever increasing number of people and goods needing to use it. Given the existing pressures on the network and the scale of growth we are anticipating, we cannot rely on small, short-term solutions; more radical solutions are required to transform transport in Oxfordshire for its people and growing economy over the next twenty years and beyond.

Connecting Oxfordshire is our new Local Transport Plan (LTP4) setting out our proposed transport solutions for the county up to 2031, with ambitions beyond that in some cases. It has been informed by public feedback received in response to a series of public meetings and two public consultations in summer 2014 and spring 2015, as well as detailed discussions with a wide range of stakeholders.

During this LTP4 period, we have a huge challenge to enable people to make the journeys they need to as the population grows, and avoid damage to the economy caused by severe congestion, as well as to protect the environment. So there needs to be a significant shift away from dependence on private cars, towards more people using forms of transport that use less road capacity and damage the environment less – where possible walking, cycling, and/or using public transport. However, this is at a time of unprecedented reductions in local government funding evidenced by our decision to stop subsidies for local bus services as we can simply no longer afford to do this. Our aim is to make this happen by transforming travel by these means, supported by innovation. Our strategy seeks to make this more possible and more attractive, for more people, particularly on our busiest routes

We need to make these other forms of transport equally if not more attractive than using the car, for the majority of people. This is not going to be easy: it requires us to consider some radical solutions as well as smaller-scale improvements, which I believe will make a huge positive impact on people's lives and provide a firm, future-proofed foundation for economic growth and prosperity for Oxfordshire's residents.

Councillor Ian Hudspeth,
Leader, Oxfordshire County Council

2. Executive Summary

Connecting Oxfordshire, our new Local Transport Plan (LTP4), sets out Oxfordshire County Council's policy and strategy for developing the transport system in Oxfordshire to 2031. We have developed it with input from Oxfordshire's district and city councils, its businesses, MPs, stakeholder groups and through public consultation. It fits our highest level strategic aims, as set out in *Oxfordshire 2030*, our Sustainable Community Strategy. It takes into account the plans and ambitions of the Oxfordshire Local Enterprise Partnership in its Strategic Economic Plan (SEP) for Oxfordshire and the aspirations of the England's Economic Heartland alliance, and so identifies transport schemes that will support the Knowledge Spine growth area. *Connecting Oxfordshire* is nonetheless a plan for the whole county; it also sets out our policy priorities for parts of the county less affected by the Knowledge Spine, thereby providing a basis for securing transport improvements to support development countywide.

Connecting Oxfordshire has been developed with three over-arching transport goals (economy, environment and society):

1. To support jobs and housing growth and economic vitality;
2. To reduce emissions, enhance air quality and support the transition to a low carbon economy
3. To protect and enhance Oxfordshire's environment and improve quality of life (including public health, safety and individual wellbeing)

To achieve these, we have developed ten objectives for transport, set out in Table 1. These support these goals, upon which we have based the structure of the policy section of this document. The objectives guide the area and route strategies and the bus, active and healthy travel and freight strategies that follow the policy section. This executive summary is not a substitute for, nor does it derogate from, the policies, strategies and text set out in the main document.

Context

Oxfordshire is experiencing economic growth. Its economy is recognised as one of the best performing in the UK and its contribution to the UK economy is well above average. For example, Workplace Gross Value Added per head averaged £30,485 in Oxfordshire in 2014, compared to the UK average of £24,958. It provides a high-performing home for start-up businesses and innovation, as recent studies have demonstrated.

Meanwhile, its population is rising: it was home to around 666,000 people in 2013, a figure that had grown by over 10% in the past decade. Economic and population growth is due to continue: Based on the Oxfordshire Strategic Housing Market Assessment, the city and

district councils (via the Oxfordshire Growth Board) have identified a need of around 100,000 new homes in Oxfordshire up to 2031, and 85,000 new jobs. This ambition is further supported in Oxfordshire's Strategic Economic Plan 2014 (SEP).

Although Oxfordshire's transport system continues to be upgraded, it will face a major challenge to cope with the number of new homes and jobs being planned for in the county over the coming years. Public transport is currently crowded in many areas and roads are congested, especially in the peak hours. Many of our urban areas have poor air quality and climate change is an issue that we need to address. We need to undertake this in a climate of rapidly diminishing central Government funding and therefore need to identify new, innovative ways of solving transport problems and of resourcing projects, working with businesses, researchers and the public in Oxfordshire.

Goal 1 - Supporting growth and economic vitality

Connecting Oxfordshire supports the growth aspirations of the SEP, the economic growth strategy for the county. Peak time travel to work is prioritised for attention, because it presents the greatest challenge to transport networks and is vital for the economy. We need innovative and traditional approaches to provide transport improvements to tackle congestion and provide new connections between homes and jobs. We will work to ensure that the transport network supports sustainable economic and housing growth in the county, whilst protecting our environmental and heritage assets, and supporting the health and wellbeing of residents.

Oxfordshire County Council is one of eight councils which have formed England's Economic Heartland, which is a strategic alliance set up to harness the economic potential of the area by taking a co-ordinated approach to planning for and delivery of strategic infrastructure. The eight councils that make up the alliance are:

- Oxfordshire County Council
- Northamptonshire County Council
- Buckinghamshire County Council
- Milton Keynes Council
- Bedford Borough Council
- Central Bedfordshire Council
- Luton Borough Council
- Cambridgeshire County Council

This establishes a strategic leadership across the area targeted at addressing barriers to economic growth. The Government's commitment to devolution provides the opportunity to seek a new regional Growth Deal through which we can implement a new delivery model: one which brings together a range of powers, responsibilities and resources in a way previously unseen. We are currently developing our proposal so that it is of the greatest potential for residents and businesses across the region and gives us the potential to lead investment in infrastructure in the area.

We will use *Connecting Oxfordshire* to seek external funding to support the delivery of transport infrastructure priorities as set out in the Strategic Economic Plan and forthcoming Infrastructure Delivery Plan. We will work in partnership with the Local Enterprise Partnership, district councils, Highways England and developers to meet the objectives of this plan and we will seek to influence and support the development of Neighbourhood Plans with a view to consistency with this plan.

Goal	Objective
Goal 1 - To support jobs and housing growth and economic vitality	Maintain and improve transport connections to support economic growth and vitality across the county
	Make most effective use of all available transport capacity through innovative management of the network
	Increase journey time reliability and minimise end-to-end public transport journey times on main routes
	Develop a high-quality, innovative and resilient integrated transport system that is attractive to customers and generates inward investment
Goal 2 - To reduce emissions, enhance air quality and support the transition to a low carbon economy	Minimise the need to travel
	Reduce the proportion of journeys made by private car by making the use of public transport, walking and cycling more attractive
	Influence the location and layout of development to maximise the use and value of existing and planned sustainable transport investment
	Reduce per capita carbon emissions from transport in Oxfordshire in line with UK Government targets
Goal 3 - To protect and enhance the environment and improve quality of life (including public health, safety and individual wellbeing)	Mitigate and wherever possible enhance the impacts of transport on the local built, historic and natural environment
	Improve public health and wellbeing by increasing levels of walking and cycling, reducing transport emissions, reducing casualties and enabling inclusive access to jobs, education, training and services.

Table 1: Connecting Oxfordshire's *goals and objectives*

We will work with partners to enhance capacity on strategic roads suffering from congestion and delays. We will work with Highways England to implement schemes to improve key junctions and traffic management on the A34, the key north-south road through Oxfordshire, although we recognise that a longer-term solution is needed to congestion on the road to

accommodate planned development and trip growth. The early years of this plan will see work on the Oxford to Cambridge expressway proposals, including examining on and off-line solutions for the A34.

We are developing a series of improvements to the A40 during this plan. This includes a new A40 park & ride site, a new eastbound bus lane from the site towards Oxford and improved facilities for cycling and walking. This will intercept car traffic west of Oxford Meadows and prevent congestion and pollution increasing on this stretch of the A40. It forms part of a more comprehensive, longer term strategy for improving transport between West Oxfordshire and Oxford, which also includes upgrade of the Cotswold Rail Line.

The A420 is another important principal route running through our county, linking Oxford with Swindon, which is congested in some areas at peak times. There is housing and employment growth both along the route in Oxfordshire, and across the county boundary in Swindon. We have developed a strategy to look at issues along the route and to suggest possible improvements should funding become available.

Congestion is not limited to the strategic road network; it is a problem throughout much of the county and in growth areas. The area strategies for Oxford, Science Vale, Bicester, Banbury, Witney and Carterton outline local transport improvements that may be required to accommodate the development identified for those areas and support Local Plans.

If we continue to see the same proportion of sole-occupancy car journeys in the future, we will simply not be able to accommodate the trips that people want to make. Through our involvement in strategic planning, we will ensure that the provision of infrastructure to support sustainable travel is a key criterion in identifying future areas of growth. We aim to minimise the need for additional road infrastructure, but where required, the investment is planned and delivered in the most sustainable manner. With housing located close to jobs, shops and schools, we can reduce the need to travel, encourage people to walk or cycle and offer more frequent and reliable high quality public transport links, reducing reliance on car travel. We will support measures that make more efficient use of the transport network and encourage and enable a greater proportion of journeys to be made on foot, cycle, or by public transport.

It is also vital that freight journeys are made using suitable routes and with minimal environmental impact and that we support initiatives to increase the proportion of freight carried by rail; we have developed a freight strategy which aims to improve the transport of freight within and through Oxfordshire, while reducing the impact of Heavy Goods Vehicles (HGVs) on communities.

Our transport strategy relies on public transport being attractive enough to offer an alternative to the private car on journeys across Oxford outside of the city centre; for travel within other towns; and on inter-urban journeys. To achieve this it will need to be very high-quality, easy to use and offer seamless integration on journeys involving different types of transport. Our LTP4 includes:

- Our **Science Transit Strategy**, which defines both our high-level vision and outline roadmap for the development of better-integrated, high-quality mobility systems across Oxfordshire, while promoting projects promoting innovation in mobility, healthy and sustainable travel (e.g. cycling, walking and Door to Door integrated travel) and integrated transport delivery, including the Oxfordshire Journey Planner;

- Our **Bus Strategy**, which sets out how we will work to improve the main countywide bus network, developing rapid transit services along the busiest routes, upgrading Premium services in the county and developing the commercial bus network;

- Our **Rail Strategy**, which sets out our ambition and priorities for rail investment in partnership with Network Rail and train operators, providing the capacity and train services necessary to support growth in the county and developing the rail network to provide inter-regional links. This includes better integration of rail and strategic bus networks and enhancing access to local rail stations.

- Our **Active & Healthy Travel Strategy**, which sets out our ambitions for walking, cycling and Door to Door integrated travel. This includes better integration of rail/bus and cycling/walking as well as developing a network of cycling routes and improving walking options

The Plan also supports access to, and development of, air travel services and facilities to support economic growth across the county, including promoting connections to Heathrow and supporting growth at London Oxford Airport.

Improving alternatives to the car will not always be enough to address congestion and pollution and the introduction of a workplace parking levy or other constraint will probably be necessary, as part of a wider programme of walking, cycling and public transport improvements. The Oxford Transport Strategy sets out proposals for this. We will manage the parking under our control and work with district and city councils to ensure that overall parking provision and controls support the objectives of local communities and this plan.

Keeping Oxfordshire's road and transport infrastructure in good condition is important for the county's economy. While potholes can cause damage to cars, they also can make bus journeys extremely uncomfortable and are a hazard to road users on two wheels. Poorly maintained footways can discourage people from walking, or even cause injuries. We will target new investment and maintain transport infrastructure to minimise long-term costs, publishing our policy on prioritisation of maintenance activity in the Highways Asset Management Plan.

Goal 2 - To reduce emissions, enhance air quality and support the transition to a low carbon economy

We will seek to ensure that the location, layout and design of new developments minimise the need to travel. Approximately 12% of people in Oxfordshire work mainly from home and there is clearly potential for this to increase. In partnership with Department for Culture, Media, & Sport, and BT, we have delivered fibre broadband infrastructure across the county, enabling over 64,000 premises to now have access to superfast broadband. This represents an estimated 90% of residences and businesses in Oxfordshire. We are now delivering phase two of the programme which will enable an estimated 95% of premises in the county to have access to superfast broadband by December 2017.

Walking is a healthy, free, and zero emission form of transport. It can be built into every journey, whether from origin to destination or to travel to bus stops and rail stations, and provides significant health benefits. The Active & Healthy Travel Strategy includes a section on how we aim to encourage and enable walking. In area strategies we will review walking networks and improve routes with the greatest potential for increasing the numbers of people walking, particularly where enhancing the pedestrian environment would improve accessibility, support economic growth, reduce car use and make routes safer for all users, as well as enhancing the pedestrian environment.

Cycling is also zero emission, so where trips by bike replace vehicle trips, this helps to reduce emissions overall. Cycling also has huge health benefits, so increasing the proportion of people who cycle regularly will help to address the problems of obesity and ill health related to inactivity. Our cycling strategy and the individual area cycling strategies set out our ambitions and proposals for this area.

We will ensure that new development adheres to the principles and philosophy set out in DfT's *Manual for Streets* and supplementary *Manual for Streets 2* as well as to subsequent guidance which the OCC intends to publish. In residential areas this will include restrictions on parking, lower speed limits where appropriate, flexible street design and more through routes for pedestrians and cyclists than for motor vehicles. We will ensure that travel plans for new developments include measures to increase walking and cycling, and that these travel plans are implemented and enforced. We will carry out targeted safety improvements on walking and cycling routes to school, to encourage active travel and reduce pressure on school bus transport.

We will promote the use of low and zero emission forms of transport, including electric vehicles and associated infrastructure, where appropriate. We will work through our Science Transit Strategy to develop and introduce low emission technology. We are supporting trials of electric buses in our county and will support further pilots where appropriate, working with business and research institutions. We will also work to reduce the carbon footprint of our transport assets and operation where economically viable, taking into account energy consumption and the use of recycled materials.

Goal 3 - Improving quality of life

To ensure that the environmental and heritage impacts of this plan are considered fully, a Strategic Environmental Assessment has been carried out, the findings of which are contained in the *Connecting Oxfordshire's* Environmental Report. We will seek to avoid negative environmental and heritage impacts of transport, seeking opportunities with new infrastructure development and through the maintenance of highway assets to enhance the natural environment and improve biodiversity. Details of how we will manage our highway assets can be found in our Highways Asset Management Plan and our Tree Management Policy.

We will work with district councils to develop and implement transport interventions to support Air Quality Action Plans by reducing harmful emissions from vehicles where feasible, giving priority to measures which contribute to other transport objectives.

We will improve urban public open spaces that are part of highway land where it is part of a wider highway improvement scheme, and we will de-clutter the street environment. We will work with partners to support Oxfordshire's 'green infrastructure', which includes our public rights of way network.

Oxfordshire is relatively healthy compared to the average for England, but this overall prosperity masks the health inequalities in the areas of deprivation, especially in some urban areas: life expectancy varies by 6.2 years for men and 2.8 years for women between the most and least deprived wards. For many people, the easiest way to build exercise into their daily routine is through walking or cycling for local journeys. Improving walking, cycling and public transport together offer the best solution for bringing accessibility to deprived areas, both rural and urban. Better transport links will provide connections with more job opportunities, shops and local centres, giving the opportunity both to improve health and to counter deprivation.

Making transport fit for an ageing population will be an important consideration in making transport improvements in coming years – including mobility scooter use and electric cycles (the latter providing an element of physical exercise) - the number of people aged 65 and over increased by 18% from 2001 to 2011 and this will be a continuing trend. We will consult at an early stage on the development of schemes and initiatives so that the needs of individuals, communities and all groups sharing a protected characteristic under the Equalities Act 2010 are considered and, where appropriate, acted upon.

Road safety is an important objective, because of the harm done to individuals by road traffic accidents and the impact on the economy from congestion caused by accidents. We will give road users the opportunity to take advantage of new technologies, for example through the use of new, safer materials and infrastructure in highway schemes, and road safety adaptations that may become permissible under new legislation, e.g. in relation to in-vehicle technology that will alert drivers to risks and potentially manage, for example the headways between vehicles.

We will provide information to support the development of road safety technologies. Monitoring casualty history allows us to target our behaviour-change programmes, and also identify sites that would benefit from maintenance or improvement schemes. We will work with partners to support road safety campaigns and will keep speed limits under review, including giving consideration to the introduction of lower speed limits and zones. We will propose engineering solutions where they would be effective in helping reduce accidents on parts of the highway network where a significant number of accidents occur.

3. Introduction

Transport and economic growth

1. Oxfordshire is expecting, and planning for, strong economic growth. It is already recognised nationally for its universities and the strength of its science-based knowledge industries, with many high-technology firms that now form an Oxfordshire technology cluster with outstanding strengths in four overlapping industries.[1] The ambition of the Oxfordshire Local Enterprise Partnership (LEP) is for it to be a global leader in 'Big Science'.

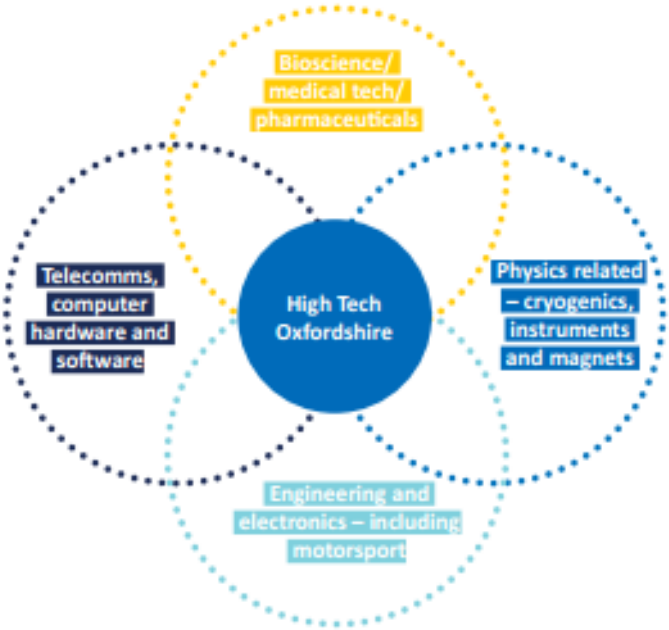


Figure 1: High Tech Oxfordshire (Source: Oxfordshire Strategic Economic Plan, 2013)

2. The growth of these sectors has been supported by a unique grouping of research facilities in Oxfordshire, including the UK Atomic Energy Authority Culham Centre

[1] The Oxfordshire Innovation Engine, Realising the Growth Potential, SQW, October 2013
[2] 'Science Vale' is the term applied to an area encompassing the county's key high tech business parks: Milton Park, Culham and Harwell Campus, and their nearby towns of Wantage, Grove and Didcot.

for Fusion Energy; the Science and Technology Facilities Council; Rutherford Appleton Laboratory; Diamond Light Source, the national synchrotron facility; the Medical Research Council's facilities at Harwell; Begbroke Science Park; and the Satellite Applications Catapult Centre. Proximity to these facilities, combined with Oxford's global academic reputation and its strategic position at one apex of the UK's 'Golden Triangle' with Cambridge and London, provides huge potential for inward investment and for businesses to spin out and grow in high quality business locations across the region: Oxford's science parks, Bicester, Science Vale[2] , the Enterprise Zone, and beyond.

3. High-tech sectors are expected to create the majority of the 85,000 plus new jobs anticipated in the county up to 2031. To do this they will need to retain and attract a large, skilled workforce. To achieve the agglomeration benefits of location in Oxfordshire, there will need to be excellent links between businesses and research establishments in the county, as well as to research establishments, suppliers and customers elsewhere in the UK and globally.

4. The Oxfordshire LEP's Strategic Economic Plan (SEP) sets out the investment that will be required to realise this growth. It focuses on providing homes, developing skills and improving connectivity and is now the basis upon which the majority of central Government funding for transport improvements is awarded locally, via the Local Growth Fund (LGF). The SEP's focus on high tech economic activity means that Government funding for transport schemes will be largely focused on links within the area encompassing Bicester, Oxford and Science Vale, known as the Knowledge Spine, as well as improving access to it from important centres elsewhere in Oxfordshire, the UK and overseas.

5. In addition to Growth funding, the Government is investing heavily in strategic transport infrastructure that will support Oxfordshire's economic development. These include important schemes such as railway electrification, East-West Rail, which will reconnect Oxford to Milton Keynes and Cambridge by rail, and direct rail access from the west into Heathrow. Additionally, Highways England is developing a route based strategy linking Southampton and the East Midlands, which will include improvements to the A34 and the development of an Oxford to Cambridge expressway. However, where business cases for transport schemes cannot be linked to the SEP and are neither rail investment nor Highways England schemes, it will be more challenging to obtain central Government funding, with increased reliance on developer funding.

6. The authorities in England's Economic Heartland have set out a proposal for a strategic alliance to harness the economic potential of the area by taking a co-ordinated approach to planning for, and delivery of, strategic infrastructure. Through this alliance, we would be able to look across investment programmes – both locally and nationally – and best take advantage of the opportunities to fund transport and other strategic investment across the growth areas of the region. We are currently developing our proposals so that they are of the greatest potential for residents and businesses across the region and give us the potential to lead investment in infrastructure in the area.

7. *Connecting Oxfordshire* therefore sets out our policy and strategy for the whole county, supporting the SEP but also setting out our priorities for parts of the county less

affected by growth in the Knowledge Spine. It thereby provides a basis for securing transport improvements to support development countywide, providing a basis to build our investment decisions on in the coming years.

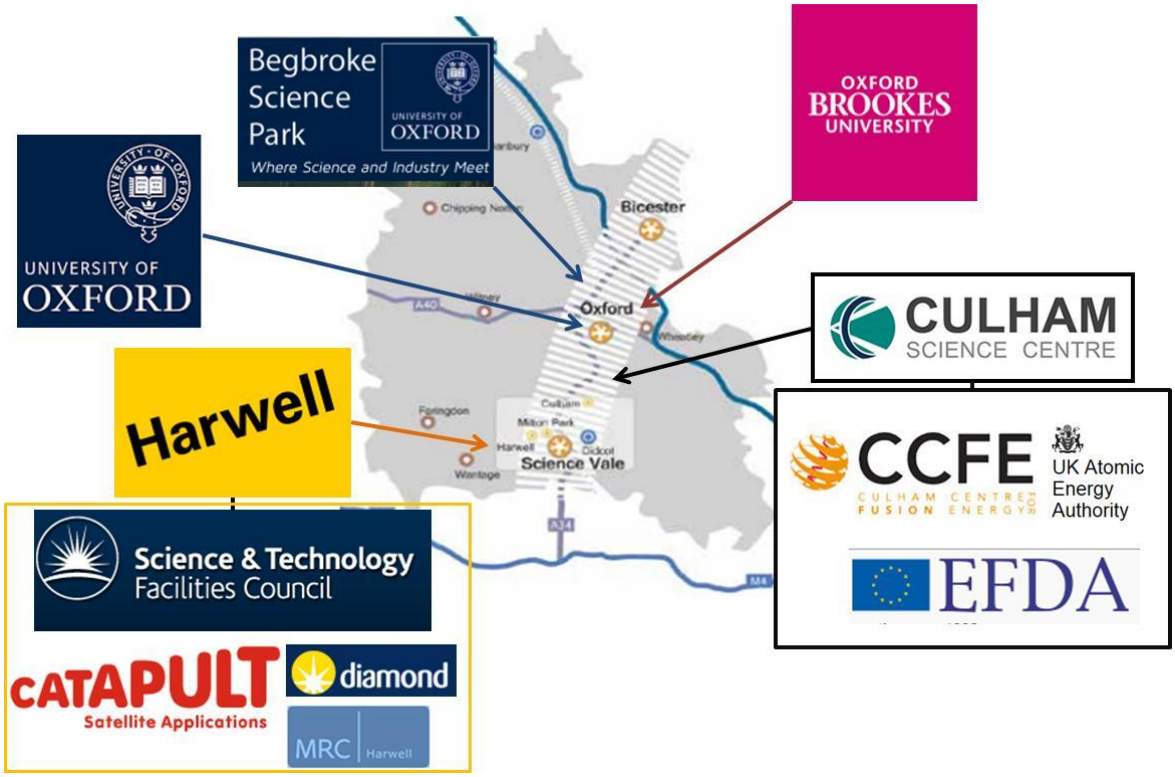


Figure 2: Oxfordshire's Knowledge Spine

Goals for transport

8. While *Connecting Oxfordshire* focuses on supporting growth in Oxfordshire, it also sets out how we will protect public health and the environment, which could be threatened by development unless action is taken. The growing economy and the transport improvements it brings have the potential to improve quality of life for all of Oxfordshire's residents; *Connecting Oxfordshire* aims to reduce inequality and promote equality of opportunity. This balanced approach fits with our highest level strategic aims, as set out in the Sustainable Community Strategy, *Oxfordshire 2030*, which sets out the long-term partnership vision and strategy for Oxfordshire. Its aims are to
   - Create a world class economy for Oxfordshire;
   - Have healthy and thriving communities;
   - Look after our environment and respond to the threat of climate change; and,
   - Reduce inequalities and break the cycle of deprivation.

9. The balanced approach of *Connecting Oxfordshire* also aligns with the Government's vision for local transport, as expressed in the 2011 White Paper *Creating Growth, Cutting Carbon: Making Sustainable Local Transport Happen*. Our vision is for a transport system that is an engine for economic growth, but one that is also greener, safer and improves quality of life in our communities.

10. With this vision and aims in mind, following consultation with the public and a wide range of stakeholders, we have developed a set of high level goals for transport improvement and innovation for *Connecting Oxfordshire*. These are:
    1. **To support jobs and housing growth and economic vitality;**
    2. **To reduce emissions, enhance air quality and support the transition to a low carbon economy**
    3. **To protect and enhance the environment and improve quality of life (including public health, safety and individual wellbeing).**

11. To achieve these goals we have developed ten objectives for transport:

Goal 1: Supporting growth and economic vitality

- Maintain and improve transport connections to support economic growth and vitality across the county;
- Make most effective use of all available transport capacity through innovative management of the network;
- Increase journey time reliability and minimise end-to-end public transport journey times on main routes; and
- Develop a high quality, innovative and resilient integrated transport system that is attractive to customers and generates inward investment.

Goal 2: Reduce emissions, enhance air quality and support the transition to a low carbon economy

- Minimise the need to travel;
- Reduce the proportion of journeys made by private car by making the use of public transport, walking and cycling more attractive;
- Influence the location and layout of development to maximise the use and value of existing and planned sustainable transport investment; and
- Reduce per capita carbon emissions from transport in Oxfordshire in line with UK Government targets.

Goal 3: Improving quality of life

- Mitigate and wherever possible enhance the impacts of transport on the local built, historic and natural environment; and
- Improve public health and wellbeing by increasing levels of walking and cycling, reducing transport emissions, reducing casualties, and enabling inclusive access to jobs, education, training and services.

The scope of *Connecting Oxfordshire*

12. *Connecting Oxfordshire* builds on an existing programme of highway and transport schemes focused on unlocking economic growth. It sets out a new transport strategy for the whole of Oxfordshire, covering the period 2015-2031. The end date of 2031 has been chosen to tie in with the period of the Local Plans published or being put in place by Oxfordshire's district councils. *Connecting Oxfordshire* considers the needs of

residents, employers, as well as people travelling to and through Oxfordshire, including tourists.

13. It has been developed with Oxfordshire's district and city councils in conjunction with the development plan process, to take account of the future location of housing and employment within the county. It also takes account of the transport challenges created by future development outside but close to the county boundary, for example on the east side of Swindon approved as part of the Swindon Local Plan.

14. However, the situation with regard to local plans is still evolving, largely in response to the 2014 Oxfordshire Strategic Housing Market Assessment (SHMA), and other spatial and related plans under development,. OCC in its capacity as infrastructure provider and enabler will continue to work with the district and city councils on spatial planning for the county to ensure efficient and effective allocations of future growth.

15. *Connecting Oxfordshire* therefore closely links national and local land-use and transport planning policies, and aligns with the National Planning Policy Framework (NPPF). It also takes into account national and local transport and enterprise policies. This is shown in Figure 3.

Strategic approach

16. Our strategy to 2031 acknowledges that predicting and providing fully for increased demand for road travel by car and freight vehicles, in the form of highway capacity improvements, is neither affordable, nor desirable from an environmental or economic perspective. It is vital that journeys made by sole-occupancy private vehicles make up a smaller proportion of transport mileage in future, and that more journeys are by means of transport that take up less road capacity or do not use roads at all. This is necessary simply to accommodate all the journeys that people and goods need to make. This plan does include road schemes to connect new developments, but we will be seeking to make best use of existing capacity taking advantage of smarter methods, mindful that any additional capacity has the potential to generate additional car traffic

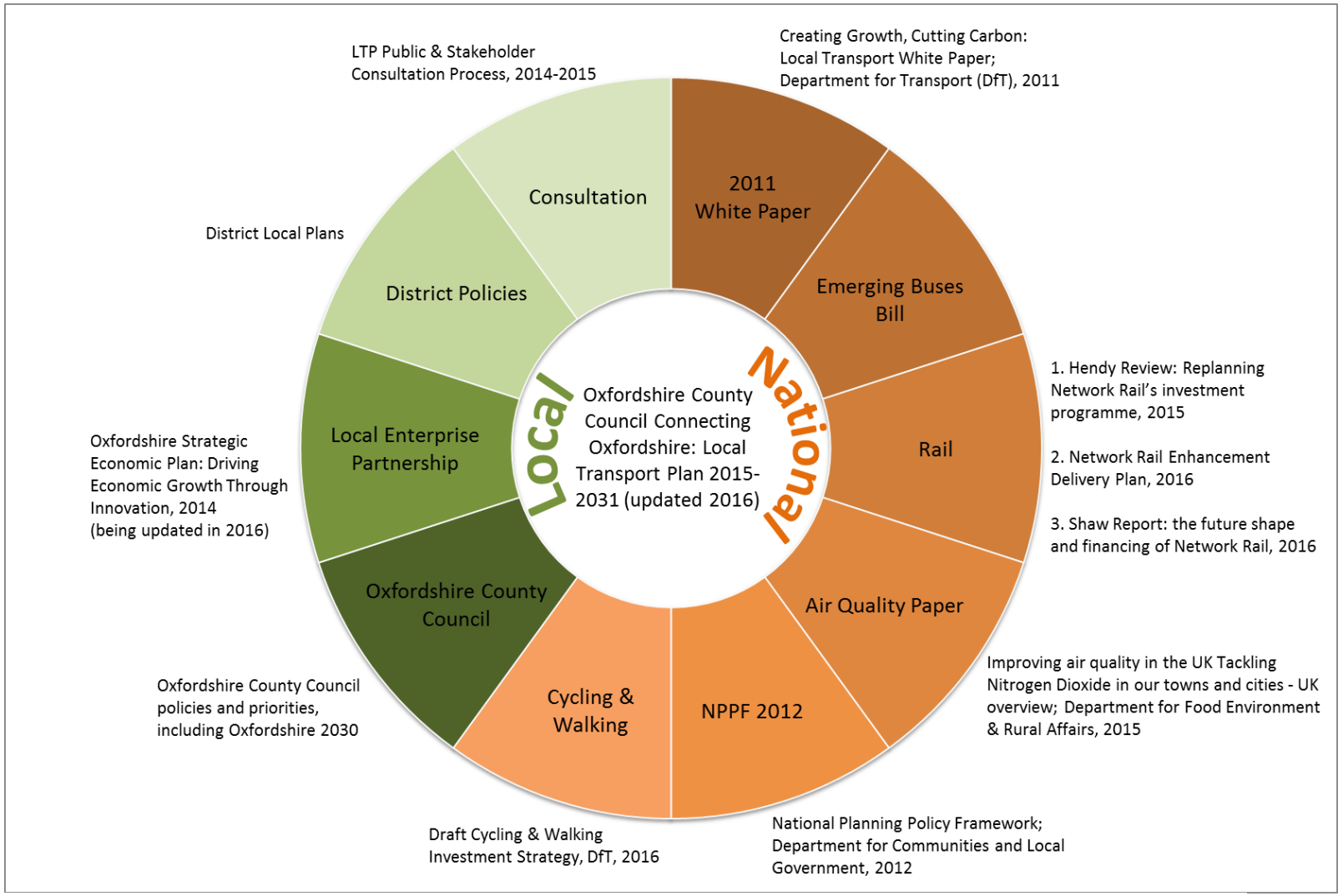


Figure 3: Connecting Oxfordshire*'s relationship with current national and local transport and planning policies and with the Oxfordshire Strategic Economic Plan*

4. Oxfordshire now and in 2031

Oxfordshire now

Population and health

17. Oxfordshire is home to around 666,000 people, an increase of over 10% in the past decade. The county is divided into five district council areas: Oxford City, Cherwell, South Oxfordshire, Vale of White Horse and West Oxfordshire. Nearly a quarter of the county's residents live in Oxford City with the remainder split fairly evenly over the other four districts. The county is the most rural county in the south east of England, and over 30% of the population live in towns and villages of less than 10,000 people.

18. Overall in the last decade, the population has become older, with the number of people aged 65 and over increasing by 18% while the number of people aged 85 years and over increased by 30%. The age profile of Oxford's population is very different from the rest of the county, however, with a smaller proportion of older people and a much larger population in the 20-30 age group due to the high numbers of students.

19. Oxfordshire's population is relatively healthy, with a relatively high percentage of physically active adults compared to the average for England. However, rising obesity, low exercise levels and related health issues are still concerns, as they are nationally: 20% of people walk for more than 20 minutes less than once a year or never in England. Oxfordshire's overall prosperity masks some stark contrasts, particularly within urban areas. There are nine wards containing small areas among the 20% most deprived in England: two in Banbury, one in Abingdon, and the rest in Oxford. This is reflected in health inequalities across the county, with poor health strongly linked to deprivation: life expectancy varies by 6.2 years for men and 2.8 years for women between the most and least deprived wards.

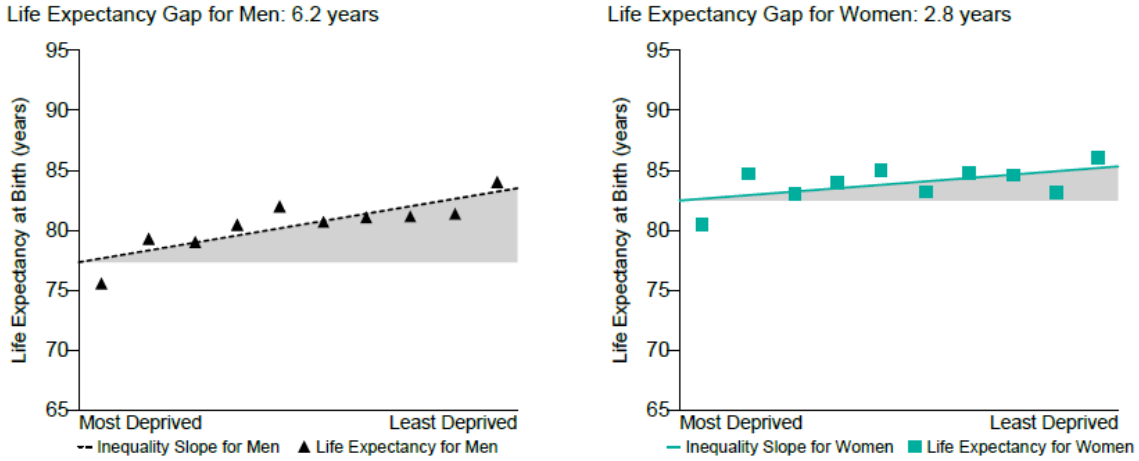


Figure 4: Life expectancy gap between most and least deprived wards in Oxfordshire (Source: Public Health England Health Profile 2014)

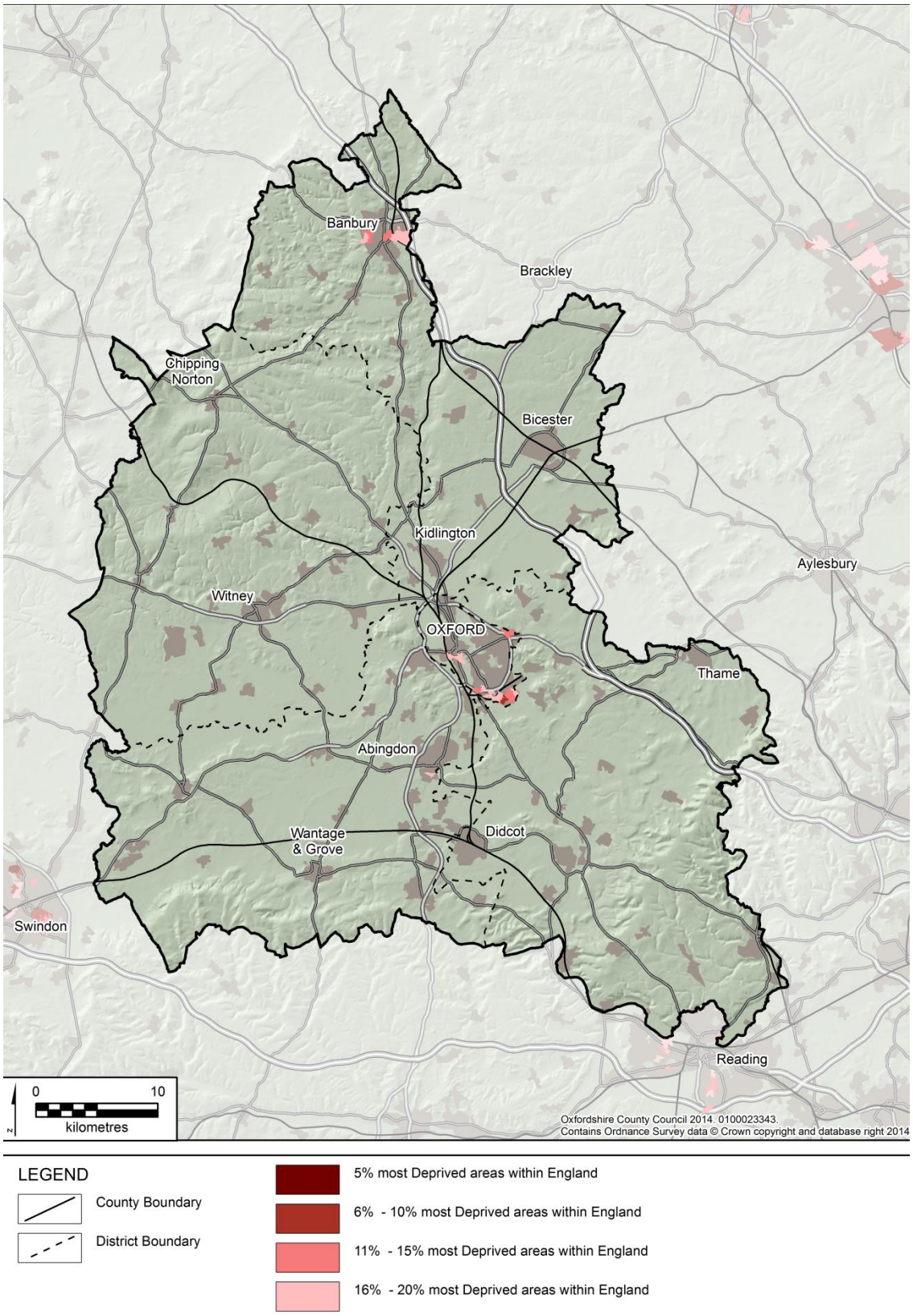


Figure 5: Deprivation in Oxfordshire: wards containing areas among the 20% most deprived in England (Source: DCLG Index of Multiple Deprivation)

Natural and historic environment

20. Oxfordshire has a rich and varied natural and historic environment, which makes it an attractive place to live, visit and work. To the north-west, the rolling hills and golden limestone villages of the Cotswolds are a magnet for tourists including walkers along the Ridgeway National Trail. To the south the landscape is dominated by the escarpments of the North Wessex Downs and the Chilterns. In between, the valleys and the flood plains of the Thames and its tributaries dominate the landscape, providing valuable farmland and lowland habitats, active gravel workings as well as a legacy of gravel extraction. The rivers themselves, particularly the Thames, offer a wealth of opportunities for leisure activities, including the Thames Path National Trail, but flood most winters with increasing severity and regularity, affecting the transport network and hundreds of homes.

21. The county contains part of three Areas of Outstanding Natural Beauty (AONB): the Cotswolds, North Wessex Downs, and the Chilterns, and a large area encircling Oxford is designed as Green Belt (see Figure 6). There are seven internationally designated conservation sites (all Special Areas of Conservation) wholly or partly within Oxfordshire, 105 Sites of Special Scientific Interest (SSSI) and nine National Nature Reserves. However, despite the presence of these sites, a number of wildlife species have been lost from or have been in decline in Oxfordshire. For example, three species of butterfly have been lost from the county in the last ten years. Semi-natural habitats such as grassland and heathland have been in decline across the county. Poorly-managed and poorly-designed developments have also taken place in recent decades in both rural and urban locations that were home to wild plants and animals. More information is in the Strategic Environmental Assessment which accompanies this document.

22. Oxfordshire also has a rich heritage and archaeological resource, with Blenheim Palace UNESCO World Heritage Site (WHS), 55 Registered Parks and Gardens, nearly 13,000 listed buildings, 242 Conservation Areas, 2 historic battlefields and approximately 350 Scheduled Monuments. These help make the county a major tourist destination.

Figure 6: Oxford's Green Belt (source: CPRE)

Economy and travel characteristics

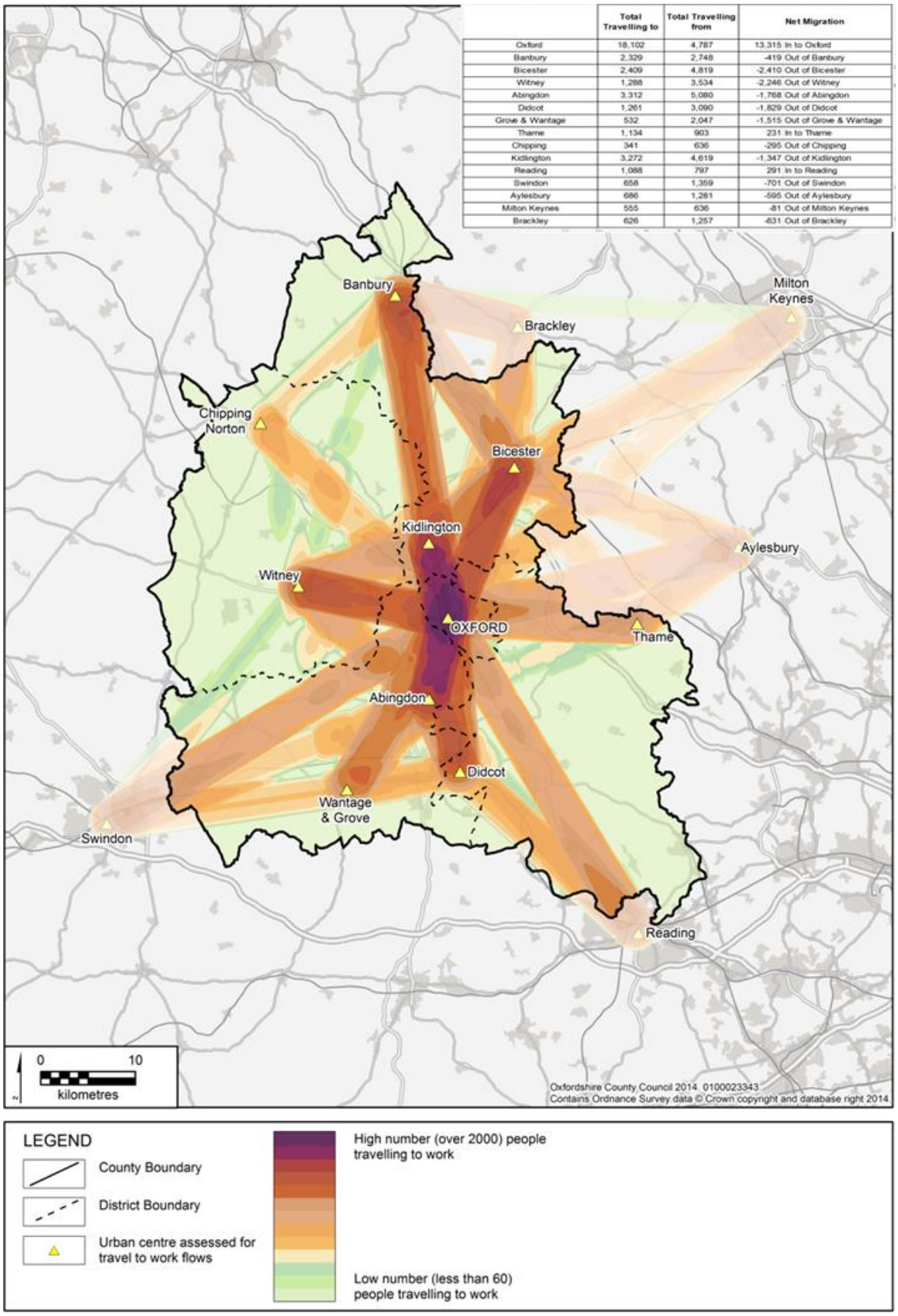
23. Oxfordshire is home to nearly 30,000 businesses, providing over 380,000 jobs, including a high proportion in research, science and technology, engineering, and high-tech manufacturing. The county's economy is recognised as one of the best performing in the UK and its contribution to the national economy is well above average. In 2014 Oxfordshire contributed £20.5 billion to the UK economy. Workplace Gross Value Added per head in Oxfordshire averaged £30,485 in 2014 up 4.8% from 2013, compared to the UK average of £24,958.

24. Oxford's unique character as a leading university city and a historic centre sets it apart from the rest of the county, and attracts much more travel than most towns or cities of comparable size. Tourism, business and academia are vital to the economy and 35% of the county's jobs are in the city. Due to the high number of jobs and the shortage and cost of housing in the city, more people commute to Oxford from outside the city than are working residents. The city also provides the majority of the county's hospital services, with three major teaching hospitals, as well as psychiatric and private

hospitals. Oxford is therefore by far the most important 'centre of gravity' in the county, though as we have seen in the previous chapter, Bicester and the Science Vale are growing in economic importance.

25. Oxfordshire's rural areas are generally prosperous, however, so although many of its towns are largely commuter towns, they have managed to retain economic vitality as attractive and thriving local centres providing a good range of services. Banbury is more self-contained and experiencing jobs growth itself, with 60% of working residents having jobs in the town, besides the significant number commuting to Oxford.

26. Oxfordshire sits on the busy road and rail transport corridor between the south coast ports, the Midlands and the north and enjoys easy links to London and the West Midlands via the M40. However, it suffers a lack of connectivity to and from the east, in particular to the high-value growth areas around Milton Keynes and Cambridge. There are currently no direct rail connections to these centres, while travel by road involves cross-country single-carriageway routes or the use of the M25 around London. Improving the connectivity on this corridor – through East-West Rail and the Oxford to Cambridge Expressway projects - will place Oxfordshire at the centre of the south-east orbital corridor as a key hub for south-west to north-east transport. As a result, Oxfordshire will have improved agglomeration opportunities for jobs, growth and innovation, with its vastly-improved road and rail links to these high-value centres of the UK economy.



	Total Travelling to	Total Travelling from	Net Migration
Oxford	18,102	4,787	13,315 In to Oxford
Banbury	2,329	2,748	-419 Out of Banbury
Bicester	2,409	4,819	-2,410 Out of Bicester
Witney	1,288	3,534	-2,246 Out of Witney
Abingdon	3,312	5,080	-1,768 Out of Abingdon
Didcot	1,261	3,090	-1,829 Out of Didcot
Grove & Wantage	532	2,047	-1,515 Out of Grove & Wantage
Thame	1,134	903	231 In to Thame
Chipping	341	636	-295 Out of Chipping
Kidlington	3,272	4,619	-1,347 Out of Kidlington
Reading	1,088	797	291 In to Reading
Swindon	658	1,359	-701 Out of Swindon
Aylesbury	686	1,281	-595 Out of Aylesbury
Milton Keynes	555	636	-81 Out of Milton Keynes
Brackley	626	1,257	-631 Out of Brackley

Figure 7: Main travel to work flows in Oxfordshire [Source: Census 2011]

27. The existing good links between Oxfordshire and London, Birmingham, Heathrow Airport and Southampton are currently used by a high volume of through traffic which can result in long delays to journeys by road. The M40 carries the most traffic, particularly on the stretch between junctions 9 and 10, which links the A34 via the A43 to the M1 and carries over 100,000 vehicles per day. The A34 carries up to 70,000 vehicles per day, including a large proportion of lorries. As the county relies heavily on the A34 for internal trips, and it forms part of the Oxford ring road, the severe congestion it suffers is damaging to the local, as well as the national economy. It is particularly vulnerable to disruption due to incidents, because of the lack of alternative north-south routes for journeys both within and through the county. The delivery of the Oxford-Cambridge Expressway will increase demand further for through travel on the A34, meaning that finding a long-term solution to congestion on the A34 will be important.

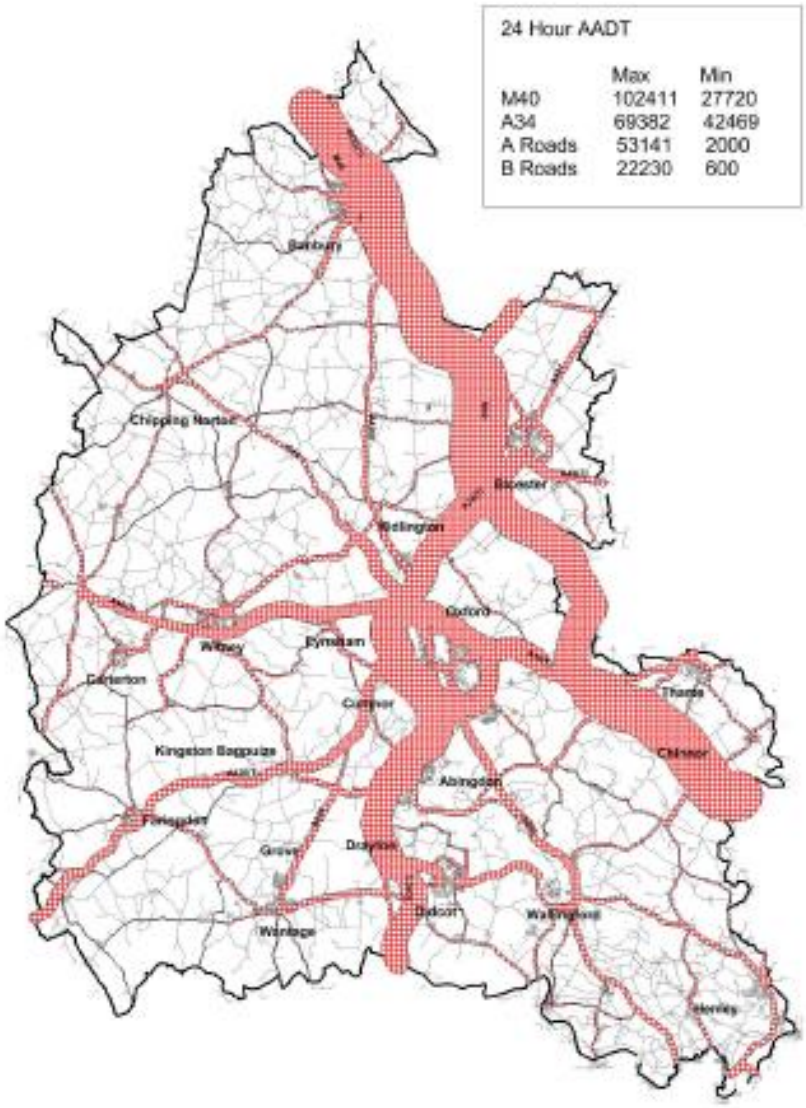


Figure 8: Annual average daily traffic flow bandwidth map – based on automated traffic counts throughout Oxfordshire. (Source: Oxfordshire County Council Transport Monitoring)

28. Car ownership and car usage is high outside Oxford, with 87% of households owning a car – compared with only 67% in Oxford. This is reflected in the high proportion of journeys made by car outside Oxford, including a large number of short trips within the county's towns. Although 50% of journeys to central Oxford are by bus, most of the city's jobs are in the more outlying areas to the east of the city, which are less accessible by public transport.

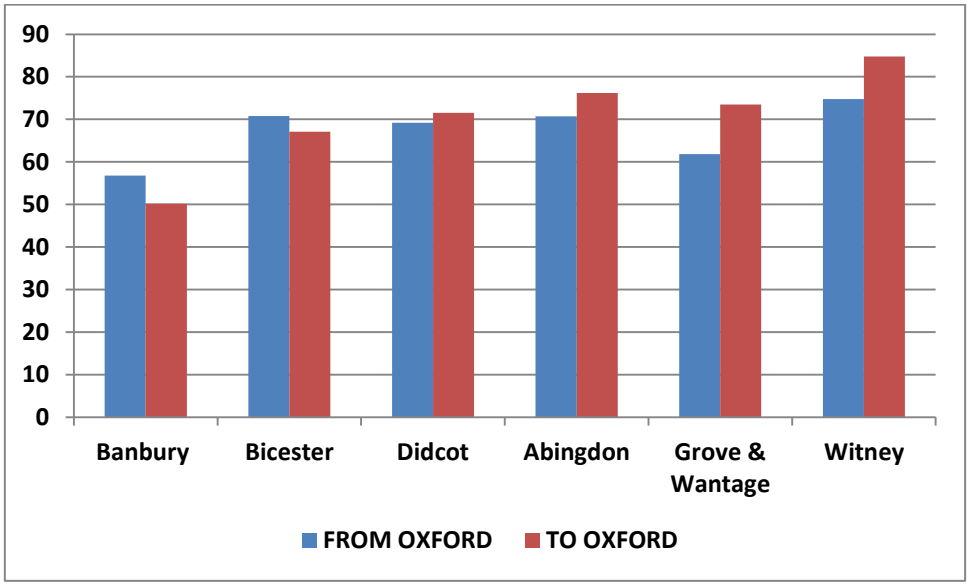


Figure 9: Car commuting between Oxford and large Oxfordshire towns as a percentage of overall commuter journeys [Source: Census 2011]

29. There is a good network of frequent bus or rail services linking the county's main towns with Oxford, yet the proportion of car journeys between these towns and Oxford remains stubbornly high. In part this is due to the success of Park & Ride on the edge of Oxford, which has been developed since the 1970s in conjunction with restrictions on access to the city centre. However, it means that the road corridors leading to Oxford used by buses all suffer from congestion. Our new approach to Park & Ride, based on an outer ring of sites, is our proposal to resolve this.

30. The A40, which is a major through route linking Gloucester and London, intersects with three key radial routes to the north of Oxford, where it forms part of Oxford's ring road, causing serious delays between Witney and Oxford. Much of the traffic using this route is accessing the large employment sites in the eastern arc of Oxford.

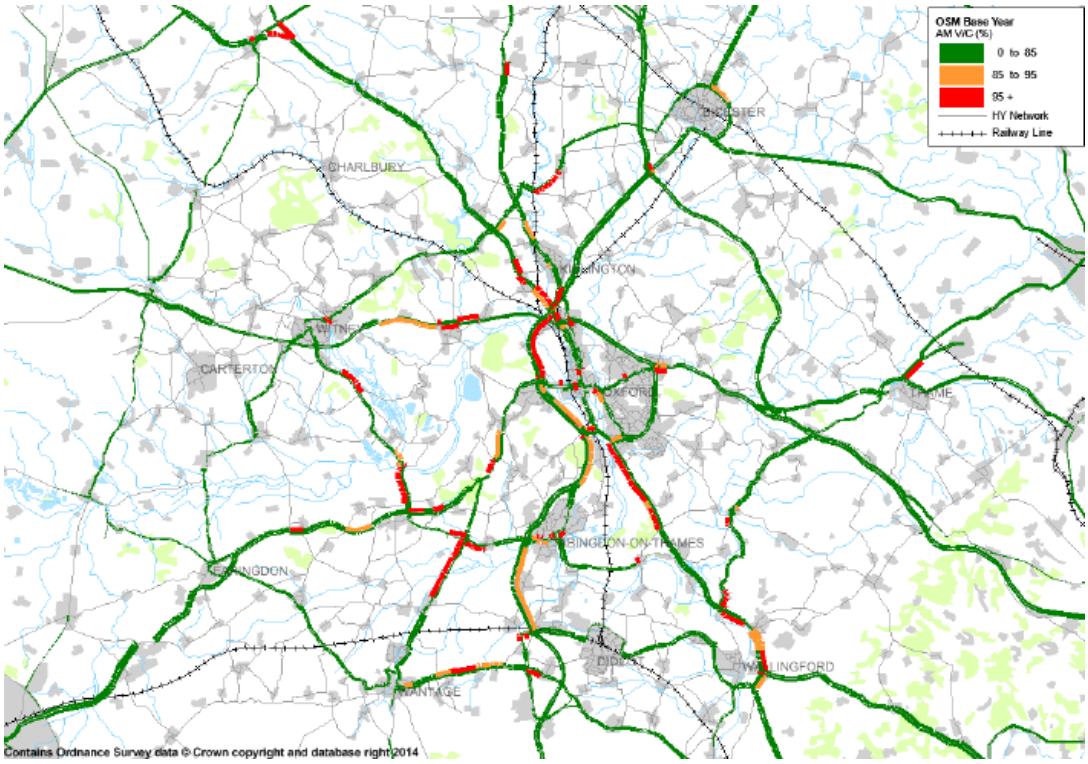


Figure 10: ***Highway Network in the morning peak – volume of traffic in relation to road capacity (85% to 95% = at capacity, 95% plus = over capacity)***

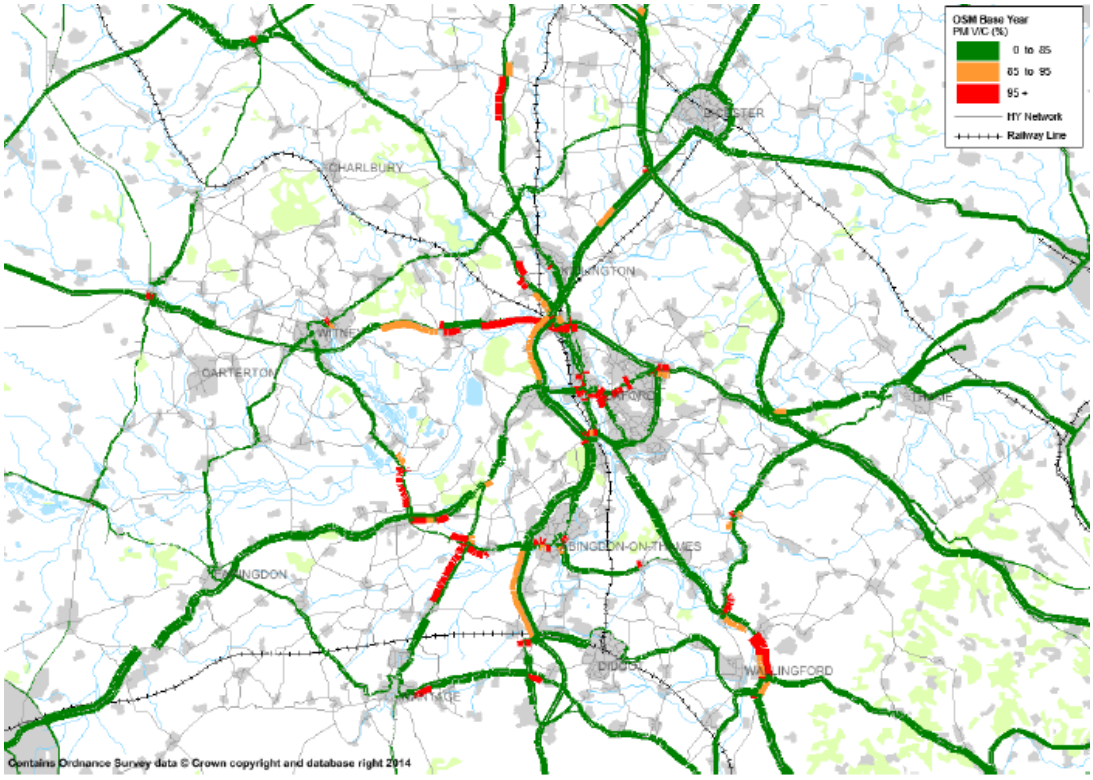


Figure 11: ***Highway Network in the evening peak – volume of traffic in relation to road capacity (85% to 95% = at capacity, 95% plus = over capacity)***

31. Within Oxford, there is a mature and well-used network of commercial bus services, including regular services to the city centre from five park and ride sites on the edge of the city. Most radial routes have stretches of bus lane, but these are not continuous due to lack of available space. A Quality Bus Partnership between the city's two main bus operators and the County Council has led to a joint smartcard ticketing arrangement and consolidation of services on larger vehicles. Vehicles are among the most modern and low emission in the country.

32. Within Oxfordshire's towns, commercial bus networks are relatively less well developed. The quality of cycling and walking networks is variable, with some towns having had very little investment in pedestrian and cycling infrastructure. Although there is a charge for most town centre parking in district council car parks other than in West Oxfordshire, many of the trips within the towns are to workplaces with ample staff parking, edge of town retail, or schools. This means that even for internal trips, a very high proportion are still made by car.

33. In rural areas, away from the main transport corridors leading to Oxford, until recently the county council has funded a network of subsidised local bus services, linking to local town centres. However, severe reductions in local government funding mean that from July 2016 these services are no longer affordable; but we are working with bus operators and using developer funding where appropriate to sustain local bus services where there is the potential for these to become commercially viable in the future.

34. There are also a few small voluntary community minibus schemes, as well as some fairly large volunteer car schemes, mainly offering transport to hospital appointments for older and disabled people.

35. Many people without cars (especially disabled and elderly people and those living in areas without a regular bus service) rely heavily on taxis, which are regulated by the district councils. Over 8,000 people are registered on the Oxfordshire Liftshare database, of which 46% of people have contacted others with a view to arranging a liftshare and registrations are steadily increasing with an average of around 50 new members joining each month over the last year. We know that about 1,300 of these have sent a request to someone else on the system to share a journey, but actual share rates are likely to be higher than this: we estimate we are saving a little over 1.75m miles over a year. We will continue to promote this scheme in light of the removal of subsidised bus routes as an alternative way to travel.

36. In Oxford city, there are community car schemes in East Oxford, Cowley, Headington and Iffley. Many villages in the county run volunteer hospital transport schemes for those without cars, while school transport and transport to daycare services are offered by our Integrated Transport Unit.

37. In Oxford socio-economic conditions and high housing density provide suitable conditions for commercial car clubs to succeed, and the County Council will give

favourable consideration to requests for priority parking for these, having regard to the needs of local residents and businesses.

38. Over 25% of Oxford residents who work in Oxford cycle to work, with a further 25% walking and 20% using the bus. Many people commute to Oxford by bike from nearby settlements, particularly Kidlington, Yarnton, Botley and Abingdon. However, the quality of the cycle links is variable, and given the short distance from Oxford, there is scope to increase levels of cycling through targeted improvements to cycling infrastructure. Elsewhere, cycle routes along inter-urban routes are largely non-existent, the notable exception being the cycle track alongside the A40 linking Witney and Wheatley to Oxford. The speed of traffic using inter-urban routes without cycle facilities is a major deterrent to cycling. Cycling levels in other towns are generally much lower than in Oxford. The Active & Healthy Travel Strategy includes a commitment to improve facilities for Door to Door travel (e.g. combining cycling or walking with bus and/or rail in locations where there is most potential demand.

Maintenance

39. The County Council is responsible for the maintenance of over 4500 km of roads in Oxfordshire. Like in other parts of the UK, the condition of the road network has deteriorated over recent years. This is as a result of a severe shortage of funding for maintenance, of increasing numbers of heavy vehicles using roads which were not originally designed to carry them, and successive harsh winters and flooding. For cyclists and pedestrians in particular, poor maintenance is a safety hazard and can deter people from walking and cycling. Funding levels over the last 25 years have been such that roads are able to be rebuilt approximately every 255 years on average, as opposed to the optimal 40 years.

40. Although Oxfordshire is in a better position than the national average, with only 11% of roads in a poor condition compared with 18% nationally, it is estimated that to bring all roads within Oxfordshire alone up to a good state of repair would cost £165 million and then an on-going year on year investment of approximately £20m per year to maintain that condition level.

Emissions from transport

41. Heavy traffic and congestion contributes to high levels of emissions from transport in Oxfordshire. Greenhouse gas emissions from domestic transport in the UK grew by 8% between 1990 and 2007, with improved fuel economy from new cars slightly offset by growth in road traffic. This was followed by a fall of 8% between 2007 and 2009, mainly due to reductions in road traffic during the recession and, to a lesser extent, improvements in car fuel economy and the increased use of biofuels. Car travel contributed 58% of the total and heavy and light goods vehicles about 30% in 2009. Under the Climate Change Act 2008 the Government is required to reduce emissions in the UK by at least 34% by 2020 and 80% by 2050, from 1990 levels.

42. More immediate and localised effects are felt from emissions of oxides of nitrogen (NOx), which cause respiratory illness and shorten lives. Nitrogen deposition also has a

negative impact on wildlife, by fertilising the soil, encouraging fast-growing species which then out-compete other, rarer species. The biggest contributors of NOx are heavy diesel engines, and at some locations in the county, NOx levels affecting people near roads exceed maximum levels. Several Air Quality Management Areas have been declared, with a number of areas under investigation. In Oxford city centre, buses are subject to a Low Emission Zone, which means modern, cleaner buses are used for services within and into central Oxford. The Oxford Low Emission zone does not apply to other types of vehicle, and freight contributes a high proportion of NOx at most AQMAs. Rail electrification should improve air quality adjacent to rail lines and around stations.

Road safety

43. While every casualty is one too many, Oxfordshire has seen a long term downward trend in the number of casualties on our roads which has been broadly in line with the trend seen nationally, although this reduction has slackened in recent years. There were 18% fewer casualties overall in 2015 compared with the average totals seen in 2005-2009.

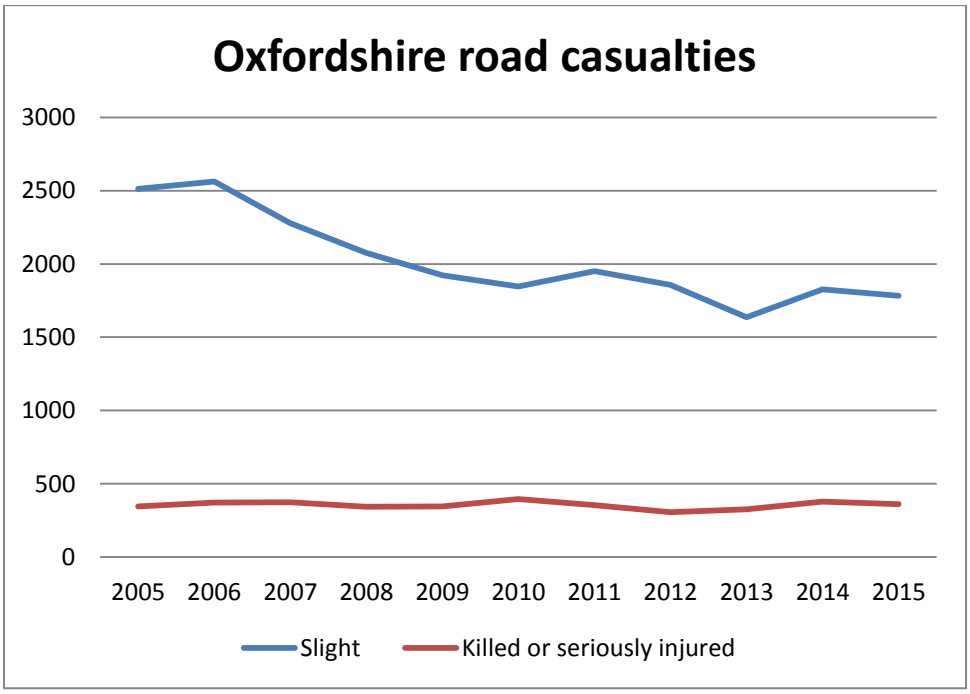


Figure 13: Oxfordshire road casualties 2005-2015

44. The notable exception to the general downward trend is for cycle casualties, where the number of injuries in 2015 was 25% higher than the average total for 2005-2009. While this needs to be seen in the context of increasing numbers of people cycling, pedal cyclists have a significantly higher risk of accident involvement per mile travelled as compared to car occupants. The Active & Healthy Travel Strategy contains our updated Cycling Strategy, which includes our plans to provide a safer environment for cyclists.

45. Motorcyclists also continue to suffer a very high casualty rate; around 25% of those killed or serious injured (KSI) on Oxfordshire's roads are motorcyclists, but they

account for only about 1% of traffic, and collectively they suffer around 56 times more KSI casualties per mile travelled than car occupants.

46. We record and analyse data from casualty reports received from Thames Valley Police. This includes information about weather and road conditions and other factors, as well as the circumstances surrounding the incident. Traffic collisions are most likely to occur when roads are slippery due to rain or ice and when visibility is reduced by poor light or fog. Other major contributing factors to accidents include excessive speed, tiredness, alcohol and drugs, and driver distractions caused by mobile phones or other devices. The severity of casualties is increased when seatbelts are not worn, and when motorcyclists do not wear protective clothing.

Oxfordshire in 2031

47. Over the life of this Plan, Oxfordshire faces a number of strategic challenges, which also present significant opportunity for purposefully-directed growth and local improvement. Looking ahead to the future, *Connecting Oxfordshire* needs to ensure that the high level of housing and economic growth expected in the county do not make the existing situation worse, but it also needs to take account of likely societal, behavioural and technological changes over the plan period, as well as changes to national strategic policies and transport infrastructure.

48. Oxfordshire's population will grow due to normal patterns of fertility, mortality and migration, but also as a result of the planned economic growth ambitions set out in the SEP, which will attract workers to live in the county. The assumptions of Oxfordshire Strategic Housing Market Assessment (SHMA) carried out in 2014 to assess the county's level of housing need, were based on an economic forecast reflecting the policy-led economic growth in the SEP.

49. The SHMA predicts around 100,000 new houses will be needed in Oxfordshire, between now and 2031, to support economic growth and meet affordable housing need. Oxfordshire's districts are now taking this into consideration through the development plan process. Figure 14 indicates the development envisaged in very broad terms and the additional commuter trips anticipated. *Connecting Oxfordshire* will be revised to take decisions on where growth and jobs will be specifically located.

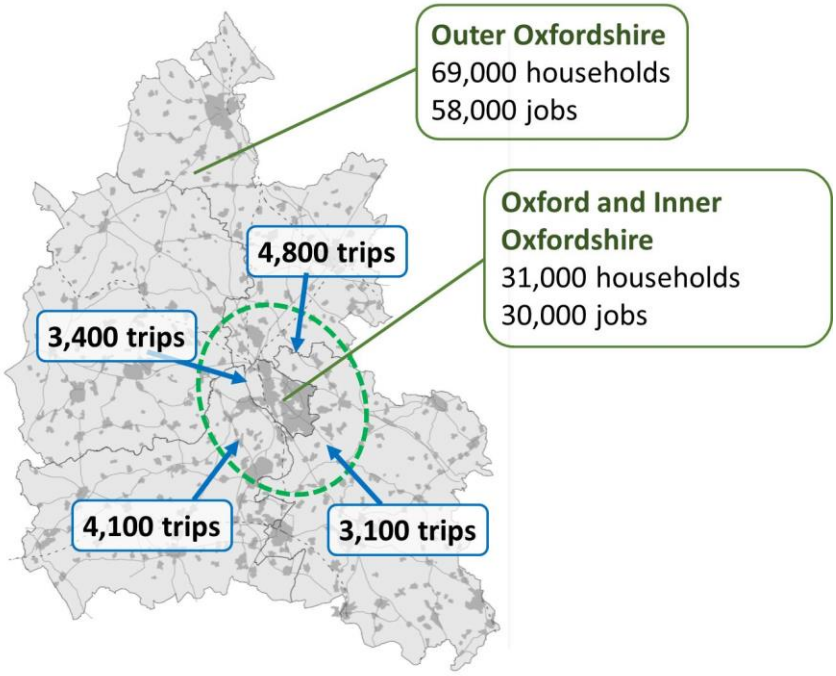


Figure 14: Strategic housing and employment allocations in Oxfordshire in 2031 (SHMA housing growth & Cambridge Econometrics jobs forecast), with our estimate of additional commuter trips into the area in and around Oxford

50. The potential impact of housing and jobs growth on the county's transport networks, taking into account committed transport infrastructure, has been forecast using a strategic transport model. The model shows many junctions over capacity in 2031, and severe delays on many routes, especially the A34, A40, A338 and A4074. These forecasts do not take into account the full level of housing need in the SHMA - when that is added to the model the situation will be worse. However, because the level of future growth has only been quantified at a countywide level, we have no detailed knowledge yet of where the development will be located, so this model uses various policy-level assumptions.

51. Unless drastic changes are made by 2031, congestion will have a severe impact on the economy and people's daily lives, with many journeys being effectively impossible. Forecasts show that additional transport capacity is required, though this does not necessarily mean more roads. New strategic road and rail infrastructure (see future rail links in Figure 17) will also change travel patterns and have wider impacts in Oxfordshire. Notable schemes include Highways England's capacity improvements on the A34, the Oxford to Cambridge Expressway, and East-West Rail, which will provide access to Milton Keynes and beyond, as well as rail access to Heathrow from the west.

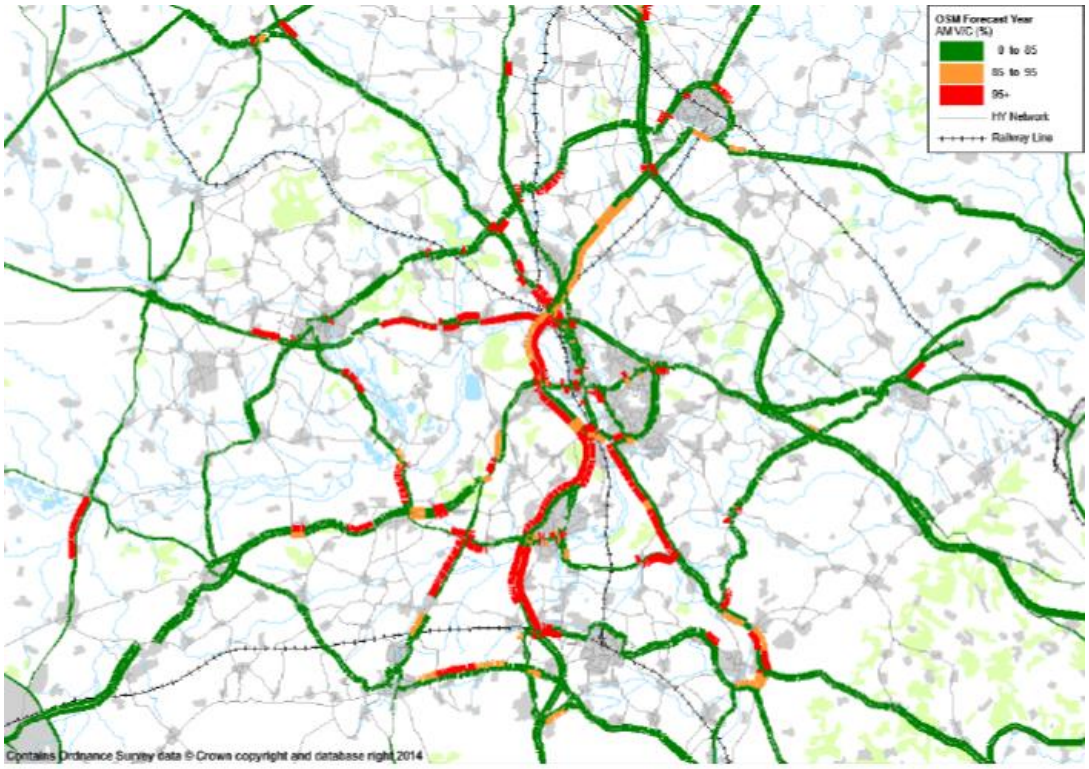


Figure 15: Highway Network in the morning peak in 2031 with no intervention – volume of traffic in relation to road capacity (85% to 95% = at capacity, 95% plus = over capacity)

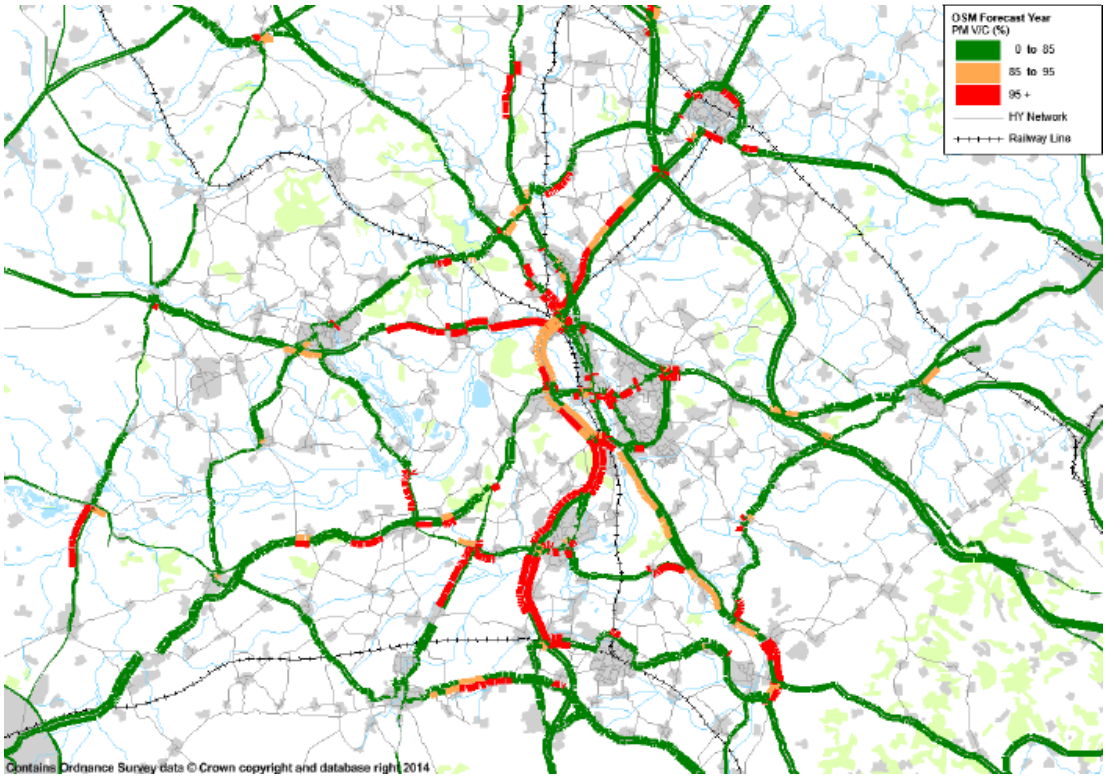


Figure 16: Highway Network in the evening peak in 2031 with no intervention – volume of traffic in relation to road capacity (85% to 95% = at capacity, 95% plus = over capacity)

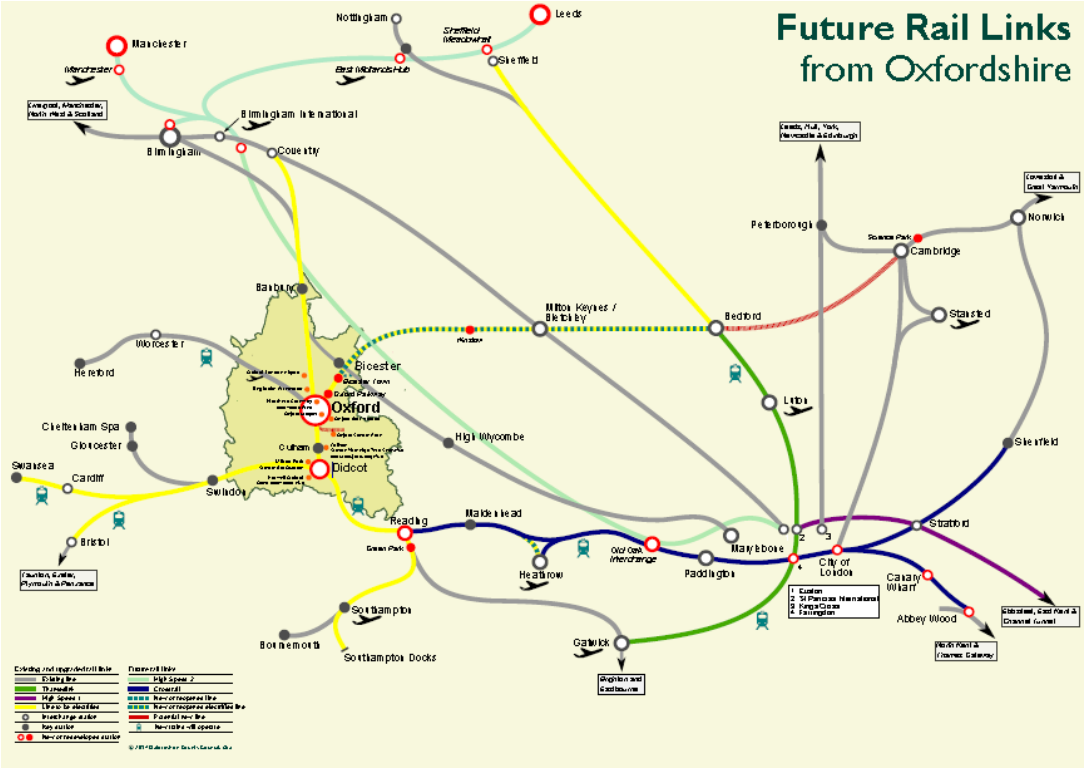


Figure 17: Future rail links from Oxfordshire

52. As the population and economy grow, more and more goods will need to be transported. The plan period is set to see significant rail freight growth, which may limit the growth in long-distance HGV traffic. However, rail freight alone will not provide for the diverse and growing demands for goods transport. In particular, there will be a substantial growth in light goods vehicle mileage, boosted by the growth of internet shopping (see Freight Strategy).

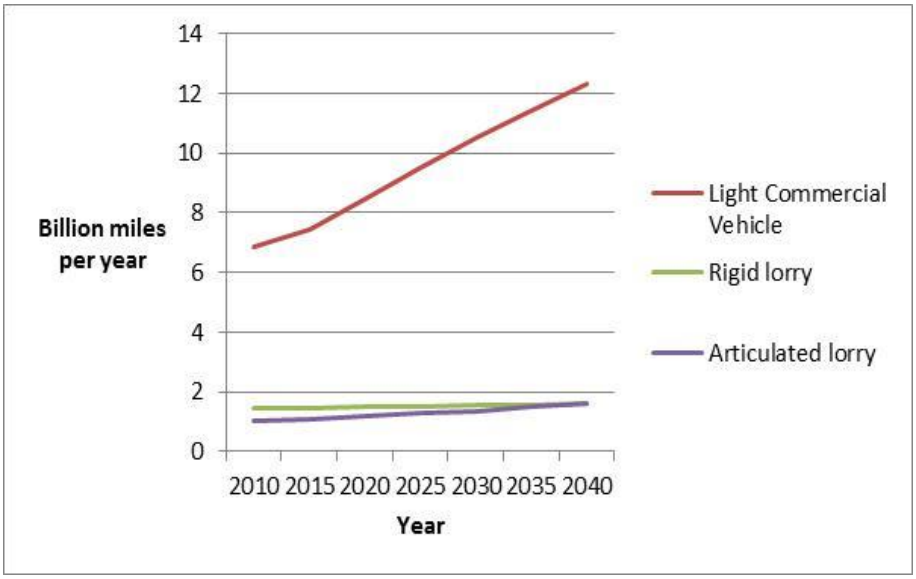


Figure 18: Forecast growth in freight on all types of roads in south-east England excluding London, billion miles per year
(source: DfT Road Traffic Forecast 2015 – extrapolated trend)

53. We recognise that encouraging and promoting greater levels of Active Travel will become increasingly important. For example, cycling - either as a sole mode of transport for shorter journeys or for longer journeys in combination with public transport - has a significant role to play in terms of reducing congestion in Oxfordshire. Research has concluded that cycle journey times are highly consistent per rider and largely independent of traffic conditions and time of day

54. Without doing this, vehicle emissions are likely to increase, albeit at a slower rate than traffic growth. Much depends on technological improvements and the incentives and regulations which encourage their adoption. It will be important to ensure that new vehicle emission standards reflect real world driving conditions and a consistent approach to managing air quality is adopted.

55. Growing road traffic levels risk a deterioration in quality of life for many residents, for example due to noise, a less safe walking and cycling environment, and associated impact on community life. It also threatens wildlife due to increasingly polluted run-off from roads and animals killed by traffic. Without very careful design and mitigation, new development and transport infrastructure could increase flood risk, destroy wildlife habitats, and blight the landscape.

56. The population will continue to age overall: by 2026 there are expected to be 46% more people aged 65 and over, and 69% more people aged 85 and over, than in 2013. Younger people will be attracted to areas with high jobs growth, provided the housing is affordable and the services and cultural and leisure offer of new neighbourhoods is sufficiently attractive. Planning policy will result in older peoples' housing alongside homes for workers in the new urban areas.

57. In rural areas, people without access to a car will find it harder to get about with non-commercial bus services no longer able be supported unless there is funding from development. This will particularly affect the older population at first, but in the future, increasing numbers of older and disabled people should be able to drive: fewer will never have driven and more will be capable of driving due to advances in vehicle technology, while automatic personal rapid transport may be available for point-to-point public transport journeys. The development of electric cycles (e-bikes) has the potential to enable many older and/or less active people to travel actively and sustainably with assistance. We will promote this form of travel that has the potential to increase levels of cycling in the county.

58. Lifestyle factors are hard to predict and could have a big impact on travel patterns. For example, we do not know to what extent social marketing and policy changes will succeed in encouraging people to be more active. We do not know how the trend for more homeworking, which increased by 35% between 2001 and 2011, will continue. It is difficult to predict how much people will need or want to travel in future for retail or services. There is growing evidence that the model of car ownership is changing, with more people using leased or shared vehicles and many no longer see the car as a status symbol.

59. It is also difficult to predict future working patterns: despite flexible working the standard working day has persisted for the majority of people. Will more people work

part time, on late or early shifts, or have more than one job? How long will people continue to work into older age? Will working patterns respond as resources such as office buildings and factories become more intensively used and business becomes even more globalised?

Science Transit

60. The UK Government seeks the development of new solutions to the problems of transport congestion and pollution using science, industry and the engagement of the public sphere, through its Future Cities and Transport Catapult initiatives. Our county is in an ideal position to take advantage of this and to develop new, smarter methods of transport, with our strengths in science, in the motor industry and with our educated populace able to debate and determine what smarter improvements can benefit it. Our Science Transit programme supports this.

61. Given the rapid pace of technology, developments could dramatically affect mobility in ways we cannot currently predict. The uncertainties and challenges anticipated during the period of this plan offer the opportunity to develop innovative solutions and new ways of working and enjoying our lives. Greater involvement of intelligent transport systems in traffic management and the deployment of autonomous or semi-autonomous vehicle technology are two key fields for development. In terms of the limited infrastructure we have, we shall seek to maximise network efficiency and capacity with the use of big data; collected via sensors, mobile devices and external sources, utilising apps and IOT data aggregation platforms' to predict network conditions.

62. Meanwhile, other technologies will increasingly allow day-to-day working from home in many industries, reducing the need to commute at all. The demand for new smart technology to address these issues (both in Oxfordshire and globally) is high. Entering that market it is a major element of *Connecting Oxfordshire* and *Science Transit*. We want Oxfordshire to become a smart county that makes transport a simple, positive experience that helps attract an agglomeration of knowledge industries. Our county should also be a great place to live; smart technology should simplify and make our lives more enjoyable.

63. Above all, progress of the economy out of recession may not be smooth and this uncertainty favours transport solutions that are incremental, efficient, reliable and scalable in response to changing demand.

Policy 01: Oxfordshire County Council will work to ensure that the transport network supports sustainable economic and housing growth in the county, whilst protecting and where possible enhancing its environmental and its creative, cultural, heritage and tourism assets, and supporting the health and wellbeing of its residents.

5. Supporting growth and economic vitality

Objectives:

- **Maintain and improve transport connections to support economic growth and vitality across the county through traditional and innovative solutions;**
- **Make most effective use of all available transport capacity through innovative management of the network;**
- **Increase journey time reliability and minimise end-to-end public transport journey times on main routes; and,**
- **Develop a high quality, resilient integrated transport system that is attractive to customers and generates inward investment.**

64. *Connecting Oxfordshire* supports the Strategic Economic Plan (SEP) - the economic growth strategy for the county - and the proposed England's Economic Heartland alliance. The refreshed SEP will focus on growing the high tech industries for which Oxfordshire is already renowned. The main focus of this growth is in the Knowledge Spine, linking Bicester, Oxford and Science Vale. Peak time travel to work is a priority, because it presents the greatest challenge to transport networks and is vital for the economy. Businesses need to attract high quality staff, and a trouble-free journey to work is an important factor for people in deciding where to live and work.

65. However, other types of journey are important for Oxfordshire's economy. In particular, the county is an attractive location because of its journey time from international gateways like Heathrow Airport. This gives business travellers and tourists easy access, and enables airfreight to reach its destination quickly.

66. Oxfordshire's economy is not just about high tech industry in the Knowledge Spine. There are thriving business parks elsewhere in the county and Banbury in particular has a strong manufacturing base, including motorsport. The north of the county has close connections with the South East Midlands LEP (SEMLEP) area economy. The economic vitality of the county also depends on the success of large and small town centre retail and leisure facilities, and many businesses catering for tourists, which are dispersed across rural areas. Oxfordshire's creative, cultural, heritage and tourist economy is estimated to be worth £3.1 billion per year. Whilst the highest demand for transport along the Knowledge Spine needs to be catered for, Oxfordshire needs good links to all its settlements.

67. We also need to accommodate through-travel: this does little to benefit the local economy, but most of the through traffic on Primary Routes has no suitable alternative to passing through Oxfordshire. Easing journeys through the county helps to avoid delays to local traffic.

Enhancements to road capacity

68. In some cases new roads, or widening roads and junctions may be necessary, to ensure a reliable and effective transport network. Some examples of this include where access is needed to new developments; where the existing road is unsafe; where the existing road brings congestion and pollution to built-up areas; or where the existing road threatens areas of environmental or archaeological interest. However, these schemes often generate new demand and quickly reach capacity again. We will always require careful modelling for major schemes to ensure that effects on the wider network are fully understood, and will consider whether the demand can be met more sustainably. Where feasible, we will consider adding safe and segregated routes for cyclists and facilities for pedestrians as an element of this process.

69. We are working with our partners to develop route strategies for the improvement of strategic roads in the county. The strategies currently under development are described below. We shall be producing route strategies for other roads over the coming years, while maintaining our awareness of the issues and priorities of local road networks.

Policy 02: Oxfordshire County Council will manage and, where appropriate, develop the county's road network to reduce congestion and minimise disruption and delays, prioritising strategic routes.

A34 and the Oxford – Cambridge Expressway

70. The A34 is the critical north-south route for Oxfordshire and is the main highway linking current and future growth areas in the 'Knowledge Spine'. It is also the main north-south route for HGVs and other traffic travelling from the south coast to the Midlands and north of England. The combined demand from local traffic and long-distance traffic creates substantial congestion along the route for much of the day. Figure 19 illustrates key opportunities and challenges along the A34 in Oxfordshire.

71. Oxfordshire County Council has been working with Highways England, which manages the route, to develop a number of schemes which are deliverable in the short-term for the A34. These include new slip roads at Chilton Interchange to turn this into an all movements junction and a "hamburger" style improvement to the Milton Interchange Roundabout to improve access onto the A34 from Didcot, both scheduled for completion in 2016. We also propose a bus priority lane on the northbound approaches to the A34 exit slip road at Hinksey Hill Interchange.

72. Highways England published its Solent to Midlands Route Strategy in April 2015. This includes the construction of funded schemes for improvements at Peartree and Botley interchanges around Oxford by the end of 2019/20. Highways England will also introduce new driver information systems between the M4 and M40 at key locations.

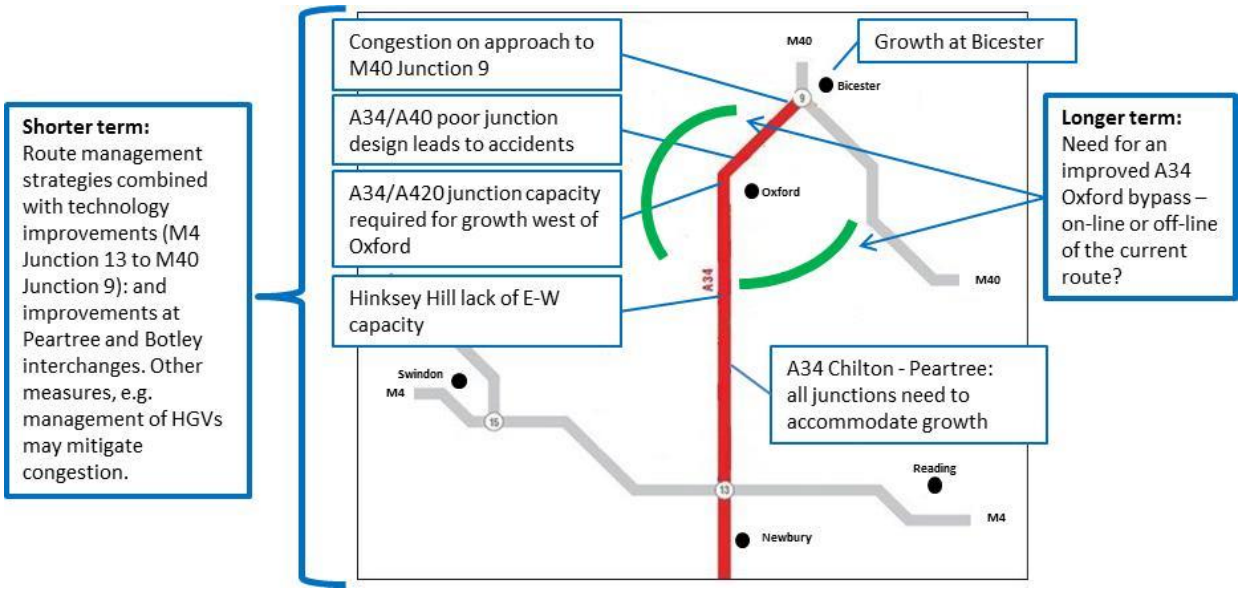


Figure 19: The A34 in Oxfordshire

73. Long-term options for providing more reliable operation of the route, especially around Oxford, will be investigated by Highways England and Oxfordshire County Council. Highways England's policy is that infrastructure improvements on the Strategic Route Network (SRN) should only be considered as a last resort in planning for development. We will develop measures for north-south travel along the Knowledge Spine that reduce or eliminate the 'without intervention' growth in traffic on the A34 shown on Figure 15 and Figure 16. If, given the forecast background growth in traffic on the SRN, infrastructure improvements are needed on the A34, these could include the development of a new road away from the existing route past Oxford, as an alternative to further enhancements to the existing A34 western ring-road.

74. Some of the fastest-growing towns in England are located in a belt to the north of London. England's Economic Heartland – the strategic alliance formed by local authorities and LEPs across Oxfordshire, Bedfordshire, Buckinghamshire, Cambridgeshire and Northamptonshire – is a £46.6bn economy and net contributor to the UK Exchequer. Transport connections between much of Oxfordshire and cities elsewhere in the alliance area – for example Milton Keynes - as well as to key regional partners such as Cambridge are notably poor. The lack of transport for people and freight between these areas creates an artificial barrier between hubs of knowledge-based growth.

75. Highways England is undertaking a study into how the strategic gap in road transport between the M1 at Milton Keynes and the M40 near Oxford can be filled. Growth around Science Vale, Oxford, Bicester and Milton Keynes creates strong arguments for upgraded transport infrastructure in the area. We – along with our partners in our strategic alliance as well as from further afield – will work with Highways England on their study into creating an Expressway to connect the towns and cities along this corridor together. This route, which must incorporate real improvements to the whole A34 corridor in Oxfordshire, will help to deliver a strong outer London orbital network

which fits a key strategic ambition for Oxfordshire and the South East. This work will take into account work already planned to improve the rail network in the area.

A40

76. The A40 is an important through route linking Gloucestershire and South Wales with London via M40. It is also critical in linking West Oxfordshire - particularly Witney and Carterton - to the Knowledge Spine through connections to the A44 and A34. It carries a daily flow of between up to 30,000 vehicles per day - well above the road's link capacity. During school term times the average journey speed on the A40 between Cassington and Wolvercote in the morning peak is 17 mph, while on the worst days it can be as low as 10 mph. Our proposals for the route are detailed in the accompanying A40 Route Strategy.

77. A number of schemes are proposed which may bring some relief to the A40. The County Council has secured City Deal funding for proposals to improve Wolvercote roundabout and Cutteslowe roundabout while the Oxford Transport Strategy is developing proposals which could include improvements to Peartree Interchange, a new access route and a Strategic Link Road between A40 and A44. Additionally, £35 million from the Government's Local Growth Fund will fund public transport improvements along the A40 corridor by 2021. The proposals comprising the A40 Science Transit scheme include bus lanes, a new Park & Ride and improved provision for cyclists and pedestrians.

78. However these improvements are unlikely to wholly resolve the current capacity issues on A40 let alone deal with the impact of future developments in West Oxfordshire. To this end a long term strategy for improving the A40 is currently being developed. The A40 Strategy published as part of this document has more details on this. In addition to these highway schemes for the A40 corridor, we will seek the completion of the Cotswold Line redoubling and the development of Hanborough station into a local interchange and Park & Rail facility, with additional platforms parking and enhanced bus and cycle access.

The Oxford Ring Road

79. The implementation of access restrictions in Oxford city centre and the city's Eastern Arc and reallocation of road space to other modes will support the goals and objectives of the LTP4 and the OTS by providing networks of sustainable travel options. This fundamental principle relies on the general presumption against travel by car within the urban area.

80. However, access by car is still a necessity in a dynamic city, and the outer ring road will be promoted as the primary route for all short-distance car trips. It will be increasingly important for cross-city movements because the OTS proposes to reallocate road space and introduce traffic restrictions on some of the roads within the city to enable mass transit, walking and cycling improvements.

81. The existing policy of improving the key ring road interchanges is therefore consistent with the proposal to remove trips from the 'inner ring road' (the B4495) and other inner city routes. This will be continued in the short-term with the schemes at Cutteslowe and Wolvercote Roundabouts; whilst longer term plans at the A34 Botley and Peartree interchanges are being considered by Highways England, along with Intelligent Transport Systems (ITS) such as Variable Message Signs and variable speed limits to be applied along the A34 corridor. The proposed ring road improvements are shown on the plan below:

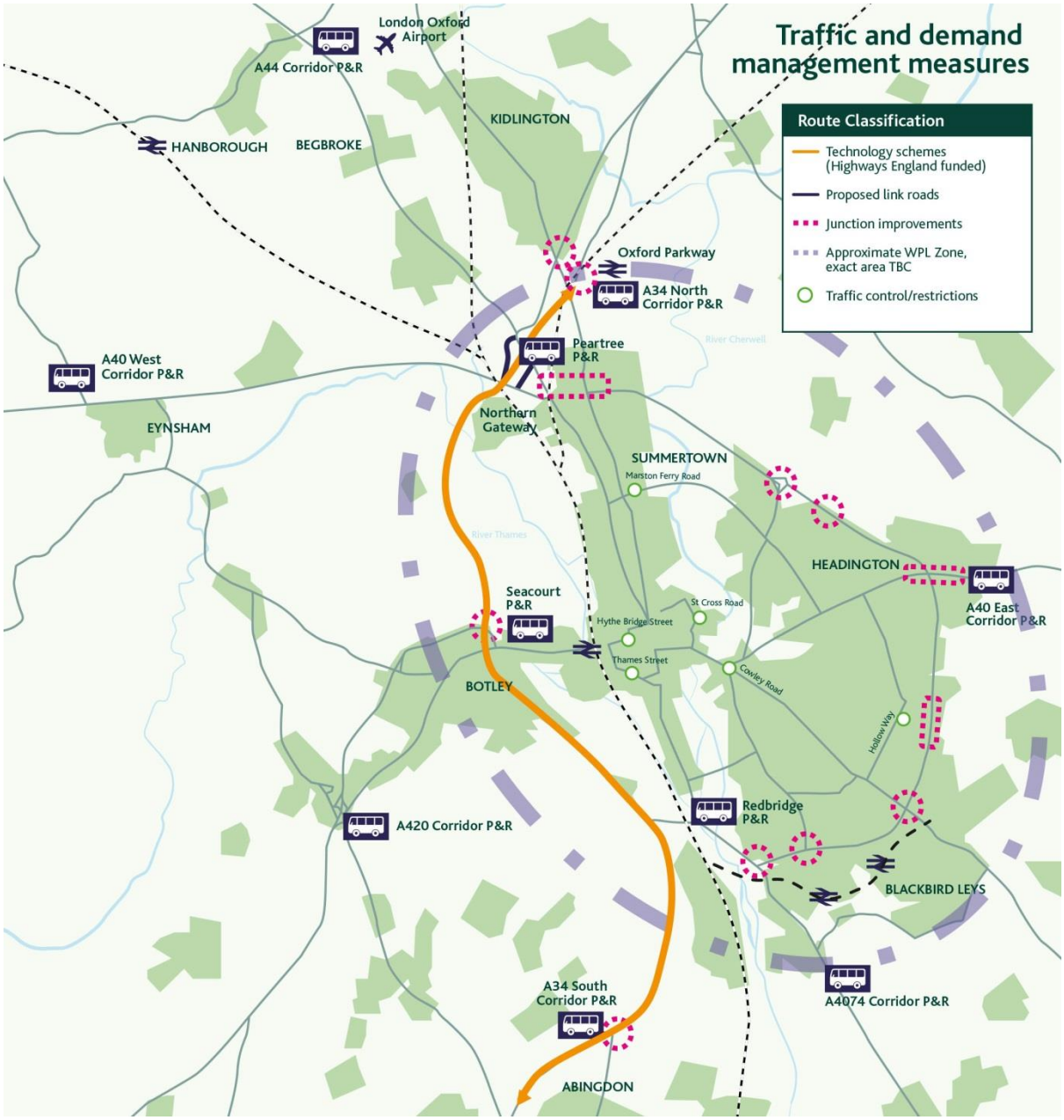


Figure 20 – Proposed Oxford Ring Road improvements

A420 Corridor

82. The A420 is an important principal route between Swindon and Oxford serving many settlements along the corridor including: Shrivenham, Watchfield, Faringdon, Kingston

Bagpuize and Cumnor. At peak times the route is congested in some areas, particularly at the northern end near Botley. Although advised to use the M4 and A34, there is some HGV usage of the route. Consultation revealed a number of concerns about junctions on the route, with roundabouts and other improvements suggested at several locations. Our proposals for the route are detailed in the accompanying A420 strategy. Funding to deliver Strategy schemes will need to be secured from development via Community Infrastructure Levy (CIL), Section 106 and/or Section 278 agreements, working closely with local councils and other stakeholders.

Local routes in Science Vale

83. A number of new road links and capacity improvements are necessary to accommodate the large scale of employment and residential development in Wantage, Grove, Harwell and Didcot. These are detailed in the Science Vale Area Strategy.

Local routes in Bicester

84. The Bicester Area Strategy outlines options for a south east perimeter road linking the eastern perimeter route with the A41. The preferred option will be identified and the Area Strategy reviewed in time for the Part Two of the Cherwell Local Plan. Large residential development in north-west Bicester offers the opportunity to relocate the north western perimeter route to enable the creation of a boulevard through the new development that will improve capacity while enabling the development to integrate with the existing town. We are also working with Network Rail to deliver a new highway bridge to allow the Eastern Perimeter Road to cross the new East West Rail line, replacing the current Charbridge Lane level crossing.

Local routes in Banbury

85. The Banbury Area Strategy includes a new link road east of M40 junction 11 to help mitigate severe traffic problems in the area from trips to / from Banbury and the surrounding area, including the M40. A spine road to be built as part of development at Salt Way south of the town will link the A4260 Oxford Road and A361 Bloxham Road.

Local routes in Witney and Carterton

86. The Witney Area Strategy outlines a new junction with the A40 already secured from the development at West Witney, and west-facing slip roads at Shores Green junction on the A40, which would enable the A40 to be used by people travelling from one side of Witney to the other. The Carterton Area Strategy outlines improvements to the B4477 between RAF Brize Norton and the A40.

87. There are other parts of the county's inter-urban road network where congestion is forecast to be severe in 2031. We will develop a programme of further route strategy work to address these, recognising the importance of enabling development across the county, and key cross boundary links.

Cross-boundary links

88. We will continue to work with Berkshire councils on the potential for additional river crossing capacity at Reading, taking into account the potential for impacts on the local road network from the increased traffic flow across the river and how or if that can be mitigated. We also need to understand expectations for population growth in Berkshire and the impact this would have on future demand across any potential bridge.

89. Similarly, we are working with Swindon Borough Council to secure appropriate mitigation for the potential traffic impacts on the A420, as a result of the Swindon Eastern Villages development and with Aylesbury Vale as a result of development proposed in Aylesbury and Princes Risborough.

Reducing pressure on the road network

90. If the same proportion of car journeys continues from future developments, our network will not be able to accommodate all trips. Through our involvement in strategic planning in the county, we will therefore need to ensure that additional road infrastructure is minimised. By locating housing close to jobs where people can more easily walk or cycle to work, in places where people will be able to use high quality public transport to get to work and where the car is not perceived as the default means of transport, the number of miles travelled by car per individual can be reduced over time, thereby slowing the growth in pressure on the road network. We will also use our influence in the planning process to ensure that new developments are well laid out so that they encourage and enable walking, cycling and the use of public transport rather than car use.

91. Bus and cycle travel uses less road space per person than car use. Walking and in some cases cycling can be accommodated away from roads. All three of these modes can help reduce congestion and help make the county a more attractive place to live and work. Our Active and Healthy Travel Strategy outlines our plans for improving Door to Door Travel (e.g. enabling journeys to be made by a combination of cycling or walking with bus and/or rail). Wherever there is the potential to accommodate more walking, cycling or public transport trips, we will consider scheme options that give priority to these modes, through traffic signals, allocation of road space, and improving conditions for cyclists and pedestrians. We will improve access to the rail network and work in partnership to improve rail capacity, for passengers and freight.

92. Before developing schemes for additional road space, we will look at ways to make existing road space accommodate more vehicle trips. There is great potential across the county to make junctions work more efficiently through investment in updating the management of traffic signals, and coordinating them so that they work together to smooth traffic flows and improve cyclist safety. Almost two thirds of cyclists killed or seriously injured in the UK were involved in collisions at, or near, a road junction, with T-junctions being the most commonly involved. (Source: Reported Road Casualties GB (DfT 2014) .

93. We will also use travel information to encourage and influence people to choose public transport, walking and cycling or Door to Door integrated travel, via the Oxfordshire Journey Planner, an on-line journey planning tool that can be used on mobile devices, accessed at www.oxfordshire.gov.uk/journeyplanner. We will embrace new technologies and use data and information to predict and influence travel on our transport networks, alongside more traditional network management techniques such as the use of Traffic Regulation Orders. This is outlined in the Science Transit Strategy.

Policy 03 Oxfordshire County Council will support measures and innovation that make more efficient use of transport network capacity by reducing the proportion of

single occupancy car journeys and encouraging a greater proportion of journeys to be made on foot, by bicycle, and/or by public transport.

Prioritising different types of journey

94. The road network has different user priorities in different environments. In order to keep through traffic on the core network moving, it is often necessary to prioritise vehicle journeys over others, restricting interruptions to traffic flow on the more important routes. These can mean a lower priority to vehicles joining or crossing the main route, pedestrians crossing the route, or due to obstructions like parking or loading. Where roads pass through urban centres as a high street, they are part of a place as well as being a link. In the latter situation pedestrians would be given a much higher priority, with plenty of opportunity to cross the road even if this means interrupting traffic flow. In the former situation, pedestrian crossings, if provided, would probably give the minimum green time to pedestrians. Each situation must be treated on its own merits, but we have classified the road network, indicating the function of each link. This classification, as set out in Table 2, will be used as a guide in decisions over which type of road user to prioritise.

95. Along main roads in Oxford and our growth towns, we will also prioritise the use of public transport and/or cycling, depending on the potential for more journeys to be accommodated via these methods. This may be through allocating road space to bus or cycle lanes, and through the use of bus priority traffic signals, or signals that give priority to cyclists if and when these are approved for use.

Policy 04 Oxfordshire County Council will prioritise the needs of different types of users in developing transport schemes or considering development proposals, taking into account road classification and function/purpose, the characteristics and function of the place and the need to make efficient use of transport network capacity.

Status	Definition	Characteristics/treatment	Oxfordshire Routes
Class 1: Motorway	A road suitable for high speed long distance national traffic *Responsibility of Highways England (HE)*	Dual carriageway with limited access and type-restricted use No weight restrictions	M40
Class 2a: Strategic Primary Routes	A strategic road suitable for longer-distance and inter-regional traffic. Main connections between defined primary destinations. Part of the national lorry route network *Responsibility of either HE or the County Council*	Able to cater for high volumes of traffic. Predominantly dual carriageway No restrictions on access or permanent weight restrictions Presumption against at-grade pedestrian crossings Presumption against speeds below 50 mph	A34, A43 (HE) A40 (M40 J8 to Witney) A41 (A34 to Bicester) A44 (A40 to A4095)* A423, A4142 (Oxford S / E bypass)
Class 2b: Other Primary Routes	A road suitable for longer distance and inter-regional traffic. Main connections between defined primary destinations. May be part of the national lorry network *Responsibility of the County Council*	Able to cater for high volumes of traffic Either dual carriageway or single carriageway No restrictions on access or permanent weight restrictions, may be some height restrictions	A40 (west of Witney) A41 (Bicester to Aylesbury) A44 (north of A4095) A420 (west of A34)# A422 (east of A423) A423 (north of A422)

Class 3a: County Principal (A) Classified Roads (major)	A road suitable for important cross- and inter-county traffic where there are relatively large volumes of traffic but not longer-distance travel. Should be able to cater for all types of vehicles *Responsibility of the County Council*	Usually good standard single carriageway Weight restrictions may be considered where there is a suitable alternative route of the same or better standard available	A338 (Wantage to A415); A415; A417; A418**; A421; A4074+; A4130; A4260 (north of A40)
Class 3b: County Principal (A) Classified Roads (minor)	A road suitable for important cross- and inter-county traffic where there are relatively lower volumes of mostly local traffic. Minor A-roads would serve to link larger settlements with major A-roads and provide missing links *Responsibility of the County Council*	Predominantly single carriageway; some sections might be of a lower standard Weight restrictions can be considered where there is a suitable alternative route available	A40 (east of A418); A329; A338; A361; A420 (through Oxford); A422 (west of Banbury); A424*; A436; A3400; A4095; A4129; A4144; A4155; A4158; A4165; A4183; A4185; A4260 (south of A40); A4421
Class 4: Non-principal roads (B/C Classified)	A road suitable for other shorter cross and inter-county movements where volumes are relatively low and no principal road is available *Responsibility of the County Council*	Weight restrictions can be considered providing diversions are not excessive and do not prevent access to properties	All B and C roads

[#] these roads are on the Primary Route Network signed as "unsuitable for HGVs" because of height restrictions at railway crossings
* routes which could be reclassified in whole or part, in accordance with Council strategy on HGV routing
** A418 is signed as alternative Primary Route between Oxford and Aylesbury to A41 for HGVs
[+] A4074 is signed as alternative Primary Route between Oxford and Reading to A34/M4 but signed as "unsuitable for HGVs"

Table 2: Road priority hierarchy

Freight journeys

96. Residents across the county complain about the environmental impact and danger caused by heavy lorries (HGVs) travelling through villages and small towns. It is a challenge to address these problems with the limited resources we have available, the lack of bypasses on some main roads and the need for local freight access. However, there are a number of approaches we can take.

97. Where HGVs cause environmental damage, we will retain and, where resources allow, consider new environmental weight limits. These prohibit HGV through traffic, but allow local access. Structural weight limits will be applied to protect the county's bridges where necessary.

98. We will also seek to minimise environmental damage from HGVs through the use of Routing Agreements, Construction Logistics Plans and Delivery and Servicing Plans, as part of the development control process.

99. HGVs are disproportionately represented in cyclist fatalities. For example, of the 14 cyclist deaths in London in 2013, 9 involved HGVs. Although the number of serious collisions involving cyclists and HGVs in 2014 decreased, it remains one of Transport for London's key commitments to reduce the number of people killed or seriously injured in London by 40 per cent over the next five years. We have set up a Cyclists and HGVs working group and will seek to reduce collisions involving HGVs and cyclists in Oxfordshire, learning from London and other good practice examples.

100. We will seek to work with district colleagues and Highways England to improve both freight distribution networks and support services, for example freight services on the motorway and trunk road network in the county.

101. We will work with Network Rail, rail freight operating companies and businesses in Oxfordshire to increase the already significant volumes of rail freight that pass to, from and through Oxfordshire, particularly between the port of Southampton and the Midlands and North of England. An increased railway loading gauge, enabling larger containers, has already removed thousands of HGVs from the A34. It is heavy and bulky items like these for which rail is most competitive, and we will support the provision of appropriately sited rail freight facilities, subject to funding being available and having regard to the impacts on local communities and on the road and passenger rail networks.

Policy 05 Oxfordshire County Council will classify and number the roads in its control to direct traffic, particularly lorry traffic, onto the most suitable roads as far as is practicable.

Policy 06 Oxfordshire County Council will support measures to reduce the number of Heavy Goods Vehicles travelling through the county, by promoting freight by rail and working to improve strategic roads.

Better-integrated, high-quality public transport

102. A large proportion of journeys to Oxford city centre are by bus and rail. However, increasing public transport use on journeys to other parts of the city, within other towns, and along inter-urban routes will be a challenge. Public transport, walking and cycling will be promoted as, given the disbenefits of congestion, poor health and air pollution. To achieve this they will need to be very high quality, easy to use, and offer seamless integration on journeys involving different types of transport. There will need to be a significant improvement in public transport provision, rather than small improvements to frequency and journey time. Cycling is already more attractive to many people than driving a car, because of congestion, low cost, health benefits and a virtual guarantee of punctuality. As congestion and inactive lifestyles increase, cycling may be seen as a viable alternative for many more people who currently drive.

103. The Science Transit Strategy defines both our high-level vision, and outline roadmap, for the development of better-integrated, high quality mobility systems that both serve the Oxfordshire Knowledge Spine and connect it with the rest of the county. It is made up of four main elements:

- Projects which promote innovation in mobility and integrated transport delivery;
- Projects which encourage intelligent mobility and opening Oxfordshire's data to promote research and enterprise;
- Key infrastructure improvements which will improve connections between key areas along the knowledge spine, for example, upgrading key junctions and constructing new mass rapid transit systems, for example rapid transit bus lanes, as well as increasing cycling facilities and opportunities for integrating walking and cycling with public transport (see Active & Healthy Travel Strategy). These infrastructure projects will sometimes be led by opportunities in funding streams; and,
- Key route enhancements which will improve connections between key locations along the knowledge spine, including new public transport routes and improved frequency of services on existing routes.

Policy 07 Oxfordshire County Council will work with operators and other partners to enhance the network of high quality, integrated public transport services, interchanges, and supporting infrastructure, and will support the development of quality Bus Partnerships and Rail Partnerships, where appropriate.

Policy 08 Oxfordshire County Council will work with partners towards the introduction and use of smart, integrated payment solutions for a range of transport modes.

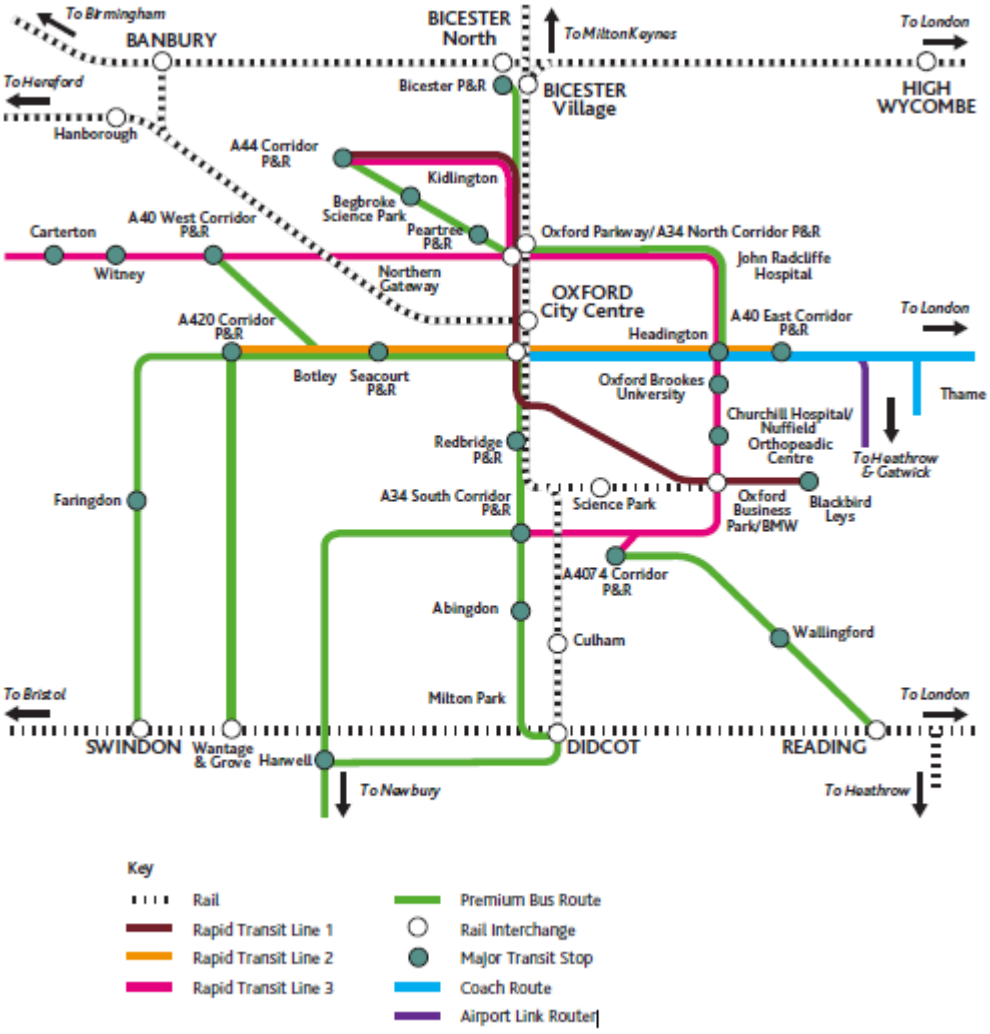


Figure 22: Potential Science Transit network

Buses and coaches

104. We have been successful in working with bus operators to increase the number of journeys made by bus in the county in recent years, a trend running contrary to most non-city regions in the UK. We do not control commercial rail and bus operators and cannot exercise the same degree of influence over public transport provision as in London. However, we have strong partnership arrangements with the main bus operators, who have introduced initiatives such as smart ticketing and payment in Oxford. Further, county-wide improvements to bus services, promoting bus travel and delivering our Science Transit ambition depend on this relationship.

105. Our bus and rapid transit strategy sets out how we will continue to work with operators to refine and expand the network. We plan new rapid transit services along the busiest routes in Oxford, upgrading Premium bus services in the county, linking proposed new Park & Ride sites and developing the bus network. Bus services also provide important links across our county boundary, with a growing market on several cross-boundary Premium routes. We will work to grow bus services on these routes.

106. Oxford is an important destination for scheduled coach services, as shown in Figure 23. Oxford has a 24 hour a day scheduled coach connection with London, with 9 coaches an hour each way on the route at the peak, half-hourly links to Heathrow Airport and an hourly service to Gatwick Airport. These services all start and end at Oxford's Gloucester Green Coach Station, which also is also served by national scheduled coach services, including National Express, which brings 200,000 passengers through the coach station annually.

107. Oxford, Blenheim, the Cotswolds and Bicester Village are also major destinations for charter coach trips, which benefit the visitor economy but require coach parking and driver break facilities to be available near stopping points. We will need to work with coach operators to ensure that we have the space and facilities to accommodate growth from scheduled and charter coach services.

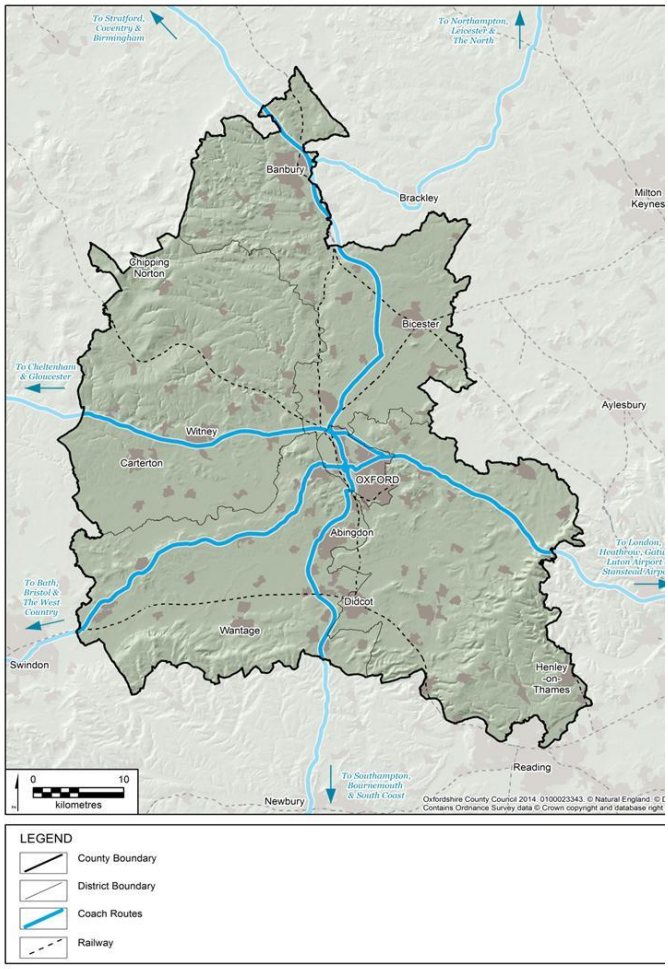


Figure 23: Oxfordshire's strategic scheduled coach network

Rail strategy

108. Our rail strategy sets out our ambition and priorities for rail investment in Oxfordshire, and how we will continue to work in partnership with Network Rail and train operators to ensure the capacity and connections necessary to support growth are provided, including new local and inter-regional links. It covers both the delivery of short term schemes to be delivered within the current control period for rail investment (up to 2019) and sets

out the development priorities and evidence base to support investment in the industry's subsequent five year planning periods, with an strong emphasis on the period 2019-2024.

109. It has been informed by a rail demand forecasting exercise completed in 2013, which showed that passenger demand is predicted to increase by 68% to 2026, with most of this growth being generated by new rail investment. The biggest increases are predicted on the Oxford-London corridor and on the rail network through Oxfordshire linking Didcot, Oxford, Bicester on to Milton Keynes and beyond when East West Rail (EWR) Phase 2 opens. Our strategy for rail also includes other route and service upgrades, for example to support growth and investment in Science Vale and further upgrades to the Cotswold Line.

110. We are also working with Network Rail on their long term planning process and development of their route strategies to 2043. We recognise that there are significant constraints on the rail network – between Didcot and Oxford in particular – which restrict our ability to develop new rail services and the potential of rail to play a much bigger part in meeting the Oxfordshire growth agenda, particularly as an alternative to the A34. This includes a greater role for rail freight in Oxfordshire, taking HGVs off the road.

111. Our strategic rail priorities include:

- Supporting the East West Rail Consortium and Network Rail in the design and delivery of East West Rail Phase 2;
- A major upgrade to Oxford station, including new platforms and through lines, new station building, transport interchange and widening of Botley Road bridge
- Supporting the completion of the Cotswold Line redoubling project, including the development and expansion of Hanborough station;
- Development of the next stage of upgrades to Didcot Parkway, including new multi-storey car park, northern entrance and new station building;
- Additional tracks between Oxford and Didcot to provide increased freight and passenger capacity, including the expansion of Culham Station;
- Opening of the Cowley rail line to passenger services, with new stations serving the Oxford Science Park and Oxford Business Park;
- Supporting provision of enhanced and direct rail services from Oxfordshire to Heathrow Airport and Crossrail;
- Developing a business case for a new service linking Bristol/Swindon to Oxford and beyond, including a proposed new station in the Grove area;
- Better integration of rail and strategic bus networks including payment and ticketing, as part of Science Transit;
- Improved access to rail stations via routes for cyclists/walkers, appropriate expansion in car parking and secure/accessible covered cycle parking.

112. Further investment in the Oxfordshire rail network will also be needed, picking up the outcomes from the rail industry's long term planning work, to remove future constraints on the rail network in the Didcot and Oxford areas.

Policy 9 Oxfordshire County Council will work in partnership with the rail industry to seek enhancements to the rail network in Oxfordshire and connections to it, where this supports the county's objectives for economic growth.

Air travel

113. Oxfordshire benefits greatly from its international business links and despite improvements in video-conferencing and technologies such as Skype, the demand for face-to-face meetings continues to rise in most global business sectors. The ease and speed with which international clients and investors can access our county has a major influence on their decisions about whether to invest and do business in Oxfordshire. Our Strategic Economic Plan's aim to increase the level of high-value jobs in Oxfordshire, together with our forecast rise in dwellings, will mean that maintaining and improving easy international connectivity for Oxfordshire becomes increasingly important.

114. Improving connections to Heathrow - the UK's hub airport and main centre for intercontinental flights and air freight - is therefore essential in maintaining Oxfordshire's international competitiveness, as well as supporting it as a popular destination for tourists. We are therefore pressing for the early implementation of the Western Rail Access to Heathrow project, which will make links between Oxfordshire and Heathrow significantly faster and easier than at present.

115. Reliable and easy links between the county and Gatwick Airport, Birmingham Airport and Luton Airport are also very important for the county's economy and residents. These airports are bases for low-cost European flights, flights to hub airports in Europe and the Middle East, and charter flights to holiday destinations. Links to both Birmingham Airport and Gatwick Airport will be improved with the electrification of the railway between Oxford and Reading (for connections with trains to Gatwick) and then from Oxford to Birmingham.

116. London Oxford Airport, located to the north of Kidlington, has the capacity for many more short-haul flights to cities and hub airports in north-western Europe, without the need for extending the runway. We will support this growth by working with the LEP to identify and respond to new central Government funding announcements. We will seek to avoid increasing pressure on the road network in the vicinity of the site, by working in partnership with the airport to improve public transport access, including links to Oxford Parkway station, secure cycle parking and key linkage to our emerging Rapid Transit Routes 1 and 3.

Policy 10 Oxfordshire County Council will support the development of air travel services and facilities that it considers necessary to support economic growth objectives for Oxfordshire.

Managing demand

117. While this Plan seeks significant improvements to the non-car transport offer, it recognises that the private car will still be an important mode of travel throughout the county. In some cases, making alternative modes more attractive will not be enough to convince or enable users to choose not to use the car. However, making shorter journeys

by cycle or on foot is something that all drivers should consider, given the benefits of active and healthy travel.

118. The Oxford Transport Strategy sets out proposals for a Workplace Parking Levy for Oxford, and we want to develop and consult on proposals as a matter of urgency; this would form part of a package including public transport, walking and cycling improvements, as well as restrictions on more through routes in the city. This would need to be combined with a pricing strategy for park and ride charges that incentivise their use over parking within the city, as well as further expansion of controlled parking zones to prevent commuters from parking in residential streets. This will provide choice for the traveller and help secure sustainable funding for investment in the transport network.

119. Elsewhere, we will work with district councils to ensure that parking provision and charging regimes support area transport strategies. The Council appreciates the value that a decriminalised parking scheme across the county would provide to ensure that the impact of parking on town centres and large events can be mitigated and will continue to work closely with the district councils to identify opportunities to introduce such a scheme in a way that does not add additional burden to the public purse.

Policy 11 Oxfordshire County Council will manage the parking under its control and work with district councils to ensure that overall parking provision and controls, including the potential for further decriminalised parking in Oxfordshire, are financially viable and support the objectives of local communities and this Plan.

Ensuring that everyone can participate in economic growth

120. There are places that lack bus connections. With the pressure on Council budgets, more places will fall into this category. Following an extensive review of current supported transport provision, the intention is to realise these savings through the implementation of a Transport Hub, and through changes to non-statutory subsidised bus services.

121. The Hub will be a single team which deals with all requests for supported transport services in a coordinated and fair way. It will ensure people are allocated transport according to their needs; supporting those who are judged capable of using existing public transport or equivalent, while protecting the most vulnerable with specialist, bespoke services. Not only does this improve how we allocate our available resources, it also ensures that the whole process for accessing supported transport is now more simple and straightforward.

122. It is vital that all of Oxfordshire's residents have an opportunity to contribute to, and benefit from, the economic success that is forecast for the county over the period of this Plan, whether or not they have access to a private car. Above all this requires access to education and jobs, but also to retail, leisure, culture, and health services. For short trips, access can be significantly improved through better walking and cycling links. When developing walking and cycling networks

for towns, we will ensure that they include connections to areas that are less well served by public transport, and in particular, areas with higher levels of deprivation.

123. For longer trips and where walking or cycling is not an option, other solutions may be necessary. Where feasible, combining public transport with walking or cycling can be a solution, as detailed in the Door to Door section of the Active & Healthy Travel Strategy. We also recognise the importance of taxis, particularly for providing links to rail stations, and will work with partners to ensure that they are given full consideration in the design of transport interchanges. They also provide a much needed service to people with disabilities, as well as people carrying large items, so we will work with the district councils who regulate taxis, to ensure there are adequate waiting and drop off facilities in town centres.

124. However, use of taxis on a regular basis is unaffordable for many people. We will work with local research and development partners to scope, design, test, and implement a family of vehicle hire and ride sharing technologies focused on bike hire, car share, car clubs and other on-demand vehicle services. We will also partner with local universities and automotive companies to create and test intelligent, driverless, demand-responsive mobility services.

125. We will also support local communities to help themselves, offering a range of support to community transport organisations that provide minibus and car schemes using volunteer drivers. A package of support could include the use of Council vehicles when they are not required for Council services, insurance or training. We will provide assistance to vulnerable people seeking transport, putting them in touch with community run schemes where appropriate.

Policy 12 Oxfordshire County Council will work with partners to identify how access to employment, education, training and services can be provided, particularly for those with disabilities or special needs, or who otherwise have difficulties in walking, cycling and/or using public transport, or for people without access to a car.

Policy 13 Oxfordshire County Council will support the development and use of locally-organised community transport to meet local accessibility needs.

Policy 14 Oxfordshire County Council will support the research, development and use of new technologies and initiatives that improve access to jobs and services, taking into account their environmental impact and fit with the other objectives of LTP4.

Resilience and maintenance

126. Oxfordshire is responsible for maintaining over 4500km of roads and keeping the network in good condition is important for the county's economy. Roads in poor condition can deter inward investment and tourism. Lack of maintenance can also cause damage to cars, make bus journeys extremely uncomfortable and act as a hazard to road users on two wheels.

127. Poorly maintained footways can also discourage people from walking, or even cause injuries and can be problematic for wheelchair, mobility scooter and pushchair users. Keeping roads and footways in good condition is therefore a key part of our strategy to get more people using public transport, walking and cycling. We will prioritise strategically important walking routes for maintenance.

128. Maintenance has been a challenge for many years because of insufficient Government funding, a succession of cold winters and flooding, and the rise in the number of vehicles, including heavy vehicles, using roads that were not originally designed to cope with them. As new transport infrastructure is built, the problem will become greater. The Council has developed an Asset Management approach to deliver a more efficient and effective approach to the infrastructure assets through longer term planning. We will consider new approaches for prioritising maintenance on routes to the benefit of sustainable transport users. Our policy on Asset Management will meet the following aims and objectives:

- *Keep Oxfordshire moving by providing a well-managed, well maintained and more resilient highway network*

129. We will make every effort to understand current and future requirements for the highway infrastructure and its contribution to creating a world class economy. In order to deliver this, we will continue to understand our stakeholders' needs, promote levels of service and maintenance priorities for our highways. Our adoption of an Asset Management approach will take a long term view in making informed maintenance and investment decisions).

- *Improve the safety and condition of local roads, footways and cycleways, including resilience to climate change.*

130. We will improve and maintain the condition of roads and highway related assets with systematic prioritisation where there are safety related issues, Premium bus routes and high pedestrian and cycle usage whilst still maintaining the network as a whole. We will maintain the drainage and associated structures to prevent flooding on and from the highway network.

- *Provide a sustainable approach*

131. We will invest in energy reducing technology for street lighting and associated electrical apparatus.

132. Our aim is to move towards a preventative approach to the maintenance of highway assets by prioritising roads for early treatment that have not yet fallen into the failure threshold. Whilst this may appear to be undertaking maintenance on roads that don't look to be in need of repair, and may seem unnecessary when there are roads in visually worse condition, this will often be the right choice and ultimately deliver the best value for the county in the long-term.

133. The system for prioritising maintenance schemes will take into account the assessed condition, the level of use by different types of road user, the type of road and its position in a hierarchy and the strategic importance of the road or footway as a walking or cycling route. Details are set out in the Highways Asset Management Plan and its annexes.

Policy 15 Oxfordshire County Council will target new investment and maintain transport infrastructure to minimise long-term costs.

Policy 16 Oxfordshire County Council will publish and keep updated its policy on prioritisation of maintenance activity in the Highways Asset Management Plan.

6. Reducing emissions

Objectives

- **Minimise the need to travel;**
- **Reduce the proportion of journeys made by private car by making the use of public transport, walking and cycling more attractive;**
- **Influence the location and layout of development to maximise the use and value of existing and planned sustainable transport investment; and,**
- **Reduce per capita emissions from transport in Oxfordshire in line with UK Government targets.**

134. Reducing emissions from transport is one of the highest local transport policy priorities for Government. The 2011 White Paper states that there is a need for a 'coherent plan to reduce the carbon emitted by transport, not least in order to meet our binding national commitments'.

135. In addition to continuing to pledge to make car travel greener through technological advances and more stringent emissions standards for manufacturers, the White Paper placed greater emphasis on non-car, behavioural change transport solutions to reduce carbon emissions, particularly for short journeys.

136. Our strategy to support the achievement of national carbon reduction targets fits neatly with our other objectives. Minimising the need to travel, and getting more people to walk, cycle or use public transport instead of driving not only reduces emissions, but also supports growth by helping to meet the overall demand for travel, and reducing congestion, as explained in the previous chapter. In this chapter we say more about how this will be achieved - including how we will support the uptake of zero and low emission vehicles – for both private and public transport.

Minimising the need to travel

137. To reduce the pressure on transport networks as the population grows, and minimise emissions and other environmental damage from transport, it makes sense to cut the amount of vehicular travel per head by making some of people's travel unnecessary. If

people work close to where they live, their commuting journeys will be shorter, perhaps short enough to make by bike or on foot.

138. Through our role in supporting strategic planning across the county, we will influence the location of development to minimise the need for car travel in particular, and ensure that where new infrastructure is required, it can be justified and is affordable. We want to move towards place-based guidance for transport and the urban realm for both existing settlements as well as new and expanding developments, which will minimise the need to travel and give the promotion of walking and cycling the highest priority.

139. We will work closely with our district and city councils and neighbouring local authorities to coordinate land-use and transport planning, with the aim of ensuring housing is located close to employment and good public transport where possible, new developments have good transport links, and are laid out in a way that enables people to get around easily on foot or by bike, or by public transport. This is in line with the National Planning Policy Framework (NPPF):

- Encouragement should be given to solutions which support reductions in greenhouse gas emissions and reduce congestion. In preparing Local Plans, local planning authorities should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport (Paragraph 30);

- Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised (Paragraph 34).

- Developments should give priority to walking and cycling, and have access to high quality public transport facilities. More details of active and sustainable travel can be found in our Active & Healthy Travel Strategy).

140. We are required by law to be consulted on the transport implications of all new planning applications. We will look carefully at plans for new developments to ensure that they support the use of sustainable travel, through the way they are laid out, the transport infrastructure and facilities they include, and the way in which the development will be managed when occupied.

141. In line with NPPF we will require all planning applications for developments over a certain size to be accompanied by a Transport Assessment, setting out the likely impact of the development on transport networks, and any proposed mitigation by the developer. Also in line with NPPF, depending on the size of the development, we will require developers to submit a Travel Plan, setting out how targets for the number of trips associated with the development will be achieved. Details of our requirements are set out in our *Transport Assessment and Travel Plan Policy Document.* We will strongly encourage travel planning from the start of the process to ensure it is embedded in the design and content of the proposed development, rather than as so often happens as an afterthought.

142. We will also support development in locations that make use of existing or planned sustainable transport infrastructure, for example development that would help create the demand necessary to make a new rail station feasible. We will ensure that housing and employment developments and investment in the transport network are progressed together. Land may not always be available in the right places, and people may not always be able to find a job or may not choose to work close to where they live or somewhere they can access by public transport, but if more people have these options, it will help to reduce demands on transport networks.

Policy 17 Oxfordshire County Council will seek to ensure through cooperation with the districts and city councils, that the location of development makes the best use of existing and planned infrastructure, provides new or improved infrastructure and reduces the need to travel and supports walking, cycling and public transport.

143. Approximately 12% of people in Oxfordshire work mainly from home, and there is clearly potential for this proportion to increase as technology develops and the nature of work changes over time. Increasing the number of homes with a fast internet connection will enable more people to work or run businesses from home. In partnership with Department for Culture, Media, & Sport, and BT, we have delivered fibre broadband infrastructure across the county, enabling over 64,000 premises to now have access to superfast broadband. This represents an estimated 90% of residences and businesses in Oxfordshire. We are now delivering phase two of the programme which will enable an estimated 95% of premises in the county to have access to superfast broadband by December 2017.

Policy 18 Oxfordshire County Council will help reduce the need to travel by improving internet and mobile connectivity and other initiatives that enable people to work at or close to home.

Active & Healthy travel

144. Our Active & Healthy Travel Strategy (A&HTS) sets out in detail how we intend to encourage and enable more people to travel actively and healthily. The Strategy has been put together in collaboration with Public Health and brings together three active travel options - cycling, walking and Door to Door sustainable integrated travel. A new Active Travel Steering Group will oversee its development and implementation, prioritise and agree proposals for investment; monitor and review completed schemes and seek funding for improvements. The Group will include representatives from the Oxfordshire Cycling Network, to ensure that users are involved in key decisions relating to active and healthy travel. The three active travel options are briefly outlined below.

Encouraging & Enabling Walking

145. The Encouraging & Enabling Walking component of the A&HTS has been developed to reflect four key aims:

- To provide a clear statement on the County Council's overall aspiration to enable

and encourage walking over the lifetime of the Active & Healthy Travel Strategy
- To provide a framework for the development of local walking strategies
- To provide a means to prioritise funding available to the County Council for best value for money investments in walking
- To raise awareness of the physical and mental health benefits of walking

Updated Cycling Strategy

146. The Strategy outlines our ambitions for cycling, setting out the detail about how we will go about increasing cycling and provides the framework for developing cycling within Oxfordshire's towns and as part of new developments. Cycling is a reliable, inexpensive way of getting around that emits zero carbon in use. Where trips by bike replace private car or public transport trips, this contributes in a small way to reducing carbon emissions overall. Cycling also has huge health benefits, so increasing the proportion of people who cycle regularly will help to address public health problems of obesity and ill health related to inactivity.

Door to Door multi modal travel for longer trips Door to Door multi modal travel for longer trips

147. The Strategy also outlines our plans for Door to Door sustainable integrated travel. This outlines our plans for making it easier for people to cycle or walk to rail stations of bus hubs so that they can travel sustainable for longer trips.

Countryside

148. 'Promoting and enabling access to the countryside' emerged as a key theme in the recently published Oxfordshire Strategic Environmental Economic Investment Plan, as did 'engaging people in the environment and enabling more sustainable lifestyles'. Many organisations came forward with specific proposals under these themes, including targeted improvements to walking and cycle routes and green spaces in and around urban areas. In addition to investment in physical infrastructure, the proposals included creating green health routes and working with GPs to offer patients green prescriptions for physical activity.

Design

149. We will ensure that new development adheres to the principles and philosophy set out in the DfT's *Manual for Streets* and supplementary *Manual for Streets 2*, which apply a user hierarchy to the design process, with pedestrians at the top. In residential areas this will include restrictions on parking, lower speed limits where appropriate, and more through routes for pedestrians and cyclists than motor vehicles. These principles may also be applied to improvements in existing residential areas and town centres where there is potential to increase walking and cycling. OCC is developing its own supplementary Design Guide and standing advice to help provide consistency and transparency for street design in the county.

150. We will ensure that travel plans for new developments include measures to increase walking and cycling, and that these travel plans are implemented.

Policy 19 Oxfordshire County Council will encourage the use of modes of travel associated with healthy and active lifestyles.

Policy 20 Oxfordshire County Council will carry out targeted safety improvements on walking and cycling routes to school, to encourage active travel and reduce pressure on school bus transport.

Influencing choice

151. Providing people with excellent public transport, cycling and walking facilities, as well as information about travel options, will not be enough to bring about the shift that we need from car use to other forms of transport. In line with the Government's approach we will enable choice following provision of better information and education adopt the principle of the 'ladder of interventions',

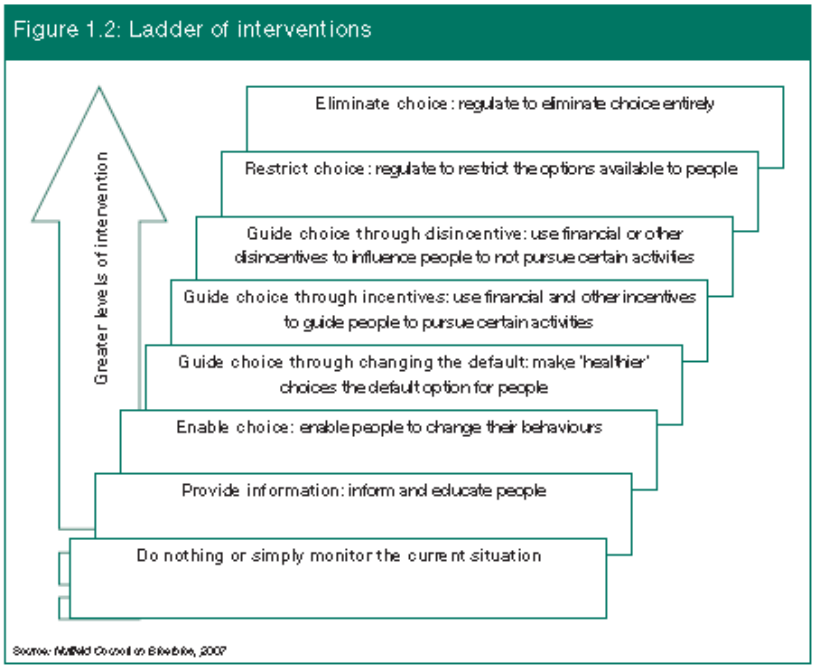


Figure 24: The Ladder of Interventions (Source: DfT, 2011)

152. With the widespread use of mobile internet devices, the Oxfordshire Journey Planner will be a primary source of information on all aspects of travel, providing people with the ability to plan their journeys in real time and make the best choices to enable them to reach their destination on time. It aims to help people make informed decisions about their journeys, allowing more seamless travel and therefore increasing the desirability of Oxfordshire for businesses, reducing congestion and environmental impacts from travel in the county.

153. The Planner makes use of a wide range of data to give people an accurate forecast of journey time via all modes of transport and combinations of modes, using real time information to provide a picture of the current situation on the network. The journey planner highlights the carbon emissions and calories burned for each mode. In addition, the tool and associated application will pull together journey planning information into one location, thus improving our service offer to the general public and tourists. To

maximise reach and take-up, local tourist websites and businesses will be encouraged to integrate the application onto their home pages.

154. This tool has been developed so that it 'nudges' people towards taking the option that is both quickest for them and best for optimising the capacity of transport networks. For example, on the approach to Oxford by car it will inform people of the time it will take them to drive to their destination, compared with the time they could save by parking and taking the bus or train. It is intended that it could be used to offer incentives for travelling in a way that relieves pressure on transport networks. Further details are set out in the *Science Transit Strategy*.

155. Over the longer term, we are also working with the private sector to develop the next generation of journey planner, which can begin to interact with the user, make better predictions of future travel conditions, and learn the patterns and needs of a user to help inform them of potential travel issues without the need for the user to query the tool. The Council is supporting organisations working on two different methods of providing this next generation of tool, to allow for the market to 'choose' the better solution.

156. Our aim is to make the Journey Planner as accessible as possible to users of all ages and ability, and to make it so easy to use that people will choose it over any other method of planning their journey. However we recognise that access to the internet is not universal, so will continue to ensure that basic information on public transport services is available by other channels.

Policy 21 Oxfordshire County Council will support the use of a wide range of data and information technology to assist in managing the network and influencing travel behaviour, and work with partners to ensure that travel information is timely, accurate and easily accessible in appropriate formats for different user groups.

157. The Council will seek opportunities to promote sustainable travel where they can be resourced from external funding streams. .

158. Generally people are most willing to consider changing their behaviour when their circumstances change, particularly when changing jobs or moving house. New housing and employment developments need to be designed and provide information to encourage people to travel sustainably. Employers can have some direct influence over their staff and can put in place policies and incentives to encourage people to travel to work by public transport, by bike or on foot. We will therefore place an emphasis on ensuring that good travel plans are in place for new developments, and seek opportunities to develop travel plans with existing organisations, including schools, who wish to promote sustainable travel, where funding allows.

Low emission vehicles

159. We will support the introduction of low emission and renewable energy vehicles to replace existing ones, and will expect any new public transport vehicles to conform to high environmental standards.

Public transport

160. Central Oxford has a Low Emission Zone (LEZ), applying to buses only. This was introduced primarily to reduce oxides of nitrogen (NOx). It requires local buses operating in affected streets to comply with the Euro V emission standard for NOx. The main bus operators have responded to this and to customer preference, by introducing a number of hybrid electric buses into the fleet. Hybrid electric buses use a combination of an electric battery pack and a diesel engine to provide power, and produce around 40% less carbon dioxide (CO2) emissions than traditional diesel-engine buses.

161. We are supporting trials of wireless induction charged electric buses, which run fully on electricity. As technology develops we expect electric buses and other types of low emission public transport vehicles and propulsion technologies to become more widespread. We will support pilots where appropriate, working with businesses and research institutions. If successful, we will support the provision of the required infrastructure, taking into consideration safety and environmental factors. We will ensure that new infrastructure considers the flexibility to enable the take-up of future low emission vehicle technologies, for example through incorporating sensor or wireless technology in new roads or bus lanes.

162. Network Rail is carrying out a programme of electrification which means that the proportion of diesel trains through Oxfordshire will reduce over the period of this plan. By 2031 we expect that the vast majority of passenger carrying rail lines through Oxfordshire will be electrified. This will reduce carbon emissions as well as NOx pollution. We will seek to encourage and enable passengers to consider cycling or walking to rail stations rather than short car journeys. Further details can be found in the Active & Healthy Travel Strategy.

Private cars

163. Electric hybrid cars are becoming more popular as they become more affordable, and battery technology develops allowing a longer range. The 'whole life' carbon benefits of electric over conventional vehicles has been debatable, but as electric power generation moves towards greater use of renewable energy sources, the benefits will become more convincing, particularly as mileage increases. In urban areas, there are clear air quality as well as lower emission benefits. However, electric cars take up just as much road space as conventional cars, so from a transport strategy perspective, it would not be desirable if people used them for journeys they could make by public transport, walking or cycling.

164. To encourage the uptake of electric cars, we will focus on support for charging infrastructure and other incentives which do not run the risk of increasing congestion. We will not support policies which undermine bus or public transport priority, such as the use of bus lanes by private electric cars. We will consider the provision of free or reduced price parking for low or zero emission vehicles at Park and Ride sites.

165. We will seek funding opportunities and work with partners to provide a network of rapid charging infrastructure, which benefits users wishing to make longer distance journeys. We will also seek funding opportunities to provide charging points on street and on Council property, to assist those residents without off street parking where they can charge a vehicle overnight. To allow the use of charging points to be optimised we

will implement parking time limits, and we will ensure that any charging infrastructure can be used by all forms of electric vehicles, subject to site-specific vehicle height restrictions. We will also look for opportunities to support the development of a network of hydrogen fuelling infrastructure as this technology develops.

Policy 22 Oxfordshire County Council will promote the use of low or zero emission transport, including electric vehicles and associated infrastructure where appropriate.

Reducing the footprint of our own operations

166. We and our partners operate a large fleet of vehicles. We will look for opportunities to introduce low emission vehicles into the fleet where this is cost effective.

167. We will seek to reduce energy consumption in our operation of the transport network, by introducing more energy efficient electrical equipment such as street lighting and traffic signals.

168. We will ensure that highway construction is carried out in an energy efficient manner, maximising the use of recycled materials where appropriate, taking into account the emissions of transporting them. Our policy is set out in more detail in the Highways Asset Management Plan.

Policy 23 Oxfordshire County Council will work to reduce the emissions footprint of transport assets and operation where economically viable, taking into account energy consumption and the use of recycled materials.

7. Improving quality of life

Objectives:

- Mitigate and wherever possible enhance the impacts of transport on the local built, historic and natural environment; and,
- Improve public health and wellbeing by increasing levels of walking and cycling as standalone modes or in combination with public transport, reducing transport emissions, reducing casualties, and enabling inclusive access to jobs, education, training and services.

169. Alongside supporting growth, transport has the potential to improve quality of life for everyone, but can also have side effects which reduce it. Figure 25 represents the ways transport can impact on seven quality of life factors[2] . Our aim is to increase the net positive impact on quality of life; however, there is a risk of environmental impacts, such as climate change and biodiversity, being understated when compared with some of the positive benefits, because they are not felt so immediately.

Figure 25: Transport impacts on quality of life

[2] Seven quality of life factors taken from the Economist Intelligence Unit's Quality of Life Index for countries. The 2 not included are Political Freedom and Gender Equality. 'Security' is actually 'Political stability and security' in the Index.

Protecting and enhancing the environment

170. To ensure that the environmental impacts of this Plan are considered fully, a Strategic Environmental Assessment has been carried, the findings of which are contained in the Environmental Report which forms part of *Connecting Oxfordshire*. It assesses this plan on its impact with respect to:

- Air quality;
- Climatic factors – greenhouse gas emissions, and adaptation to effects of climate change;
- Noise;
- Biodiversity – flora and fauna;
- Population and community;
- Human health, including safety;
- Soil;
- Water, including quality, quantity and flood risk;
- Material assets, including resource efficiency and waste;
- Cultural heritage and the historic environment, including architectural and archaeological heritage; and,
- Landscape and townscape.

A Habitats Regulations Assessment and a Health Impact Assessment have also been carried out.

171. Damage to the environment, including heritage assets, can occur as a result of development of physical infrastructure, or as a result of increasing use of environmentally damaging forms of transport. The policies of this Plan generally support a reduction in car mileage, which will have a positive impact. However, the plan also proposes the development of transport infrastructure to support growth. This needs to be carried out in a way which avoids damage to the environment where possible and seeks opportunities to enhance it.

172. Environmental factors, including relevant legislation and guidance regarding the impact on the natural environment and heritage, will be considered at the outset of every transport infrastructure scheme, while a number of scheme options are still being considered. This will allow proper consideration of less environmentally damaging options and for the design to be guided by environmental considerations so that the best mitigation and enhancement measures can be incorporated into the scheme. Early consideration of environmental factors will deliver better outcomes than considering the environment later in the process, when making changes becomes more costly.

173. We will ensure that the impact on biodiversity informs transport decisions. We will seek to provide biodiversity enhancements from infrastructure schemes where possible, including seeking to reduce the impact on biodiversity from vehicle emissions. Where negative impacts on biodiversity are unavoidable, we will ensure that mitigation and compensation are provided. In managing our transport assets, we will consider how we

can make positive biodiversity gains, including protecting and enhancing habitats for bees and other pollinators in line with the Council's resolution in July 2014. This includes the way in which we manage highway verges and trees, what materials and the type of equipment we use, and drainage. Details of our plans can be found in the *Highways Asset Management Plan* and the *Tree Management Policy*. Our approach to biodiversity is set out in the *Oxfordshire Biodiversity Action Plan*.

174. We will work with partners to develop Oxfordshire's 'green infrastructure', which includes our public rights of way network. Details of our plans will be set out in the Rights of Way Management Plan.

175. We will help to conserve designated Areas of Outstanding Natural Beauty (AONB), though working with the AONB management teams to implement relevant policies or actions from their management plans.

176. We will manage flood risk through our statutory role to coordinate flood risk management for surface water, groundwater and smaller watercourses in the county. The Environment Agency remains responsible for main-river flooding. Details of our plans can be found in the *Oxfordshire Local Flood Risk Management Strategy*.

Policy 24 Oxfordshire County Council will seek to avoid negative environmental impacts of transport and where possible provide environmental improvements, particularly in Areas of Outstanding Natural Beauty, Conservation Areas and other areas of high environmental importance.

177. We will ensure that transport decisions are informed by an understanding of landscape and townscape character and sensitivity to development, recognising that materials, signing and lining can have a negative impact on character and tranquillity. We will use tools such as the Oxfordshire Wildlife and Landscape Study (OWLS) and Historic England's Streets for All streetscape manual, as well as local landscape and townscape character assessments.

178. When responding to development proposals, we will seek appropriate mitigation for environmental impacts, and highlight opportunities for environmental enhancement. Where it is part of a wider highway improvement scheme, we will seek to improve urban public open spaces that are part of highway land, to make them more visually attractive and inviting, taking the needs of all road users into account, and prioritising pedestrians where it is appropriate. This includes removing unnecessary street clutter such as signs that are not legally required and are of little use.

Policy 25 Oxfordshire County Council will work with partners to improve public spaces and de-clutter the street environment.

Improving health and wellbeing

Transport can play an important part in contributing to improvements in public health, particularly in four key areas:

- Encouraging physical activity by enabling active and healthy travel;

- Promoting independence for all – young people, older people, those on low incomes, disabled people, etc
- Contributing to an improvement in air quality; and
- Improving road safety.

Physical activity

179. Low levels of physical activity and increasing obesity are a huge concern nationally. Oxfordshire has a relatively high percentage of people who take part in regular activity per week (26%) but there is room for improvement. Preventing chronic disease through tackling obesity is a key priority of Oxfordshire's *Joint Health and Wellbeing Strategy.* Our policies to increase the amount of walking, cycling and public transport use support the priority of tackling obesity. Physical activity – particularly outdoors - has also been shown to improve mental health. Research has found that those who walked or cycled to work benefitted from improved health and well-being in comparison to those who travelled by car.

180. For many people, the easiest way to build-in regular physical activity to their daily routine is through walking or cycling for local journeys. Using public transport is also good, because it can include walking or cycling to/from a station or bus stop - our plans can be found in the *Door to Door* section of the A&HTS.

181. The Council is also responsible for management and maintenance of an extensive network of public rights of way (PRoW), providing opportunities for outdoor exercise as a leisure activity and valuable pedestrian, equestrian and cycle links for getting around. Leisure cycling can build confidence and encourage people to take up cycling as part of their daily routine. The Rights of Way Management Plan sets out our plans for developing the PRoW network. We will seek enhancements to the network from new developments, with additional sections of path where necessary to link these to the existing network.

Policy 26 Oxfordshire County Council will aim to record, protect, maintain and improve the public rights of way network so that users are able to understand and enjoy their rights in a safe and responsible way.

182. River and Canal Towpaths provide opportunities for walking and, where permitted, cycling. Particularly in urban areas, these form part of important local networks of walking and cycling routes. We will work with the Canal and River Trust to promote the use of these paths and seek funding towards their improvement, mindful of the fact that removing the natural features of river banks can damage valuable habitats.

Policy 27 Oxfordshire County Council will support appropriate opportunities for improving towpaths along the waterways network, where it would not harm the ecological value of the area or waterway network.

Promoting independence

183. Nationally, the ageing population means that there will be increased pressure on social and health services. Transport, particularly active travel, has a role in helping more people to stay independent and healthy, which will reduce this pressure. People need to be able to

do basic things such as shopping, banking and going to the doctor, as well as activities that keep them healthy and reduce isolation, such as visiting friends and generally being part of the community. Older people also make a vital contribution to the economy: they are more inclined to support local shopping centres, and many of them provide important services as volunteers.

184. In Chapter 4 we discussed the importance of ensuring that older and/or disabled people can get around and how this can be supported. We will work to remove the barriers to access that these groups of people encounter. We will consider the impacts on disabled people at an early stage in developing new transport schemes, so that improvements can be built into the design. This will involve consulting disabled people or their representatives. It is our policy to carry out a Vulnerable Road User Audit on the design of all new schemes to fully understand the impacts. However, it is important to recognise that many older people are very fit, active and do walk and cycle.

185. We will also work closely with public transport operators to ensure that vehicles and infrastructure are fully inclusive and that people with disabilities receive excellent service and feel safe and secure at all times when travelling.

186. We have statutory duties to promote equality, celebrate diversity, improve social inclusion and ensure fairness for everyone in Oxfordshire. Our ambitions for equality in the delivery of County Council services are set out in our *Equality Policy 2012-17*. The County Council also has a *Social Inclusion Strategy*, which highlights the importance of improving transport links.

187. Under the Equality Act 2010, the Council has a Public Sector Duty, which includes a duty 'to advance equality of opportunity between people who share a protected characteristic and those who do not.' The protected characteristics are: age, disability, gender reassignment, marriage and civil partnership (but only in respect of eliminating unlawful discrimination), pregnancy and maternity, race – this includes ethnic or national origins, colour or nationality, religion or belief – this includes lack of belief, sex and sexual orientation.

188. A formal assessment (SCIA) has been made of this Plan and is available along with the other consultation documents. Similar assessments are required under the Council's Equalities Policy for all new schemes, policies and plans.

Policy 28 Oxfordshire County Council will consult from an early stage in the development of schemes and initiatives so that the needs of individuals, communities and all groups sharing a protected characteristic under the Equalities Act 2010 are considered and, where appropriate, acted upon.

189. When assessing the health impacts of transport schemes and initiatives, we will be mindful of the need to address health inequalities, which are often linked with the differences in levels of deprivation between different areas. We are working closely with Public Health colleagues on health issues relating to transport and how they can be mitigated.

Improving air quality

190. In 2015 the county council resolved that LTP4 should be strengthened in its aims to reduce air pollution by more positively:

1. Encouraging walking and cycling
2. Restricting diesel vehicles in town centres
3. Working more proactively with the city and District Councils to develop and enact Air Quality Action Plans
4. Introducing low or zero emission mass transit vehicles

191. Chapter 3 sets out the problem of air pollution from oxides of nitrogen affecting Oxfordshire. This is a serious public health issue, affecting respiratory health. District Councils are responsible for air quality monitoring in Oxfordshire.

192. When an area is declared an Air Quality Management Area (AQMA) because of exceeding levels of particular pollutants, the district or city council is required to develop an Air Quality Action Plan (AQAP). As transport contributes most of the problem pollution (in Oxfordshire this is currently NOx in all cases), many of the potential actions are only possible with the support of the County Council. We recognise our responsibility and will work with District councils to develop appropriate actions, taking into account our overall transport strategy.

193. The following Air Quality Action Plans are in force in Oxfordshire:

- **Oxford City**: The Oxford AQAP covers the entire city within the ring road
- **Cherwell:** Kidlington, Bicester and Banbury
- **West Oxfordshire**: Witney town centre and Chipping Norton
- **South Oxfordshire:** Henley, Wallingford and Watlington
- **Vale of White Horse**: Abingdon town centre, and Botley, adjacent to the A34

194. Measures to support the Oxford AQMA are set out in the Oxford Transport Strategy.

195. South Oxfordshire District Council has drafted an action plan that contains some suggestions on how the air quality issues in these three areas, and South Oxfordshire as a whole, can be tackled.

196. In the Vale, the District Council has drafted an action plan covering the two AQMAs in the district: Abingdon has had an AQAP since 2009, and the Abingdon Integrated Transport Strategy, which smoothed traffic flows in the town centre, has helped to reduce levels of NOx. Botley AQMA has not previously had an AQAP: specific actions to reduce NOx in Botley are very difficult because the pollution is created by the busy A34 managed by Highways England. A 50 mile per hour speed limit on the A34 has been introduced to reduce air pollution; however levels remain above the air quality standard. Work with Highways England to develop a strategy for the A34 will take into account the need to reduce NOx pollution in Botley and support the AQAP.

197. In Chipping Norton, the AQAP proposed the introduction of a weight limit for HGVs and re-routing of HGV traffic between south-east England and the Vale of Evesham via the A40. This included 'de-priming' the A44 and associated modification to signage but this would require significant local and/or developer funding. Further to this, measures to improve air quality and road safety, will be sought from new development sites, including those allocated in the West Oxfordshire Local Plan, to mitigate the impact of growth on the Chipping Norton air quality management area. The East Chipping Norton Strategic Development Area (SDA) will need to assess the impact of the strategic development site on the town wide transport network and provide appropriate transport infrastructure to mitigate the impact. The County Council will seek infrastructure which is proportionate to the number of houses agreed for the East Chipping Norton SDA which could include a new spine or distributor road where necessary to mitigate the impacts on the town wide transport network

198. We will continue to work with District Councils to develop transport measures as part of AQAPs for all AQMAs and any that may be declared during the period of this Plan. However, in the context of the very limited resources available, there is a need for a more co-ordinated approach across the county, which also reflects the new Government framework.

199. Below we set out how this Plan has been strengthened in response to last year's Council resolution:

Encouraging walking and cycling

200. The Active & Healthy Travel Strategy sets out our plans to enable more walking and cycling, including how they can be promoted in combination with bus and rail services for longer journeys. These have the potential to improve air quality by replacing car trips, particularly in congested urban areas where traffic is the main cause of poor air quality. They can also improve public health – for example the availability of pedestrian and cycle routes which avoid heavy traffic flows can help to reduce exposure to poor air quality.

Restricting diesel vehicles in town centres

201. In December 2015 the Government published a policy paper 'Improving Air Quality in the UK Tackling Nitrogen Dioxide in our towns and cities UK overview'. This sets out a framework for local authorities to introduce Clean Air Zones, based on Euro 6 for diesel and Euro 4 for petrol, with four options for what vehicles they would cover:
    - Class A – buses, coaches and taxis
    - Class B – buses, coaches, taxis and heavy goods vehicles (HGVs)
    - Class C – buses, coaches, taxis, HGVs and light goods vehicles (LGVs)
    - Class D – buses, coaches, taxis, HGVs, LGVs and cars

202. Five cities with the poorest air quality will be required to introduce Class B (Derby, Nottingham, Southampton) or Class C (Birmingham, Leeds) Clean Air Zones. London's proposed ultra-low emission zone is likely to include cars i.e. Class D. Other local authorities are encouraged to consider introducing Clean Air Zones, including the upgrade of existing Low Emission Zones (LEZs).

203. In Oxfordshire, currently, only central Oxford has a LEZ, applying to buses only. This was introduced primarily to reduce oxides of nitrogen (NOx). It currently requires local buses operating in affected streets to comply with the Euro 5 emission standard.

204. However, the ambition of the Oxford Transport Strategy is to start a city centre zero-emission zone for all vehicles by 2020, with the zone being gradually expanded over time as the required infrastructure and technology develops. This will support objectives to improve air quality and targets to reduce emissions from vehicles. Further private sector investment from operators on all routes will be required, not just the short to medium range services, and be achieved through the deployment of electric buses, advanced electric-diesel hybrid vehicles with an electric drive mode for emission-free operation in built up areas, and routeing changes as outlined above.

205. As technology improves, vehicles will be able to cross the whole city whilst on full electric power, enabling the creation of a city-wide zero-emission zone by 2035. Vehicles which cannot comply with specific emission standards will be required to terminate at Park & Ride sites outside of the city. However, it is important to stress that each stage in the development of the Oxford zero-emission zone would be subject to consultation and would depend on the widespread availability and affordability of zero-emission vehicles before their use becomes mandatory.

206. In parallel with the development of the Oxford city centre zero-emission zone, the whole city (plus other towns where Air Quality management Areas (AQMAs) have been declared) will be considered for Class B Clean Air Zones. The aim is to start by 2020; however, this will be subject to other factors which will need to be taken into account:

- It will be important to take account of the costs and benefits, learning from experience elsewhere, particularly the larger UK cities – which suggests reviewing progress and issues on the five cities referred to above, before committing Oxfordshire to a solution on a more quantifiable basis.

- Enforcement costs could be significant as the Government envisages camera enforcement for all but Class A restrictions. Only Oxford has camera enforcement, covering certain streets.

- With the theoretical benefits of Euro 5/6 not being matched by real on-the-road emission levels, it be sensible to wait until the real world outcomes of the latest Euro 6 standards are clearer before committing to this approach in Oxfordshire.

Working more proactively with the City and District Councils to develop and enact Air Quality Action Plans

207. There is a commitment to work with District Councils in a more co-ordinated way on Air Quality Action Plans. However, further resources will need to be identified if the Council is to develop partnership working with District and local councils to help deal with the most sensitive air quality areas.

208. The division of responsibility between air quality (districts) and transport (OCC) is not ideal when transport is seen as the both as the main cause of poor air quality and the most effective solution to addressing it. The combined responsibility for these closely related areas is one of the benefits of unitary status; the County Council's recently commissioned study of options for local government in Oxfordshire will need to take this into account.

Introducing low or zero emission mass transit vehicles

209. The main bus operators have responded to the Oxford LEZ by introducing the latest low emission buses – either hybrid electric or Euro 6 standard.

210. Looking to the future, we are supporting trials of wireless induction charged electric buses, which run fully on electricity. As technology develops we expect electric buses and other types of low emission public transport vehicles to become more widespread. We will support pilots where appropriate, working with businesses and research institutions. If successful and if funding is available, we will support the provision of the required infrastructure, taking into consideration safety and environmental factors. We will ensure that new infrastructure considers the flexibility to enable the take-up of future low emission vehicle technologies, for example through incorporating sensor or wireless technology in new roads or bus lanes.

211. Network Rail's programme of electrification means that the proportion of diesel trains through Oxfordshire will reduce significantly over the period of this plan. By 2031 we expect that most of Oxfordshire's passenger rail services will be electric.

Policy 29 Oxfordshire County Council will work with district and city councils to develop and implement affordable transport interventions to support Air Quality Action Plans, giving priority to measures which also contribute to other transport objectives.

Improving road safety

212. When evaluating the costs and benefits of new road schemes, the Department for Transport uses an estimate of just under £80,000 for the average value of preventing each road accident, however serious. This reflects not only medical costs, but also the suffering of those involved as well as any lost economic output. It excludes the wider costs such as the severe congestion that is often caused even by comparatively minor collisions on the strategic roads in the county.

213. Our strategy for improving road safety by preventing casualties is set out in the *Oxfordshire Community Risk Management Plan*. Our approach consists of:

- Gaining an understanding of the problem through analysing casualty reports and monitoring the casualty history of all roads in the county, and targeting our work accordingly;
- Changing road users' attitudes and behaviour so they take more responsibility for their own and other people's safety;
- Maintaining transport infrastructure in a safe condition;

- Highway engineering improvements where appropriate, and designing in safety to all new highway schemes including those being constructed as part of new development; and,
- Changing speed limits where appropriate and reinforcing these with specific measures like variable message signing, where this can be justified.

214. During the period of this Plan, technologies to improve safety will very likely be further developed or become more widely available. The Council will respond positively, so that road users in Oxfordshire have the opportunity to take advantage of new technologies, for example through:

- The use of new, safer materials and infrastructure in highway schemes;
- Considering road safety adaptations that may become permissible under new legislation – many of these are likely to relate to in-vehicle technology that will alert drivers to risks and potentially manage, for example, the headways between vehicles; and
- Providing information to support the development of road safety technologies.

215. We process and analyse all reports of injuries on the road received from Thames Valley Police. This allows us to identify collision problem sites and routes, and trends in numbers overall and for specific road user groups, as well as to explore behavioural and other factors. Prompt processing of data allows us to respond quickly to maintenance issues such as gully clearing to reduce localised flooding or worn road markings.

216. Monitoring casualty history allows us to target our behaviour-change programmes, and identify sites that would benefit from maintenance or improvement schemes. Because casualties are dispersed, and therefore the number of casualties at any site is often low, we monitor them over a five year period to detect patterns. However, we acknowledge that many casualties, particularly minor ones that don't involve motor vehicles, are not reported to the police. For this reason, we also receive summary information from the NHS on road accident casualties to complement the police data.

217. We deliver Road Safety Education programmes, sometimes in collaboration with other agencies such as the police or local community safety officer. We use casualty data to identify road user groups most at risk and target our programmes to achieve casualty reduction within those specific groups, either county-wide or to address specific local problems.

218. Each year a proportion of our maintenance budget is spent on planned road safety maintenance schemes, such as rectifying substandard skid resistance. Schemes are identified from analysis of casualty records and surveys. This is in addition to routine maintenance such as cutting vegetation to maintain visibility, and reactive maintenance to repair serious safety defects such as large potholes and damaged safety barriers. As an element of the new Active & Healthy Travel Strategy, we will be submitting walking and cycling priorities for maintenance, while being mindful of limited resources.

219. We investigate road engineering solutions for parts of the road transport network where collisions occur most frequently. It is important to understand the

causes of collisions and that engineering solutions may not always be possible or cost-effective and in many cases may have little impact. An assessment of the priority of a safety scheme will take account of its cost and anticipated accident savings.

220. We have a legal duty to regulate traffic in the interests of safety, through our powers as a highway authority. It has the power to set speed limits, following strict Government guidance and subject to consultation. Lower speed limits have been found to be effective in reducing casualty rates, in particular on rural single carriageway routes. A general review of the county's A and B roads was completed in 2011, and this may be repeated within this Plan period. However, we will investigate additional changes in response to new development, and our ongoing casualty monitoring.

221. The minor rural road network outside towns and villages (which are mainly unnumbered roads, but include some comparatively lightly trafficked B roads) are currently subject to the national speed limit of 60mph, but their character and usage (for example by pedestrians, cyclists and equestrians) in many cases makes such speeds hazardous. Although the frequency of accidents is typically low, concerns over safety and the loss of amenity for vulnerable users are often raised. Recent changes to the national traffic signing regulations now permit without specific government authorisation the introduction of 40mph zones, and we will work in partnership with local councils and Thames Valley Police to investigate and promote such zones where they can be justified and funded.

222. In Oxford, most residential roads were reduced to 20mph in 2009, which has been successful in reducing accidents and encouraging more walking and cycling. Government guidance urges traffic authorities to consider introducing more 20 mph limits, over time, in primarily residential urban areas and built-up village streets, to increase safety for pedestrians and cyclists. We are aware that a number of communities across Oxfordshire have expressed an interest in 20mph limits, and, subject to funding, we will work in partnership with local councils and Thames Valley Police to investigate and promote lower speed limits where they can be justified and funded. This includes areas where lower speed limits could help meet wider objectives, such as encouraging more cycling and walking.

223. While we use casualty records to target sites for potential engineering or speed reduction improvements, we are also mindful of the importance of perceived safety on people's behaviour: that is where people view a situation as unsafe, even though this may not be borne out by casualty records. This is particularly relevant to our objective to develop and increase cycling and walking. In some locations safety improvements may not appear to be justified by casualty records, but they could remove barriers to walking and cycling, and in particular support parents in allowing children to walk or cycle to school.

224. People with reduced mobility feel particularly vulnerable, and the fear of a collision or of falling can discourage them from going out. Targeted safety improvements, such as improved crossings, can support the key priority of the Oxfordshire Health and Wellbeing Strategy to support older people to live independently with dignity whilst reducing the need for care and support.

Policy 30 Oxfordshire County Council will identify those parts of the highway network where significant numbers of accidents occur, and propose solutions to prevent accidents.

Policy 31 Oxfordshire County Council will work with partners to support road safety campaigns and educational programmes aimed at encouraging responsible road use and reducing road accident casualties, and will keep speed limits under review, including giving consideration to the introduction of lower speed limits and zones in accordance with the current Department for Transport guidance.

8. Funding and implementation

225. The strategic approach and policies outlined in the preceding chapters will be applied across the whole county in the following ways:

- Through our key role in collaborative strategic land use and transport planning for the county;
- Through our involvement in the development of Local Plans and Neighbourhood Plans;
- In our response to strategic infrastructure and development proposals;
- In our response to planning applications;
- Through the development of area strategies for areas planned for growth;
- Through the development of supporting strategies;
- Through our work with partners to develop transport solutions; and,
- In our decision making process for all aspects of transport for which we have control.

Development of area, route and supporting strategies

226. For those parts of the county due to experience significant housing and/or employment growth, we have developed Area Strategies reflecting emerging Local Plans for formal adoption as part of this Plan. These include: Oxford; Science Vale (the area encompassing Wantage and Grove, Abingdon, Didcot, Culham, and Harwell Campus), Bicester, Banbury, Witney and Carterton.

227. These set out a clear strategy for transport to guide decision making and support future funding arrangements to mitigate the impact of the growth proposed. We have also set out route strategies for the A40 and A420 and we are considering the need for further route strategies. These will consider the transport impact on smaller settlements and key junctions along the routes.

Influencing and supporting Neighbourhood Plans

228. For smaller towns, villages and rural areas where there is less growth to impact on transport demand and less of an impact on strategic transport networks, in the spirit of

localism we are not planning to develop detailed transport strategies for local communities. Many of these communities are developing Neighbourhood Plans, and we will expect these to set out priorities for transport in keeping with our LTP policies and our freight, cycling, rail and bus strategies and advice in our published Neighbourhood Planning Toolkit.

Figure 26: Connecting Oxfordshire's input into Neighbourhood Plans where there is no area transport strategy

Policy 32 Oxfordshire County Council will support the development of Neighbourhood Plans. Where a Neighbourhood Plan has been adopted and providing it is consistent with LTP4, the Council will seek funding to secure the Plan's transport improvements from local developments and the Community Infrastructure Levy as appropriate.

Funding transport improvements

229. Councils no longer receive funding directly to spend on transport improvements. Capital funding for local projects from the Departments for Transport, Business Innovation & Skills, and Communities & Local Government has been pooled into a single Local Growth Fund (LGF). The Government has given responsibility for deciding on priorities for investment and putting in bids for the LGF to the Local Enterprise Partnerships (LEP).

230. This means that for each transport scheme for which the Council wants to seek Government funding, it has to prepare a bid and is then dependent on the LEP selecting it for submission. It then is considered in competition with non-transport schemes and schemes from other LEPs across the country. This more challenging route to funding

requires us to prepare strong business cases that show how schemes contribute towards economic growth.

231. From time to time, specific grant funding opportunities arise, but these are moving towards becoming funding streams within the LGF. With tightening local authority budgets, Government revenue grants are particularly valuable, allowing us, for example, to carry out promotional activities no longer affordable from Council budgets. We will seek to bid for every available opportunity that is relevant, which means we need to have schemes and projects ready to put forward.

232. The other main source of funding is from development, via planning obligations. Developers either contribute towards improvements to mitigate their transport impacts, or carry out works under S278 Agreements with the Council.

233. While developments can 'pump-prime' public transport service improvements, in the long term these must be provided commercially because there will be insufficient funds to subsidise further public transport services. Private sector funding is therefore a key part of the funding mix for our transport strategy.

234. We will work in partnership with district and city councils and the LEP through the Growth Board to develop a prioritised programme of capital transport schemes, taking into account the various funding sources. We will also seek to work strategically with other counties or authorities where applicable to secure and develop further funding opportunities. This will be updated annually.

235. In addition, reductions in funding for local government coupled with rising demand for services mean that we have to change the way we deliver public services, with a shift towards enabling people and communities to take ownership of local priorities, including for example maintenance, such as verge cutting. Our Oxfordshire Together programme sets out how we propose to change the way we deliver services by working with communities.

Policy 33: OCC will work in partnership through the Growth Board and developers to meet the objectives of LTP4 and seek external funding to support the delivery of transport infrastructure priorities as set out in the Strategic Economic Plan and forthcoming Oxfordshire Infrastructure Strategy.

Influencing development

236. Much of what we want to achieve depends on how we can guide development. Our approach is both proactive (strategic planning) and reactive (responding to development proposals).One of the ways in which we respond to development is by requiring mitigation under S106 of the Town and Country Planning Act. This is in the form of payments and requiring works to be carried out. The conditions under which this is done are dictated by the National Planning Policy Framework.

237. The County Council works closely with district councils, which are each responsible for preparing a Local Plan. Local Plans - together with any Neighbourhood Plans - form the development plan for an area. They set out the opportunities for development and contain

policies on what will be permitted, and where. The County Council provides transport input and advice into Local Plan development and works with district councils to set priorities for strategic transport infrastructure.

238. In most cases district and city councils decide whether a development can go ahead (the County Council only determines planning applications for minerals and waste developments and Regulation 3 developments, such as quarries and landfill sites). Planning applications should be determined in accordance with the development plan for the area unless material considerations indicate otherwise.

239. The County Council provides pre-application advice to developers on request to help ensure the development proposals meet transport objectives and do not create unacceptable safety or congestion problems.

240. In determining planning applications district councils are legally required to consult and take account of the advice of the County Council in its capacity as highways authority and in relation to its other statutory responsibilities. The County Council provides co-ordinated advice on development proposals through its consultation response on planning applications. This may specify requirements for measures to mitigate the transport and other impacts of the development, which can be secured through legal agreements.

241. The County Council can object to an application but district councils are not obliged to follow our recommendation and need to balance it with other factors.

242. We will work in partnership with the district councils to ensure that new development:

- Is located in accordance with the relevant spatial planning policies and proposals;
- Contributes to the timely delivery of improvements to the transport network and services, either for better management of existing infrastructure and services or for the provision of new facilities to support growth;
- Delivers appropriate highway mitigation works to prevent adverse impacts arising from development
- Is designed to encourage/support the increased use of sustainable transport;
- Does not impose undue stress on ongoing highway maintenance costs; and,
- In terms of the transport and highway elements, complies with current national and local policy guidance, is designed to modern contemporary design standards, and built to the Council's specifications.

243. In responding to consultations on planning applications the County Council will focus greater resources on the assessment of strategic and large major applications which contribute to economic and housing growth and which raise significant issues for the provision of supporting transport and highways infrastructure.

244. Applications need to be accompanied by the right supporting information, including testing through approved transport models, to enable a proper assessment of the proposals and identification of any necessary mitigation measures. The County Council encourages

developers to enter pre-application discussions so that key issues can be identified early and it can advise on the information that is required.

245. For developments which generate significant transport demand, we will normally expect a Transport Assessment to accompany a planning application, or, in the case of smaller developments, a shorter Transport Statement. This sets out the transport issues relating to a proposed development and identifies what measures will be taken to deal with the anticipated transport impacts and contribute towards our transport objectives. It will be used to determine whether the impact of the development is acceptable. We will continue to develop and maintain a robust transport model which should be used by developers to test their schemes for impact and solutions as part of developing their proposals.

246. In particularly sensitive locations, such as Air Quality Management Areas, the environmental impacts of the traffic generated by the development will need to be addressed in a separate Environmental Statement or included in the Transport Assessment.

247. Where the development will generate a significant increase in lorry movements during construction or in operation, the applicant should provide information of routeing arrangements to avoid, where possible, sensitive locations such as Oxford city centre, town centres, villages and residential areas. This may lead to a formal routeing agreement being signed.

248. For developments which generate significant transport demand, we will ensure that there is a comprehensive Travel Plan in place. This sets out how a development will be managed, post occupation, to meet targets to reduce car dependence from the site and promote sustainable travel.

249. The County Council will develop and publish guidance documents to assist developers in meeting our requirements. These are influenced by the guidance of both volumes of Manual for Streets.

Mitigation and developer contributions

250. If proposed new developments are considered to undermine the efficient, effective or safe operation of the transport network, the County Council will expect the developer to remedy any identified impact. This can be either through carrying out remedial works themselves, to our satisfaction, or by making an appropriate contribution to allow this work to be done by us. Where CIL is in place, additional obligations will be sought under S106 for direct mitigation specific to the development.

251. Developers can be required to mitigate transport impacts which occur away from the development site. For example, a pedestrian crossing might be needed to help people get from a new development to the centre of a village across a busy road. Developers are required to protect rights of way or enhance those running over or near their developments; applications for diverting or stopping-up rights of way are dealt with under a separate process.

252. Where the cumulative impact of a number of developments in an area over the plan period will require improvements to transport infrastructure and services, all developments will be expected to provide transport enhancements or make a contribution towards the wider improvements. This contribution will be additional to any works or contributions aimed at resolving any particular problems caused by the development alone.

253. The system for obtaining contributions is likely to change, as districts now have the power to impose a 'Community Infrastructure Levy' (CIL). The County Council will input into the CIL process by agreeing priorities for local transport which will then be used to set the level of the CIL in each district.

254. Our aim is that most new development in Oxfordshire will be located where it can be served by existing high quality public transport services, especially the designated Rapid Transit, Rail and Premium bus routes, and close to our main transport hubs and interchanges. Where the existing public transport is inadequate we expect developers either to secure services in agreement with us, or to provide funding for them. This will normally be required until services reach a point where they are commercially viable and can operate without subsidy. We will also ensure that developers provide high quality sustainable access to public transport services, particularly where the Rail Network, Rapid Transit and Premium Bus Routes can be accessed.

255. Our approach to the use of developer contributions for developing the public transport network and increasing patronage is shown in policy 34 below, and is set out in more detail in our bus strategy. It includes reference to providing more detailed standing advice, which when approved will set out guidance on Section 106 contributions towards public transport from development.

Policy 34 Oxfordshire County Council will require the layout and design of new developments to proactively encourage walking and cycling, especially for local trips, and allow developments to be served by frequent, reliable and efficient public transport. To do this, we will:

- secure transport improvements to mitigate the cumulative adverse transport impacts from new developments in the locality and/or wider area, through effective Travel Plans, financial contributions from developers or direct works carried out by developers;
- identify the requirement for passenger transport services to serve the development and negotiate the provision of these passenger transport services with the developer;
- ensure that developers promote and enable cycling and walking for journeys associated with the new development, including through the provision of effective travel plans;
- require that all infrastructure associated with the developments is provided to appropriate design standards and to appropriate timescales;

- agree local routeing agreements where appropriate to protect environmentally sensitive locations from traffic generated by new developments;
- seek support towards the long term operation and maintenance of facilities, services and selected highway infrastructure from appropriate developments, normally through the payment of commuted sums;
- secure works to achieve suitable access to and mitigate against the impact of new developments in the immediate area, generally through direct works carried out by the developer

Connecting Oxfordshire: Local Transport Plan 2015-2031

Bus & Rapid Transit Strategy

CONNECTING OXFORDSHIRE

OXFORDSHIRE COUNTY COUNCIL

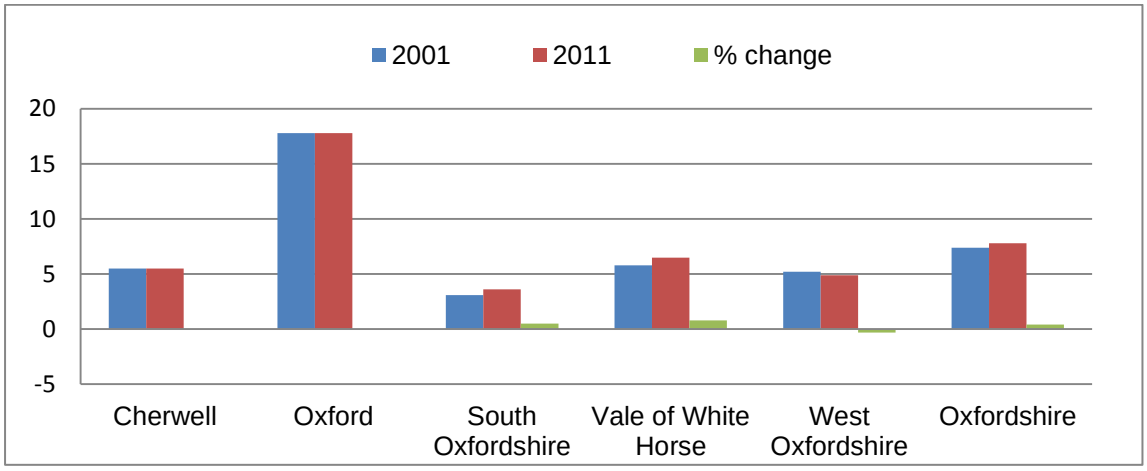
Oxfordshire Bus and Rapid Transit Strategy

Introduction

1. Oxfordshire County Council has a long and consistent track record of promoting bus travel, working in close partnership with the bus industry. Our forward-looking pro-bus policies over the last four decades have been a key factor in the continued growth of bus patronage and the development of a bus user culture, especially in and around Oxford, which now has one of the most highly-developed and successful commercial bus networks in the country.

2. As a result, Oxfordshire has managed to avoid the widespread decline in bus passenger numbers elsewhere in the country, with one of the highest rates of growth in England and the South-East region. During this time major improvements have taken place on the inter-urban bus network and with the introduction of a Quality Partnership, including an integrated ticketing scheme in Oxford.

3. In the past four years alone total bus passenger journeys in Oxfordshire rose by almost 21% and the number of journeys per head of population by almost 17%. In 2013/14, there were over 43 million bus journeys in Oxfordshire, an increase of seven and a half million trips in just five years. In the more rural districts the bus network is much less developed, with bus patronage substantially lower as figure 1 shows. In 2011 over 70% of all bus commuting trips in the County originated and/or ended in Oxford.



Bus Strategy Figure 1: Commuting to work by bus & coach in Oxfordshire - 2001 and 2011 - mode share by district [Source: Census]

4. Despite this sustained growth, Oxfordshire continues to have very high levels of car congestion, especially at peak hours. This makes journeys unreliable, limits capacity for growth and damages health. Transforming the bus network is a key contributor to limiting congestion, encouraging sustainable transport and addressing the Plan's high-level goals. The table below identifies the main LTP outcomes from this bus strategy:

Connecting Oxfordshire high-level goals	To support jobs and housing growth and economic vitality	To support the transition to a low-carbon future	To support social inclusion and equality of opportunity	To protect, and where possible enhance, Oxfordshire's environment and improve quality of life	To improve public health, safety and individual wellbeing
Bus strategy key outcomes	More people will be able to travel to more destinations by bus, improving access to work, shops and local centres	Sustainable, energy-efficient bus transport will reduce sole-occupancy car usage and help manage car emission levels	Accessible bus connections will enable disabled people, elderly people and those unable to drive will travel more	More public transport journeys mean fewer car journeys: fewer roads need to be built and harmful vehicle air pollution is lower	Regular walking and cycling to and from bus stops and interchanges can be an important contributor to keeping fit

Bus Strategy Table 1: Key Outcomes

Challenges

6. Over the next few years the Council and its partners face a number of unprecedented challenges in meeting this aim of transforming the bus network. These are:

(i) Major reductions in revenue funding, coupled with increasing demand for essential non-transport services such as social care. This has led the Council to take the unwanted step of having to withdraw funding from the supported bus network across Oxfordshire. Instead there will be an increased reliance on developing and enhancing the Commercial Bus Network, and access to it, coupled with funding from development to extend it. . We already have a good track record of working in partnership with the commercial bus operators who provide the majority of bus services in the county, but in future will have fewer resources for partnership working, with less ability to fund infrastructure such as stops, shelters and real time information displays and more emphasis on traffic management and working with developers and other partners to provide facilities.

(ii) The huge increase in population forecast for Oxfordshire. There is already a housing shortage and parts of the county, particularly Oxford, are among the least affordable places to live in the UK. The scale of housing and other development required to address this problem and cater for population growth is significant and a major part of Oxfordshire's plans. Although growth has the potential to increase congestion it can also create opportunities through additional demand for public transport and the potential to ease recruitment problems e.g. for bus drivers.

(iii) The limited capacity of the road network, which already suffers from severe congestion. Making better use of the network and reducing the share of car travel in favour of bus will be essential. This requires measures to reduce congestion and/or enable buses to avoid it. Many of the opportunities to reallocate road space to buses through measures such as bus lanes have already been taken in Oxford, where tough choices and radical options, such as a workplace parking levy may be needed, as outlined in the Oxford Transport Strategy.

(iv) Changes in our lifestyles and work patterns and how they impact on commercial bus services. Successful commercial bus services need high passenger numbers and affordable fares. The ideal pattern of demand is a good load of passengers in both directions throughout the day, as this makes best use of the key resources of drivers and vehicles. A service mainly used by commuters in peak periods will be less viable, with the risk of buses running nearly empty during the day. Balanced demand can benefit from a variety of journey purposes e.g. shopping, leisure, healthcare, working and education; flexible working patterns can also help, particularly if commuters can avoid the peaks.

(v) Changes in land use - This includes the trend towards more complex and dispersed patterns of movement, with (for example) important employment sites scattered through the Science Vale area and in Oxford's Eastern Arc. Although these are not currently well served by bus other than mainly radial routes to and from central Oxford, there is scope to run direct services and develop interchanges between services at locations like Park & Ride sites.

The Bus Strategy

5. The main elements of our strategy are:

- **Integrated transport planning** building on Oxford's successful policy of land use planning, traffic management, parking management and restraint, and bus promotion, and adaptation of this approach to the rest of the County.

- **A cohesive and integrated bus network and provision of accessible, high quality infrastructure** with clear policies and design standards to guide the development and improvement of route infrastructure.

- **Tackling congestion and delays** by implementing bus priority or other traffic management measures at specific points along the major bus routes to ensure that buses can operate reliably and at commercially attractive speeds.

- **Adapting the bus network** to cater for more complex and dispersed journey patterns and new major development. We will encourage and support the development of more cross-town and cross-area bus routes where these are practically feasible and there is sufficient potential demand.

- The development of **mass rapid transit systems and routes** between Oxford and a proposed **new outer ring of Park & ride sites**.

- The **development or upgrading of new high quality Premium urban and inter-urban services** where new development makes it feasible including bus priority measures and enhanced passenger and interchange facilities in:
  - Oxford, especially within and linking to the growing Eastern Arc
  - The Science Vale area,
  - larger towns outside Oxford,
  - locations along some strategically important inter-urban routes.

- **Enabling good onwards access on foot to major destinations** facilitating the penetration of bus services as close as possible to the heart of destinations such as town centres, employment areas and hospitals, with conveniently located bus stops.

- The further development and extension of **integrated and flexible ticketing** which will offer a greater range of journey choices than at present, e.g. for part time workers.

- **The further development of the Quality Bus Partnership approach** to focus on improving service punctuality/reliability, information and integration in line with the Government's emerging proposals to strengthen partnerships

- **Improvements to the securing and use of developer contributions for bus development,** by revising our approach to securing and utilising Section 106 developer contributions, and making preparations to achieve optimal use of the Community Infrastructure Levy.

- **Enhanced partnership working with local planning authorities** and use of the planning system to achieve better coordination between land use planning and future bus service provision.

- **Integration with Science Transit** to develop new technology and research in bus operation and network development, including autonomous vehicles and integrating the commercial bus network with any future personal rapid transit (PRT) in a complementary way.

Oxfordshire's Bus Network

6. Oxford and its immediate surrounding area have a highly developed and generally high quality bus network, including a well-established Park & Ride system. Within Oxford there are already extensive bus priority measures (although gaps or 'pinch points' remain). Outside Oxford bus priority is almost non-existent on inter-urban routes and is generally under-developed in most of the larger towns. We need to identify the most important routes or corridors outside Oxfordshire where bus priority (or new services) may be needed to improve journey time reliability and reduce traffic congestion.

7. The Premium route bus network in Oxfordshire tends to follow a strongly radial, 'hub and spoke' pattern centred on Oxford, particularly the city centre. Outside these radial corridors – both within Oxford and Oxfordshire as a whole – there is currently more limited public transport connectivity.

8. The existing strategic inter-urban bus network is well connected to some major towns outside Oxfordshire, but there are other strategically important links where services are less developed. Passenger demand may grow substantially as a result of major planned development in and outside Oxfordshire and the strategic co-ordination through links to Northamptonshire, Milton Keynes and Cambridge through the proposed 'Economic Heartland of England' strategy area.

9. Bus networks in and around Oxfordshire's larger towns have become increasingly limited and bus patronage has not grown significantly. Our strategy is to use developer funding where available to 'pump prime' increased service frequency on routes serving the new developments if the new service is considered likely to become commercially viable by the end of the funding period.

10. The Council can no longer afford to support socially necessary but non-commercial bus services, other than those which we have a statutory responsibility to provide, e.g. for those entitled to free home to school transport.

11. There may be opportunities to develop a new approach to rural public transport, including a role for community-based transport services, given that the County Council can no longer afford to support these financially. However, finding volunteers can be a challenge so, while potentially valuable, community transport will not be able to fill all of the gaps left by previously subsidised rural bus services.

12. Travel demand within Oxfordshire is becoming highly dispersed and complex and it is difficult to serve with single-stage bus services. With substantial employment and urban growth planned over the next 20 years, much of which will be concentrated within the 'Knowledge Spine' area, travel demand patterns will become increasingly decentralised. The public transport network needs to evolve in order to cater for this more complex pattern of internal journeys. Supporting this with more efficient and attractive payment and ticketing systems helps create an easier to use, integrated public transport system.

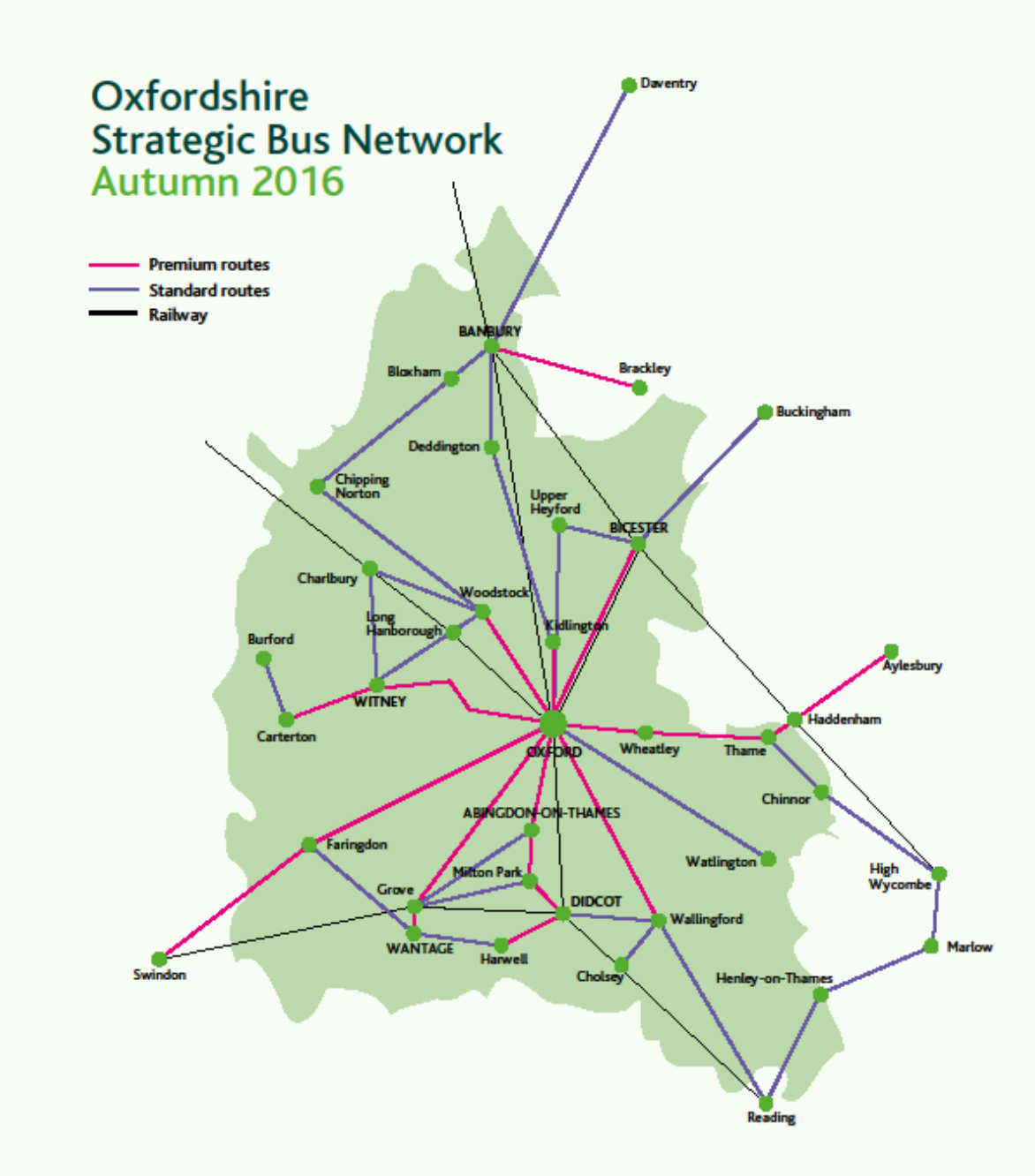
13. Developing the bus network will remain the primary responsibility of the commercial bus operators, and new services (even with some initial pump-priming funding from development) will need to have the potential to be commercially viable. The location and layout of new development can help to make or break a new bus service in terms of its long term financial and economic sustainability.

Bus Network Hierarchy

14. Three levels of service are set out below, all of which will need to be fully commercial in the longer term although short term pump priming may be available in some cases. Each of these service levels would cater for all journey purposes, with those more dependent on commuter flows subject to marketing to promote other journey purposes such as leisure and tourism in order to enhance their commercial viability.

SERVICE	DESCRIPTION	PRIMARY FUNCTION
RAPID TRANSIT	• Very high passenger volumes • Very high frequency (ideally a minimum of 6-8 buses per hour) • Extensive hours of operation • High level of bus priority/segregation • High quality vehicles and passenger and interchange facilities	• Connect places of strategic importance and busiest demand on main transport corridors in and approaching the largest settlements e.g. A40 corridor,
PREMIUM TRANSIT	• High frequency (ideally a minimum of 4 buses per hour) • Early and late evening services • Direct, with some express services esp. at peak-time • High level of bus priority/segregation Moderate level of bus priority on inter-urban corridors but may utilise high level BRT infrastructure to Oxford) • High quality vehicles and passenger and interchange facilities • Different standards for urban/extra-urban and inter-urban routes	• Connect places on main inter-urban corridors between Oxford, market towns and major urban centres in region • Links to main line railway stations at Oxford, Oxford Parkway, Didcot, Bicester (Village & North) and Banbury
CONNECTOR TRANSIT	• Moderate frequency (ideally a minimum of two buses per hour) • Less extensive hours of operation and Saturday/Sunday services • Fixed route • High quality vehicles and passenger and interchange facilities • Fully commercial services or services with strong prospects to become so • May have a moderate level of bus priority /segregation on main urban and inter-urban roads (but may use high level BRT infrastructure into Oxford)	• Local town services • Utility journeys to key trip generators (including railway stations) • Main corridors between market towns and larger villages • Secondary corridors into Oxford

Bus Strategy Table 2: Oxfordshire's strategic bus network hierarchy



Bus Strategy Figure 3: Oxfordshire's strategic inter-urban bus network

The Strategic Bus Network

Introduction

15. Figure 3 shows the strategic inter-urban bus network identifying Premium and other routes. The aim of the strategic bus network is to optimise the use of existing strategic transport infrastructure and minimise the growth in vehicle traffic. In some cases the premium routes shown may not yet have a frequency of four per hour but will have seen increases towards this level as well as investment in high quality vehicles and infrastructure. The Oxford Transport Strategy includes an Infrastructure Plan which provides details of proposals for rapid transit in and around Oxford.

16. Our policy is for the bus network as a whole to become entirely commercial, especially services on the strategic network. This will require the right combination of:
    - **Potential demand -** matching desired travel patterns between residential origins and a range of potential destinations, across the day and not just in peak hours.
    - **Critical mass** – ensuring that services provide the optimum level of capacity for the size of development.
    - **Frequency and reliability –** providing a service that is attractive in terms of frequency and journey time reliability for work trips and other types of journey.
    - **Fares –** affordable fares optimising potential revenue which will sustain further growth and improvement.
    - **Seat capacity** – bus sizes matched to the level of demand, to maximise vehicle efficiency and keep bus movements in urban centres to an acceptable level.

17. Where developer or other external funding allows, our policy on the strategic network is to make services as attractive as possible for current and potential users through:
    - **'Pump priming'** increased service frequency or operating hours, where there is a prospect of the higher level of service being commercial once funding is removed.
    - **Improving on-road conditions** for strategic bus services to achieve better journey time reliability and faster journey times.
    - **Improving passenger facilities and access** to bus stops and other interchange points particularly on foot and by bicycle. This element is covered in detail in the 'Door to Door' section of the Active & Healthy Travel Strategy
    - Supporting commercial bus operators through the **Bus Quality Partnership** framework in delivering well-targeted and designed marketing and promotion.

- In addition, where service improvements are associated with new residential or business developments there is a significant role for travel planning and other smarter choice initiatives to help achieve the development's bus mode split targets.

Rapid Transit Routes/Services

18. We aim to develop three Rapid Transit routes centred on Oxford that will achieve an exceptionally high level and quality of service. These routes will require substantial investment in bus priority measures, or possibly purpose-built infrastructure, as well as on-board passenger facilities and high quality pedestrian and cycling links to stops. The Active Travel Steering Group will review priorities and funding options for creating better cycling and walking links to access popular bus (and rail) hubs. We expect higher density developments around the hubs/routes to take maximum advantage of the investment and the potential for encouraging sustainable travel behaviour. Our strategy for developing these routes is set out in the section on the Oxford area bus strategy in Annex 1 and in the Oxford Transport Strategy.

Premium Transit Routes/Services

19. Premium Routes generally serve the most heavily trafficked road corridors and larger settlements and employment areas in the County. Improving bus journey times and service punctuality is therefore a high priority for all Premium Routes.

20. A major challenge is to provide protection against worsening traffic congestion in order to ensure that buses remain attractive alternatives to the private car for work, education and shopping. Premium bus routes will therefore require investment in bus priority and/or other measures to address congestion where circumstances permit, in order to improve journey time reliability and speed.

21. We wish to see future development proposals located on or near Premium Route corridors, where appropriate sites can be identified. This would be more financially sustainable than designation of entirely new routes and is also likely to reduce levels of traffic generated by new developments.

22. Premium Routes have traditionally focused on service frequency; but operators have demonstrated already that there are many other aspects of the service that help to deliver a quality product. For example, operators have introduced high quality and low environmental impact vehicles on services in and around Oxford.

RAPID TRANSIT

Why do we need rapid transit solutions in Oxford and the surrounding area?

Huge population growth is proposed in and around Oxford over the next 20 years. There are acute and increasing levels of traffic congestion and we are faced with virtually insurmountable physical constraints on further improvements and expansion of conventional bus service solutions. Together these create the need for new rapid transport solutions.

Bus rapid transit (BRT) represents an innovative, relatively low cost public transport solution to many of Oxford's mobility and accessibility problems. BRT is a way to improve mobility in Oxford and the sub-region at relatively low cost through incremental investment in a combination of bus infrastructure, new vehicles, operational improvements, and technology.

An example of bus rapid transit and its infrastructure.

Another option for rapid transit is the introduction of a tram system. Trams share many of the same benefits as BRT, but also differ in a number of ways. At this point in time it is difficult to be sure what type of system will be most suited to Oxford.

What is Bus Rapid Transit?

BRT systems are found in cities throughout the world. Although they vary in form, their key characteristic is that, compared to conventional bus services – even good ones – they are faster and higher quality, operating on routes ranging from an above average level of on-road bus priority up to complete segregation e.g. a separate, possibly elevated track.

They are more than this however. BRT is an integrated system of facilities and services that collectively improves the speed, reliability, and identity of bus transport. Other typical features include: use of 'rubber-tyred' vehicles and roads (rather than rail track), faster methods of passenger boarding, faster fare collection, and a unique identity and recognisable public image. The best systems include a combination of Intelligent Transportation System (ITS) elements in a fully integrated system.

BRT's flexibility and ability to be built quickly, incrementally, and economically accounts for their growing popularity in these times. In many respects BRT is similar to a light-rail rapid transit system, but with greater operating flexibility and lower capital and operating costs. As with new tram systems, the implementation of a BRT system can be accompanied by improvements to the public realm, improving the feel and function of city streets.

Some buses on BRT systems will be able to run entirely on electricity without any aids such as diesel hybrid engines and overhead wires for power supply.

An example of a BRT system in the UK: Cambridgeshire

The Cambridgeshire Guided Busway connects Cambridge, Huntingdon and St Ives and the route consists of two long sections of guided operation (together covering 16 miles), a bus-only road, and other places with on-street operation using conventional bus lanes. New park and ride sites have been built at Longstanton and at St Ives, with a cycle track/bridleway alongside some sections of the route. The scheme includes bus priority and real-time passenger information system displays at special busway bus stops, and better links are being created to bus stops for pedestrians and cyclists.

The busway between Oakington and Longstanton. The cycle path runs alongside on the left.

Two bus operators have been given exclusive use of the route for five years in exchange for providing a minimum service frequency. Specially adapted buses are used on the guided sections.

A total of 2,500,000 trips were made in the first year of operation - 40% higher than predicted. Bus ridership along the corridor was estimated to have increased by 33% over the same period.

The benefits of trams and light rail

Trams have the potential to be more efficient at carrying large numbers of people, require less road space because they follow a fixed railway, and where travel demand is high, can have lower operating costs. Trams are often seen as superior to and faster than buses although BRT is increasingly able to offer a high quality passenger experience.

Trams and their appropriateness to Oxford

However, there are some reasons to suggest that trams are less suited to Oxford. According to the 2011 census, the population density of Oxford is 3,331 persons per km2. This is somewhat lower than other (much larger) English cities with tram systems, such as Sheffield (4,092/km2); Nottingham (4,073/km2); Manchester (4,051/km2); and the London Borough of Croydon (4,200/km2). Research in the USA suggests that for trams to be in the top quarter of cost-effective rail investments, densities closer to 7,000/km2 are required.

Consequently, even allowing for the potential future growth needed in the City of Oxford, it would be likely that densities would have to increase significantly in order to make a tram system viable. Given the constraints due to Oxford's unique heritage and the Green Belt, achieving such densities may be unlikely.

Costs and funding

Construction costs for the physical infrastructure for trams tends to be much higher than those for BRT. Early indications from feasibility studies into light rail versus BRT between Oxford and Witney suggest that infrastructure for BRT may be as much as 30% cheaper than light rail.

The Nottingham Express Transit tram system.

Due to funding constraints from central government and the dependence on seeking funding via developer contributions, the ability to construct infrastructure for BRT routes incrementally allows for greater flexibility relative to the comparative difficulty in extending tram systems.

Connector Transit Routes/Services

23. Connector bus services often play an important role in providing "feeder" links to the Premium Route bus services and rail services, as well as origin to destination journeys. Services will need to be commercially provided and except where new development requires (and funds) a higher frequency (to be attractive to new users) than early numbers of residents or employees would justify until the development is completed.

24. Our main is to assist with protecting and improving commercial viability through infrastructure and service enhancements such as:
    - Targeted measures to address problems such as on-street parking
    - improving traffic signal operation;
    - Improved bus stops and hubs;
    - Integration with more frequent bus and rail services

25. In return, bus operators will provide high quality, low emission vehicles and well trained drivers with good and consistently available information.

Developing and upgrading bus services and routes

26. We need to take advantage of travel demand from proposed future development – in particular housing, employment and urban retail - to increase the frequency of existing bus routes where these exist, to Premium or higher standard if potential demand exists, and introduce new routes where different travel patterns are created. "Pump priming" funding from section 106 developer contributions can provide enhancements to higher standards, particularly in terms of service frequency, for an initial period of time. After the end of the pump priming, services need to be provided on a commercial basis with additional demand primarily coming from new development. The priority for service enhancements will therefore be on work and other utility journeys (education, shopping and access to essential services) which can be financially sustainable.

27. Bus routes that run within new developments must be planned and designed in a way which minimises vehicle journey time, whilst aiming for a maximum walking distance from a bus stop of around 400 metres. Longer maximum walking distances are tolerable if this results in a better, faster and/or more frequent bus service although this

can have an adverse impact on older and disabled people). Time consuming and circuitous bus routes must be avoided, as they will not be attractive to most people. The road layout of new developments should therefore enable buses to be routed efficiently and to provide easy access for people transferring from other modes of transport.

28. Bus priority measures help attract more passengers by providing faster and more reliable services. Until now there has been little investment in bus priority measures in the larger urban areas other than Oxford, or on the main inter-urban routes. However, with growth and increasing congestion on many of these routes, we need to increase the amount of bus priority infrastructure and co-ordinate it with introducing new services – which tend to come from different funding streams - to maximise the potential for use. Where we have a reasonable expectation of sufficient demand we will encourage bus operators to develop new routes, to avoid unnecessary interchange.

Other types of bus service

29. There are a number of specialised services designed to meet the needs of specific groups. The most numerous of these are school bus services, which we provide for those living over three miles from their nearest state-maintained secondary school (two miles for primary schools). These are run largely as an independent network not available to the general public. Some independent schools also provide services. Higher and further education establishments provide a range of services; some of these – notably the *Brookes Bus* network provided by Oxford Brookes University – also run as scheduled local bus services which contribute to the local network.

30. Some major employment sites fund bus services to serve their sites, notably Oxford Science Park. These are generally combined with local bus services. Some retail sites also fund shoppers' services to their sites; these generally run free to users, are not registered as local bus services and completely separate from the local bus network. We expect the operators of such sites to ensure that they are accessible by public transport without funding from the council but, where they might be conveniently combined with a local bus service, we will help facilitate discussions with the operator.

Public transport interchange strategy

31. Reliable and attractive public transport services require high-quality, easily accessible stops where users can wait in safety and comfort. High quality interchanges make transfers between bus and other public transport services easier and quicker, resulting in more frequent and wider ranging travel opportunities.

32. The main challenges we face in improving interchange in Oxfordshire include:
    - Overcrowded and inadequate stops and interchange facilities and limited available space in Oxford city centre
    - Extended dwell times and layovers occupying stops for longer than necessary and delaying other buses
    - Some Park & Ride sites close to capacity at certain times
    - Inadequate interchange facilities in many of Oxfordshire's other main urban centres and along main inter-urban bus routes.
    - A need to protect and enhance the built environment and ambience in all town or city centres, with Oxford presenting a particular challenge.
    - An increasing demand for travel
    - Increasing passenger expectations of safety, security and comfort
    - Differing needs of passengers and pedestrians
    - Working with many partners who often have differing objectives and priorities.
    - Limited financial resources

    We will increase connectivity and access and improve the passenger experience by

    - working with operators and other partners to develop and improve the public transport hubs and other interchanges facilities so that they are appropriate to the size of urban area and demand along the corridor;
    - improving access to these facilities by feeder modes (both access routes and co-ordination of services); and
    - making payment and ticketing systems easier and speedier to use.

33. Criteria which will be considered in planning and designing appropriate interchange facilities include facilities for disabled passengers, opportunities to connect by walking and cycling, improving personal safety and security, and enhancing the public realm..

34. There are a number of major hub locations where the potential for new or improved interchange will be developed in coming years :

    - **Oxford** – station re-development as part of wider master plan with enhanced bus / rail interchange; a revised Park & Ride system involving the creation of a ring of new sites further out of Oxford on key radial corridors.
    - **Banbury** – reviewing bus interchange facilities in and near the town centre and making improvements accordingly.
    - **Didcot** – further development of the multi-modal interchange at the station creating a high quality gateway leading to the town centre.

35. With the recent development of high frequency inter-urban bus routes in the County there is a growing demand for better access to these services by residents in towns and villages along the routes and surrounding villages so better interchange facilities at other urban centres on the Premium inter-urban bus network will need to be considered.

36. Increased access by car to the inter-urban bus network suggests there could be benefit in developing small local parking facilities close to stops at some locations and we recognise there may be situations where small formal car parking may be desirable in order to facilitate access, encourage patronage growth, and avoid undermining access by car to local centres. Where development funding permits, we will consider parking provision and management at locations along strategic inter-urban bus routes.

37. We will work with the new Active Travel Steering Group to encourage and facilitate access to main bus routes by walking and cycling, with improved foot and cycle access to bus routes given a high priority when new routes are developed or existing routes upgraded or altered, or when investigating the siting of new bus stops. Where funding can be secured, cycle parking facilities will also be provided where appropriate. If funding allows, opportunities will be taken to introduce low-cost improvements to waiting facilities, if possible on a whole-route basis.

38. Co-ordinating bus and rail services to reduce waiting times and facilitate easy connection is a particular challenge given the large number of private operators and sometimes conflicting priorities. Operators however recognise the importance of making services more attractive, particularly to those that have the option of car use. We will

continue to work with bus and rail operators to improve service co-ordination and integration, although we can no longer afford to subsidise railbus services.

39. Developing more efficient and attractive payment and ticketing systems is a particularly important. This is a highly complex and challenging issue but substantial progress has already been made in Oxfordshire with the introduction in 2011 of the *Smartzone* integrated, multi-operator ticketing system centred on Oxford, which has enabled bus passengers to make trips on any operators' service within the zone and was the main reason for the large growth in passenger numbers following its introduction.

40. Outside Oxford, the ability to use smartcard payments systems - particularly when these are associated with more economical regular user tickets for certain periods – can benefit both passengers and operators. For the former they can make payment easier (and cheaper) and for the latter they help speed up boarding and journey times.

41. However, with increased bus network development and greater bus and rail network connectivity, demand for an extension of the *Smartzone* integrated ticketing system to other parts of the County is likely to grow. We will look for opportunities to extend the integrated ticketing system as well as support the further development of smartcard and other off-board payment and ticketing systems.

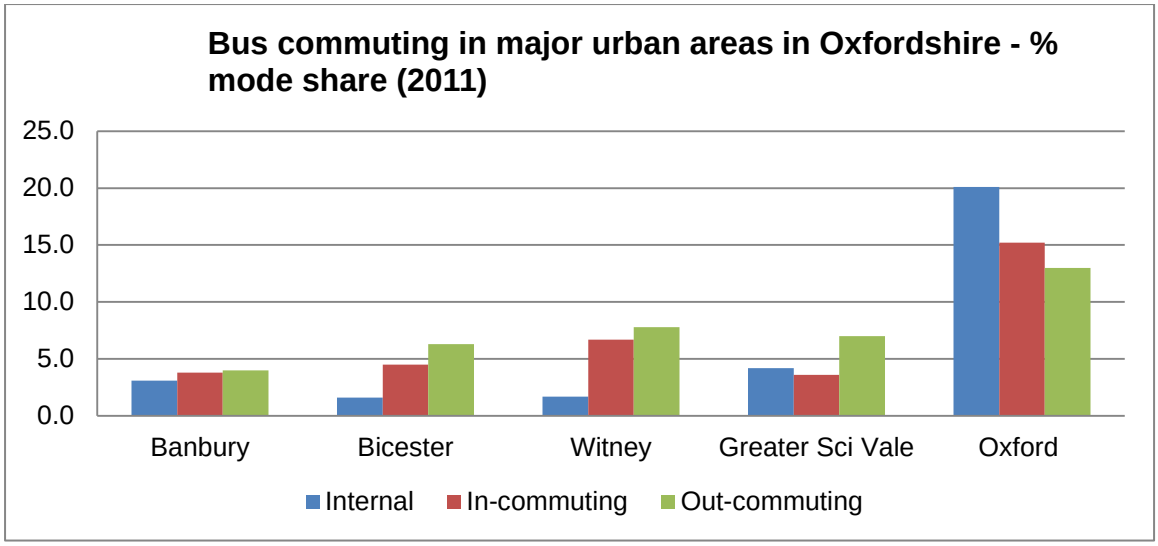
42. However for passengers it is the cost and range of fares available that usually matter most, not the technology and means of payment. In particular, we need to cater for the growing number of people who travel regularly but not every day as flexible working patterns become more common.

43. Outside Oxfordshire some neighbouring authorities plan to develop public transport hubs that will have an impact on the Oxfordshire bus network and travel opportunities for Oxfordshire residents. The most significant of these is a proposed major park & ride site on the A420 on the approach to Swindon. It is important to ensure that this complements rather than undermines the growing Oxford-Swindon through bus service.

Developing and enhancing bus networks in the main urban areas

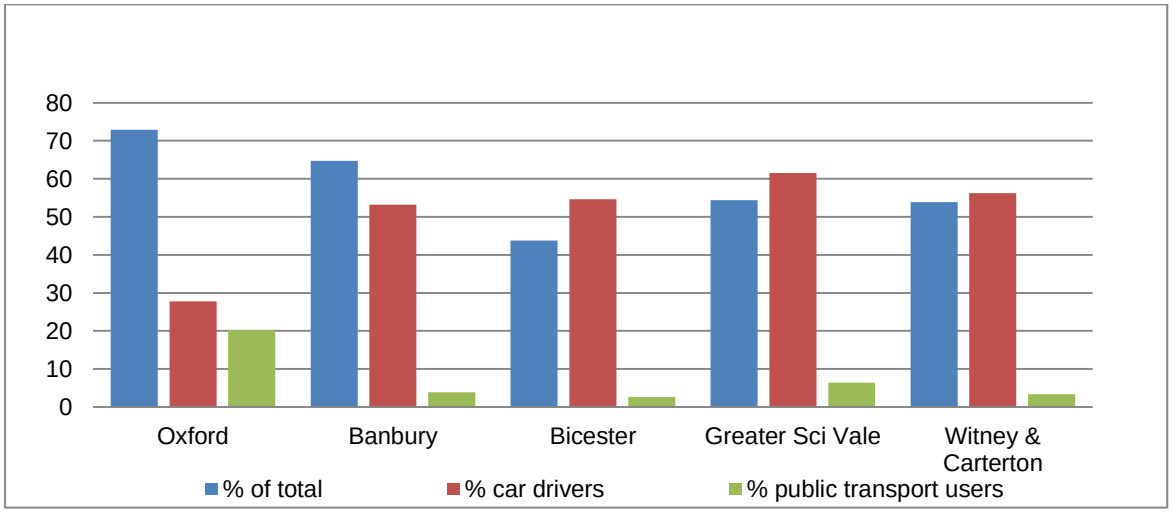
44. For this strategy the main urban areas have been defined as Oxford, Banbury, Bicester, Witney and Carterton, and the Greater Science Vale area which includes Abingdon and Wallingford. Figure 6 shows the proportion of people that were commuting to work by

bus in 2011 within, to and from these settlements or areas (i.e. for the longest part of their journeys) and shows the very low levels of bus commuting in outside Oxford.

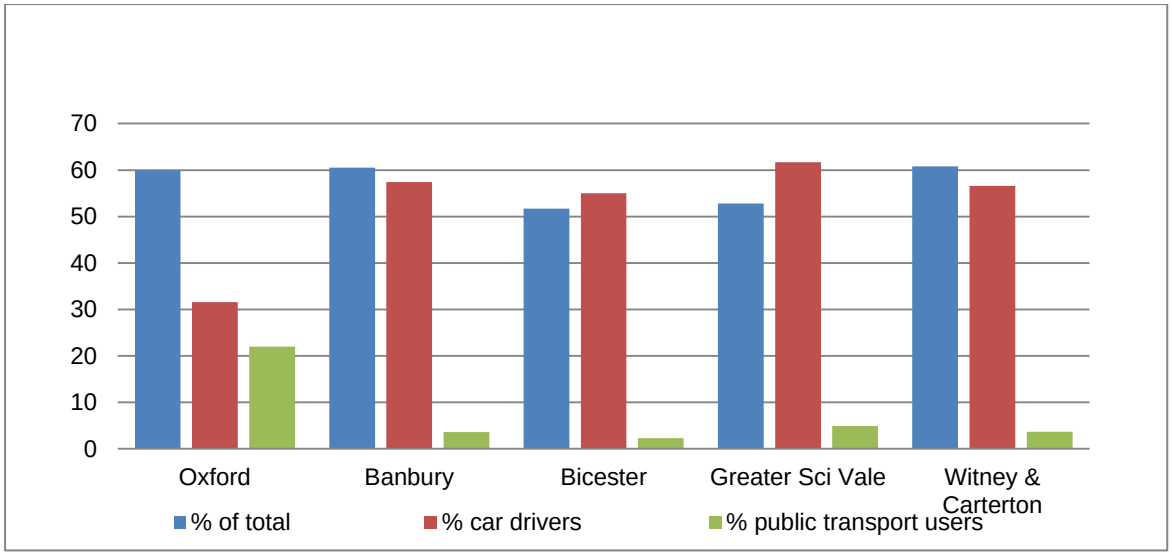


Bus Strategy Figure 3: Bus commuting in major urban areas in Oxfordshire

45. These settlements display a very wide variation in the proportion of local employees who live within the surrounding area (defined here as being up to 10km of their workplace) and the proportion of residents whose workplace is within this range. This, alongside the comparative level of access by bus and other modes of transport, has a profound influence on mode choice and mode split within these settlements and surrounding catchment areas (see figures 3, 4 and 5). We have developed plans for bus network improvements to 2031 for each of these areas.



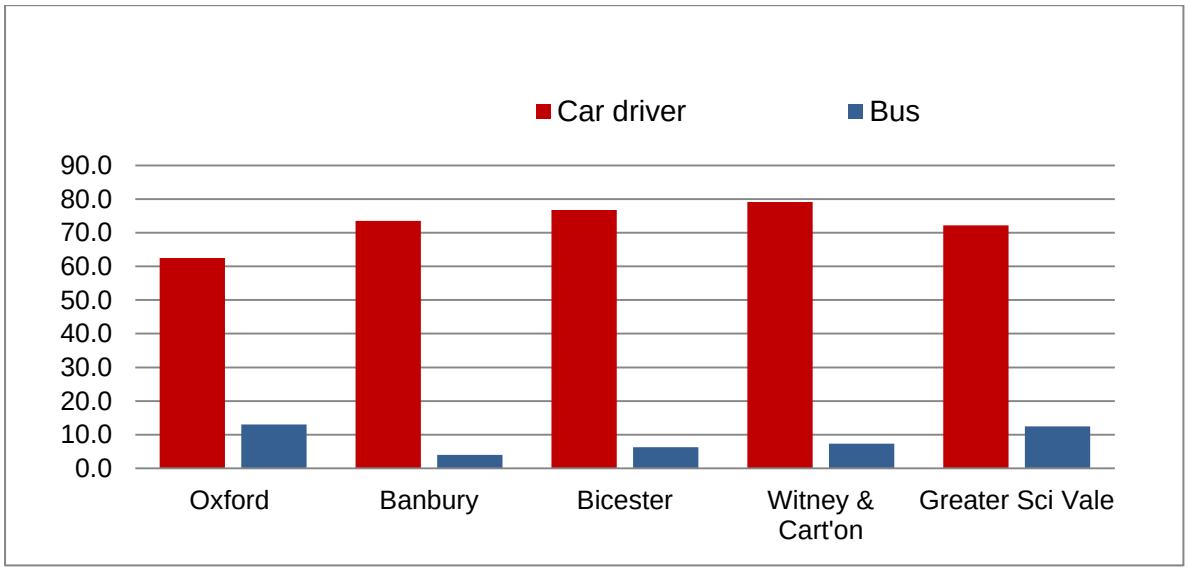
Bus Strategy Figure 6: Main urban areas: Means of transport and percentage of residents working within 10km of home (source: 2011 Census)



Bus Strategy Figure 7: Means of transport and percentage of employees residing within 10km of workplace (source: 2011 Census)

Developing and enhancing the inter-urban bus network

46. A large proportion of journeys in Oxfordshire, particularly commuting to work, involves travel outside residents' home settlements and the vast majority of these journeys are made by car and very few by bus (see figure 8 below). These produce the majority of road based carbon emissions, vehicle miles, and traffic congestion on busy inter-urban routes and within urban areas.



Bus Strategy Figure 8: Out-commuting by bus and car, main Oxfordshire urban areas, 2011 (Source: Census data)

47. For many journeys, bus is the main alternative to car travel. A relatively frequent inter-urban bus (and coach) network has developed in Oxfordshire in recent years linking some of the larger towns in the County, and also Oxfordshire to the wider region and beyond. In partnership with the main bus operators the Council has supported the development of this network which has helped facilitate a significant and rapid growth in passenger numbers on several routes.

48. The network has a strongly radial pattern centred on Oxford and the inter-urban routes with the highest proportion of bus/coach commuters generally start or finish in Oxford. To some extent this reflects the centralisation of employment and services in Oxford and subsequent weaker patterns of demand between other urban centres. . As travel patterns become even more complex (and decentralised) in the future, the strategic inter-urban bus network will need to adapt to cater much better for complex, non-radial patterns of travel demand.

49. Given that bus patronage growth in Oxford has levelled off in terms of market share, the majority of passenger growth in the County is now occurring on these routes and for operators it seems likely that this where many of the best commercial opportunities lie.

50. Our approach to increasing growth on the strategic inter-urban routes is divided into three main elements:
    - a revised Oxford Park & Ride strategy
    - increasing inter-urban bus connectivity within, to and from the Knowledge Spine
    - improving inter-urban bus connectivity within Oxfordshire and for connecting Oxfordshire to the wider region

Park & Ride and the Bus Strategy

Introduction

51. The Oxford Park & Ride strategy has evolved, in conjunction with parking management, bus priority and service improvements. It is one of the main means of tackling traffic congestion on the main radial routes within the City and on the Oxford ring road. It facilitates access to Oxford city centre and other destinations such as the hospital sites. Its main purpose is to enable transfer to bus for the last leg of the journey into Oxford.

52. Park & Ride has become a hugely successful, commercial operation. Many of the existing sites are now often close to capacity, however, and especially for those sites within the ring road, the congestion has spread to the approaches to the sites. This not only increases car journey times to reach the sites but suggests the current strategy has limited potential in dealing with further expansion in travel demand along these routes.

53. Oxford's Park & Ride system is one of the key elements affecting the City and County's bus system and has a wide geographical influence on travel behaviour. Changes to the County's Park & Ride strategy and system will therefore have a considerable impact on the planning, operation, and attractiveness of the Oxfordshire public transport network.

Strategy

54. A new approach to Oxford's Park & Ride system has been proposed as part of our updated Oxford Transport Strategy. The following section outlines these proposals, which will require further development before a final approach is agreed.

(a) Short/medium term Park & Ride strategy

55. The main element of the new approach to Park & Ride is the development of a network of larger sites located further out of Oxford adjacent to the main inter-urban radial routes. This 'outer ring' of sites has been developed to meet the following objectives:
    - maximising the potential for intercepting trips closer to their point of origin and before they cross the ring road
    - reducing congestion on the inter-urban network,
    - increasing bus modal share to Oxford (and onward connections), and
    - site availability and financial feasibility.

56. The first of these new sites, opened in 2015, adjoins the new residential development at south-west Bicester (A41). Five other locations, plus expansion of the existing Oxford Parkway and Thornhill sites, are proposed as part of Oxford's longer term Park & Ride strategy - all aimed at intercepting car trips before they reach the ring road. These are at: A40 East & West Corridors, A420 Corridor, A4074 Corridor, A34 North & South Corridors, and the A44 Corridor. The Oxford Transport Strategy document contains further details.

57. The development of this 'outer ring' of sites may mean that some of the existing sites within the Ring Road could be redeveloped or used for parking in a different way, for example to cater for shorter stay shopper or visitor parking rather than all-day commuting. This is being considered as part of our further Park & Ride strategy work.

58. Opportunities will also be created from new Park & Ride developments planned outside Oxfordshire. In particular, we recognise that the proposed P&R site on the A420 approaching Swindon will potentially have an impact on traffic along the A420 corridor in both directions, and on inter-urban and local bus services in the area. In partnership with Swindon Borough Council and bus operators we will seek to maximise the public transport benefits for Oxfordshire.

(b) Impacts on the County's inter-urban and local bus networks

59. It is too soon to predict the impacts of proposed changes to the Park & Ride system on the network and travel patterns, but the following changes are planned or expected:
    - The proposed outer Park & Ride sites described earlier, along with the existing site at Thornhill, would become the termini of three Rapid Transit routes centred on Oxford.
    - Outer Park & Ride sites are expected to develop into significant bus hubs connect Rapid Transit or Premium Transit services into/from Oxford with services to/from neighbouring urban and rural areas and longer-distance bus and coach services, greatly enhancing public transport connectivity and access across Oxfordshire.
    - Bus journey times and reliability for all services using the Rapid Transit routes will be greatly enhanced. In combination with other measures, this should help facilitate substantial growth in bus use on inter-urban routes in and out of Oxford.
    - Providing feeder bus services to sites may boost local bus services and networks, and help facilitate a reduction in car dependency outside Oxford.
    - The interchanges planned on the RT routes within Oxford and the Park & Ride sites close to built-up areas, would not only greatly enhance public transport connectivity within and out of the City, but also give increased pedestrian and cycling access to the strategic public transport network and final destinations.
    - There will therefore be a strong emphasis on providing good links to/from interchange facilities and neighbouring employment sites, residential areas, and other trip attractors and cycle parking at interchanges and destinations. We will ensure that active travel facilities are considered as a priority.

c) Longer term Park & Ride strategy

60. Longer term, there may be the need and opportunity to develop additional Park & Ride sites to serve Oxford and other towns in Oxfordshire. In developing this, consideration will be given to meeting the following objectives:
    - reducing the total amount of car travel (and therefore carbon emissions),
    - promoting and enabling Door to Door travel involving cycling or walking
    - maximising other non-car access options to/from the site including integration with connecting local and inter-urban bus services,
    - encouraging outward- as well as inward-bound commuting,
    - potential for supporting local economies and town centres,
    - minimising damage to the environment and landscape including flood risk

Connecting the Oxfordshire Knowledge Spine

Introduction

61. The majority of employment and housing growth in Oxfordshire up to 2031 is likely to take place along the 'Knowledge Spine', which lies along the north-south strategic transport corridor consisting of the A34 road and the Didcot-Oxford-Bicester rail line. The A34 is already severely congested in many places and prone to severe unplanned disruptions, particularly at peak times. There are very few suitable alternative north-south roads capable of providing adequate connectivity within the Knowledge Spine.

62. Table 4 shows the level of commuting flows between the major urban centres and some of the major employment areas within the Knowledge Spine in 2011. It shows Oxford City and the employment clusters at Milton Park and Harwell Campus as the two largest inter-urban commuting destinations and also the significant scale of out-commuting from Abingdon. With large amounts of growth planned initial modelling suggests that this pattern will continue, although Bicester and Didcot in particular are likely to grow in importance both as the destination and origin of inter-urban commuting trips.

63. The difficulty of accommodating more movements on the existing north-south road network, particularly the A34, highlights the need to significantly enhance the strategic public transport network between growth areas along the Knowledge Spine (and beyond), and also strengthen east-west public transport connections.

		DESTINATION						
		Bicester	Kidlington[1]	Oxford	Abingdon	Didcot	Business Parks[2]	**TOTAL**
ORIGIN	Bicester	-	640	2,530	130	50	80	3,430
	Kidlington	280	-	3,575	130	30	50	4,065
	Oxford	400	980	-	960	250	900	3,490
	Abingdon	70	240	3,700	-	370	1,100	5,480
	Didcot	<50	140	1,430	780	-	1,560	3,960
	TOTAL	800	2,000	11,235	2,000	700	3,690	20,425

Table 4: Commuter flows between key towns and selected employment areas within the Knowledge Spine, 2011 (Source: Census data) 1. Kidlington including Oxford airport 2. Milton Park and Harwell Campus

64. The main rail line linking Didcot, Oxford, and Bicester is an extremely important part of the public transport strategy for the Knowledge Spine and Oxfordshire. Rail can move very high volumes of people quickly and efficiently, especially for medium and longer-distance journeys. With new infrastructure and services being developed and planned, for example East West Rail, the new Oxford Parkway station and proposed development of the Cowley branch line, rail is likely to provide a much greater proportion of journeys within and to the area in the future, especially for commuter trips.

65. The majority of travel demands within the Knowledge Spine - including to main business / employment clusters – tend to be dispersed and complex and this is likely to continue. For many of these journeys, bus services will be more flexible and accessible than rail. Services can potentially operate at very high frequencies and move high volumes of passengers on main strategic corridors, with certain services deviating from the main route to serve more dispersed demand in residential or employment areas nearby. Multi-stage bus journeys can be made easier by providing more and better bus integration and service co-ordination. Investment in bus priority measures on specific routes can also demonstrate very good value for money, especially when coupled with investment by operators in new vehicles and additional services.

66. The importance of the bus for commuting to work is identified in table 5, which shows the shares for bus and rail commuting for the trips mentioned in the previous table. The data also shows the much lower levels of bus commuting to the locations mentioned

outside Oxford. Notable are the very high level of bus use between Kidlington and Oxford and that bus commuting between places on the opposite side of Oxford is currently very limited given the lack of direct services or easy ability to interchange.

67. More detailed analysis shows that the majority of inter-urban bus commuters along the Spine tend to work - or live - in the central part of Oxford City, given the relatively poor access by bus to the eastern side of Oxford.

Rail commuters		**DESTINATION**						
		Bicester	Kidlington[1]	Oxford	Abingdon	Didcot	Business Parks[2]	**TOTAL**
ORIGIN	Bicester	-	0.3	3.3	0.0	4.0	1.3	2.6
	Kidlington	0.0	-	0.0	0.0	0.0	0.0	0.1
	Oxford	3.2	0.0	-	0.4	6.7	6.8	2.7
	Abingdon	0.0	0.0	0.7	-	0.3	0.0	0.5
	Didcot	8.9	3.0	19.9	0.6	-	0.0	7.6
	TOTAL	2.1	0.3	3.5	0.5	2.9	1.7	2.5
Bus commuters		**DESTINATION**						
		Bicester	Kidlington[1]	Oxford	Abingdon	Didcot	Business Parks[2]	**TOTAL**
ORIGIN	Bicester	-	2.8	17.3	2.3	0.0	0.0	13.4
	Kidlington	12.5	-	36.6	5.3	3.3	2.0	33.3
	Oxford	18.8	20.7	-	14.5	5.9	7.6	14.4
	Abingdon	10.4	4.1	25.4	-	7.0	8.5	19.7
	Didcot	0.0	3.0	2.5	6.2	-	13.9	7.7
	TOTAL	14.8	11.8	24.2	9.9	6.0	10.4	18.1

Table 5: Commuting between main towns and employment areas within the Knowledge Spine in 2011, % comparison between rail and bus based on the mode used for the longest stage of the journey (Source: Census data)

Strategy

68. Given the pattern of transport demand in the area, the flexibility of bus transport and its much lower infrastructural costs, the bus and Rapid Transit (RT) in places with high demand will continue to provide the main public transport alternative to the car for most inter-urban journeys within the Knowledge Spine.

69. Buses will also play a vital role as feeder services between railway stations and main business sites, town centres and residential areas.

70. Our strategy for improving bus connectivity within the Knowledge Spine comprises:

New Park & Ride strategy:

- The proposed new 'outer' Park & Ride sites adjacent to the strategic highway network linked to the development of three Rapid Transit Routes centred on Oxford, will improve bus connectivity between Oxford and other parts of the Knowledge Spine.

Increased and improved public transport interchange capacity:

- The improvement in interchange and greater connectivity within Oxford, with the planned interchanges between RT and other bus and rail services, is likely to significantly improve access by bus to/from the Eastern Arc in Oxford, and increase bus connectivity through the City for people travelling to destinations on the opposite side of Oxford.

- We expect the Park & Ride sites to develop as significant bus and coach hubs facilitating the growth in local bus services improving access and connectivity.

A major new north-south highway corridor linking Didcot and the eastern side of Science Vale with east Oxford:

- A potential new road link and Thames River crossing with bus priority where required connecting north Didcot, Culham Science Centre and the east side of Oxford.

Innovative strategic bus routes:

- Where possible, we will encourage and support bus operators' proposals to develop innovative bus services and routes, especially more direct and express services, for example a strategic bus link from south-east of Bicester to the Oxford Eastern Arc.

- We will explore the feasibility of a busway 'spine' running north-south through central Science Vale – possibly terminating at the proposed A34 South Corridor Park & Ride site in the north and Harwell Business Park in the south. This would be a high frequency RT route with services branching off to strategic employment and residential developments.

- With Highways England we will continue to explore the possibility of bus priority measures at junctions and on specific links on the A34.

Connecting Oxfordshire and the wider region

Introduction

71. While most of Oxfordshire's housing and employment growth up to 2031 is likely to be within the Knowledge Spine it will be important to strengthen the bus network in the rest of Oxfordshire and increasing bus connectivity to the wider region where we can, to:

    - reduce traffic growth and congestion;
    - reduce transport emissions,
    - support local economies in Oxfordshire, including the rural economy
    - provide opportunities for people without cars to access employment and services.
    - Provide opportunities for active & healthy travel, e.g. by combining bus with cycling

72. The focus of this section is on the inter-urban bus and coach network outside the Knowledge Spine, and the following section addresses the rural bus network.

Strategy

73. Following analysis of current and predicted peak hour and commuting, general and bus passenger flows and patterns of major growth in Oxfordshire and adjoining areas, the strategic inter-urban bus network has been updated as shown in table 6 below.

74. Where inter-urban bus routes are designated as Premium standard we will, where applicable, review the conditions for bus operations and passenger access, as part of developing route strategies. Route strategies for the A420, A34, and the A40 will give a high level of consideration to facilitating quicker bus journeys, and better access and bus interchange facilities along the routes. Review of bus conditions and facilities on other strategic inter-urban routes will take place according to need and opportunity, especially where related to major development on or near the route.

ROUTE/LINK	CHANGE	RATIONALE
Didcot - Harwell Campus link	Upgraded to Premium	Strategic importance, housing & economic growth, high volume of demand
Witney – A40 West Corridor P&R – Northern Gateway – Headington – Cowley – A34 South Corridor P&R / A4074 Corridor P&R	New RT route	Strategic importance, high volume of demand. Intercept trips on A40, A4074, and A34 corridors at P&R sites and provide high speed, high frequency service to/from Oxford
A44 Corridor P&R (Begbroke) – City Centre - Blackbird Leys	New RT route	Intercept trips on A44/A4260 corridors at P&R and provide high speed, high frequency service to/from Oxford
A420 Corridor P&R – City Centre – Thornhill P&R	New RT route	Intercept trips on A420 and A40 corridor east of Oxford at P&R sites and provide high speed, high frequency service to/from Oxford
A44 – A4260	Designated a potential strategic link	Potential connection for Banbury – Oxford and/or Witney – Woodstock – Kidlington airport bus routes
Kidlington – Upper Heyford	New strategic route – connector level	New development at Upper Heyford
Banbury - Upper Heyford - Bicester	New route – connector level	Major growth at Banbury, Upper Heyford and Bicester
Bicester - Milton Keynes	Designated a strategic route – connector level	Major growth at Bicester and along Cambridge Arc
Bicester & Banbury - Brackley– Northampton (A43 corridor)	Designated a strategic route – connector level	Major growth at Bicester, Banbury and Northants
Grove – Faringdon	Designated a strategic route – connector level	Strategic importance of access to employment in Science Vale from west part of Vale of White Horse and Swindon; moderate volume of demand
Harwell - Newbury	Designated a strategic route – connector level	Strategic importance of access to employment in Science Vale from Newbury area
Thame - Aylesbury	Upgraded to Premium route	Strategic importance, mod/high level of demand
Oxford – Swindon	Upgraded to Premium route	Strategic importance, mod/high level of demand

Bus Strategy Table 6: Proposed changes in the strategic bus and coach network

75. Bus services also provide important links across our county boundary, with a growing market on several routes serving destinations in neighbouring areas, such as Reading, Newbury, and Swindon. We will work to grow bus services on these routes, with are a number of services to that will benefit from the improvements proposed in our route corridor strategies, such as the A420 route strategy. Where strategic bus routes extend into neighbouring areas we will work with the relevant authorities to ensure that our respective plans for bus infrastructure and service development are co-ordinated.

76. Partnership with rail operators will need to be strengthened, by bringing bus and rail operators together. Given the lack of county council funding for railbus services, we will consider lobbying for these to be provided as part of future rail franchise commitments. This would have the further advantage of better integration of timetables and ticketing.

77. Partnership with the Active Travel Steering Group will be established to improve facilities for active travel such as cycling or walking in combination with bus (and rail).

Public transport for rural areas

Introduction

78. Oxfordshire is one of the most rural counties in the South East. Most rural settlements in Oxfordshire do not lie on main inter-urban bus routes and the dispersed and low level of transport demand in many rural areas makes the provision of commercial public transport services unfeasible and publicly supported or subsidised services are no longer affordable. To meet it statutory responsibilities, the Council continues to fund a range of 'supported transport' services including: Home to school transport (SEN and Mainstream); Adult social care transport (older people, learning disabled, mental health); Children's social care transport and Concessionary fares.

Integrated Transport Hub

79. We have introduced a new Transport Hub; a 'single front door' for all supported transport services in Oxfordshire. The Hub is a single team which deals with all requests for supported transport services in a coordinated and fair way, ensuring that people are

allocated transport according to their needs; supporting those who are judged as capable to use existing public transport or a suitable voluntary sector provider, while protecting the most vulnerable with specialist, bespoke services. This improves how we allocate our available resources and also ensures that the whole process for accessing supported transport is now more simple and straightforward.

80. There is a wide range of bus service information available, but funding pressures mean that our whole approach to information provision needs to change, with emphasis on commercial partners funding and providing what is needed. This will be done in partnership with operators and representatives of bus users and other target groups, ensuring a greater focus on the “end customer”.

81. Oxfordshire’s Real Time Information service is amongst the best-performing systems in the UK primarily because the partners have focused on achieving quality in terms of the proportion of buses accurately predicted at stops and bus operators have invested in the on-board technology so have a vested interest in the performance of the system. The issues faced by the system include whether the geographic coverage should be extended and whether the functionality of the system should be further developed.

Integrated Ticketing and Payment

82. We support the development of off-bus and integrated ‘smart’ payment, as a means of facilitating multi-stage and multi-operator public transport journeys, and reducing bus journey times by speeding up boarding. The integrated smart ticketing system introduced in Oxford has significantly increased bus patronage on urban and some inter-urban services by making multi-operator journeys easier and more affordable.

83. We will continue to work in partnership with operators to develop payment and ticketing schemes, potentially to include other services like parking at Park & Ride sites.

Partnership working

Quality Bus Partnership

84. The County Council and bus operators have worked in partnership since the 1970s, with successful outcomes including a network of co-ordinated timetables and smarter ticketing on Oxford's main bus routes. The challenge is now to expand the scope of the Partnership across Oxfordshire and work with bus operators and other partners to develop strategies for serving new development and making existing markets and routes function more effectively.

85. This approach will be based on the Department for Transport's "Enhanced Partnership" model, which will see a broader range of Stakeholders, including District Councils and the Local Enterprise Partnership, to further develop quality partnership working covering the commercial network across the whole county.

86. The primary focus will be on the major urban areas and inter-urban corridors (especially where development is planned) with objectives including:
    - Greater time-based and geographic coverage of bus services based on evidence of when and where people want to travel.
    - Reduction in service cancellations and delays as a result of traffic congestion.
    - Increases in passenger satisfaction with the "end to end" journey experience.
    - Increase in numbers of bus passengers.

87. Future Oxfordshire QBPs will concentrate on the following major strands of activity:

    - Strategic oversight of the Oxfordshire Bus Market, including integration with other transport services, scheme prioritization and funding bids, third party and other supported services.

    - Development of the Oxfordshire Bus Network and services as a central component of supporting Oxfordshire's growth, spatial planning and infrastructure investment proposals and outcomes.

    - Influence and take into account changes to national bus policy and other central government led proposals.

    - Consider / review strategic bus planning and related work, e.g. Oxford and other Locality Transport Strategy workstreams and the Oxfordshire Park & Ride network.

- Decision making on shared priorities for network/service development and investment proposals, including commissioning / review of business case(s) for bus priority and other infrastructure investment.

- Ownership of the Oxfordshire Bus Strategy, and associated Network and Punctuality Improvement Plans, including delivery of agreed priorities and actions, and monitoring progress of Network Management and Punctuality Improvement workstreams on an 'exception' basis.

- Senior Manager / Director liaison on all aspects of partnering, including identification of issues and proposals for political consideration.

- Oversee formal Oxford Bus Qualifying Agreement, including signing off any proposed changes to Coordinated Services

Equality-related partnership working

88. The Council will follow two important principles on all schemes. The first of these is that consultation with disabled people and their representatives should take place from the earliest stage in the development of schemes and initiatives before any details have been determined. The second principle is that the Council should secure high level disability awareness training for all appropriate staff in order that scheme designers can have greater awareness of the needs of disabled people.

89. In planning new schemes and improvements to existing facilities, we will consult local access groups, OXTRAG (the independent body representing disabled and mobility-impaired people throughout Oxfordshire in relation to transport issues) and with the Oxfordshire disability organisation Unlimited. We will also, when necessary, seek expert advice to ensure the final outcome is a satisfactory and useable facility for everyone.

Promoting bus use through the planning process

Strategy

90. Our strategy to enhance the bus network and achieve a substantial increase in bus patronage through the planning process consists of the following main elements:

Integrated land use planning, transport development control and travel planning

91. To support bus development and maximise use of strategic transport investment we will:
    - Encourage appropriate types of new development to be located, planned and designed with good access to the strategic bus network, especially alongside designated Rapid Transit and Premium bus routes.
    - Encourage growth to be concentrated in existing larger urban areas or, with the development, to reach a threshold of greater potential self-containment and transport sustainability
    - Support increased urban densification, especially near major strategic public transport infrastructure
    - Encourage master planning to give bus a central place in the transport hierarchy
    - Seek developer funding to support the development of existing or new bus services to achieve a higher and more attractive standard of service as required where there is a reasonable expectation of longer-term commercial sustainability.
    - Where significant new developments are planned, seek developer funding to pay for necessary bus stop infrastructure to upgrade it to the desired standard and aim to ensure that secure cycle parking is be provided close to busy bus stops.
    - Ensure that new developments are planned to ensure optimal movement of buses, with commercial services that operate frequently, reliably and efficiently. Bus routes must provide very high levels of penetration through and within sites, complementing the pedestrian and cycle networks.
    - With the relevant district council partners, explore the possibility of introducing tighter parking standards at new major employment sites and residential developments, and restraint measures at existing major employment sites.
    - Explore opportunities with the relevant District and Town Councils and local businesses to gradually introduce parking controls/regimes in town centres that could encourage the greater use of buses and other non-car modes of transport while taking account of town centre vitality.
    - Support residential and workplace sustainable travel planning, including ambitious sustainable travel plans and targets which are monitored, managed and enforced
    - Secure planning agreements that support bus development in terms of both hard infrastructure and ‘soft’ travel planning measures.

92. Increased consideration will be given to the most appropriate developer funding source for infrastructure schemes and bus service development and the most appropriate and best use of developer funds in particular cases. The options include Section 106 contributions, Community Infrastructure Levy (CIL) and devolved major scheme funding.

Section 106 agreements

93. The identification, negotiation and securing of section 106 developer contributions to bus services and infrastructure is currently undertaken on a site by site basis. OCC (and partners such as bus operators and District Councils) consider a number of factors when proposing bus service and infrastructure improvements – shown in Table 7 below.

94. There is no strict formulaic approach which calculates a financial contribution to transport measures. The size and phasing of any specific developer contribution is a matter of negotiation and agreement between the local authorities and the developers. The current approach allows flexibility based on the specific circumstances of development(s) based on experience elsewhere. Service and infrastructure measures can be tailored to circumstances, based on available local evidence and knowledge of bus operating conditions and potential passenger demand and professional judgement

Improvement	Key Factors
New bus service or improvement in existing frequency / daily coverage	• Size of development (e.g. number of houses, number of new jobs, floor area of retail development etc.)
	• Time taken to construct and occupy development (phasing)
	• Location of development (i.e. distance from existing frequent public transport corridor)
	• Frequency / commercial viability of existing bus services
	• Proximity to existing urban centres and travel generating destinations
	• Potential links to other proposed developments
Bus priority measures	• Evidence of current problems and / or future congestion resulting from development-related travel demand
	• Requirement to minimise journey times to adjacent settlements / developments
Bus stops and support accessibility improvements (walking routes and road crossings)	• Size and geographic extent of development
	• Minimising the required walking time from the development
	• Proximity of existing or proposed bus routes
Travel Plans	• Size of development and travel demand generation potential
	• Projected travel patterns (origins and destinations)
	• Socio demographic profile of development

Bus Strategy Table 7: Factors in identification of service and infrastructure improvements

95. Our policy has been to concentrate on promoting the development of local bus services by using developer contributions to increase service frequencies, particularly for employment and utility trips, attract more passengers and therefore improve commercial viability. The developer funding to support these services is time-limited therefore it is critical that improved services become commercially sustainable in the longer term. There is also a role for travel planning and other initiatives to support these services.

96. A drawback of the current approach is the potential for a lack of transparency and consistency in the way developer contributions are secured and apportioned, especially where more than one development is required to make a contribution to bus service and infrastructure improvements in an area or corridor. Individual developers may challenge the financial contribution expected if they believe that they are paying more than their "fair share". This all makes for a time-consuming and inefficient system. There is also a need to plan a future integrated network that links different developments rather than simply introducing a series of isolated routes.

97. There is a case for defining a more consistent and transparent policy and process for developer contributions towards transport improvements, including bus services and infrastructure. With the much higher future level of population and employment growth anticipated outside Oxford and our ambition to achieve a major step change in the bus system and patronage it has become a priority to review our strategy and policy in this area. This will imply adopting a formulaic approach for calculating contributions from developments to public transport, based on the anticipated transport impact (including the key factors outlined above). The key principles of this approach could include:

    - Provision of a multi-modal trip rate for the different classifications of development (e.g. residential, B1 office, retail etc.).
    - Calculation of a financial value per trip based on the estimated cost of transport services (including buses) and infrastructure that would be necessary to make the development work in transport terms.
    - Provision of local weighting factors to reflect specific circumstances (potentially including local economic conditions, sustainability of the development site, proximity of existing Premium Routes etc.)
    - Agreement of binding targets for bus use from specific developments – with additional investment being triggered if targets are not met.

98. For this to work, there will need to be a clear local vision for a future bus network which would link each development to an appropriate range of trip attractors and generators. Individual s.106 agreements will need to build up the wider public transport network rather than simply providing isolated routes that would disappear once funding ended. We would also need to ensure that operators who provide services as part of s.106 contributions subscribe to the principles set out in the Quality Bus Partnership.

Community Infrastructure Levy (CIL)

99. We need to improve conditions for buses and facilities for passengers outside Oxford and on inter-urban routes, where bus priority is currently under-developed. In some areas bus operators have indicated that they would find investment in infrastructure, particularly bus priority and other traffic management measures that would improve bus reliability more beneficial and attractive for them in the longer run than subsidising higher service frequencies. It is suggested that this might make them more willing to take the commercial risk of introducing new or additional services. As CIL is only applicable to capital infrastructure schemes, enhancements to bus services would still need to be secured through section 106 contributions.

100. The basis of CIL is a charging rate per residential dwelling or square metre of development, which generates an overall sum for funding strategic infrastructure required to facilitate both individual and multiple developments. There is no size limit to CIL and the money can be pooled to address transport problems that are wider than any specific development. The potential advantages of CIL include:

- Improving predictability and certainty for developers as to what they will be asked to contribute;
- Increasing fairness by broadening the range of developments asked to contribute;
- Allowing the cumulative impact of small developments to be better addressed; and
- Enabling important sub-regional infrastructure to be funded.

101. Bus services and infrastructure are a vital part of the solution for additional travel demand and congestion that could be generated by planned development in the county. Therefore CIL policies and schedules being developed by the District Councils should include provision for bus priority and transport hub strategic priorities.

Annex: Bus strategies for selected urban areas

Oxford and surrounding area

Introduction

102. In functional and transport terms Oxford exerts a strong centralising influence over a large part of central Oxfordshire. In 2011 it had a resident population of almost 152,000 and had approximately 96,000 jobs and about 32,000 full-time students. It is also a major regional centre for retail activity and other services - particularly health care.

103. Oxford enjoys a very high level of employment self-containment which is conducive to sustainable travel behaviour. Currently only a very small proportion of employed Oxford residents work outside the City - 13% - and 52% of jobs based in Oxford were filled by local residents in 2011. In addition, there are a very large number of student commuting movements, which are predominantly internal, relatively short-distance, and mostly performed using sustainable modes of transport.

104. The bus has become a key part of the Oxford local transport system as part of a long established integrated transport strategy approach. In 2011, over 10,500 residents of Oxford (about 18% of the total) regularly commuted to work by bus or coach, and of these 8,500 travelled to workplaces inside Oxford (over 20% of internal commuters).

105. Levels of bus commuting from outside Oxford are also relatively high: in 2011 almost 7,000 commuters (over 15% of *in-commuters*) travelled to work by bus/coach. However levels of *out-commuting* by bus/coach (with the exception of journeys to London) are significantly lower than levels of internal and in-commuting: slightly over 2,000 residents commuted out of Oxford by bus in 2011 of which almost 600 travelled to London.

106. The following factors present challenges to the further growth of bus use in/to Oxford:

Traffic congestion: There is acute congestion on several of the main radial roads in and approaching Oxford City, the A34 and A40, the Oxford Ring Road, and at a number of locations in the 'Eastern Arc' during the morning and afternoon/ evening peaks. Despite extensive on-road bus priority measures conditions for buses have tended to become worse in many places leading to deterioration in bus journey time reliability. A few major 'pinch points' still exist on some of the main radial and the few orbital routes.

Constraints on the continued effectiveness of the current Park & Ride system: Most of the existing P&R sites on or near the edge of the City are now often operating close to capacity and congestion now affects the approaches to most sites at peak times.

Restricted bus movement around/through the city centre: The constrained central area road network creates difficulty in traversing or going around the city centre impeding the development of cross-town services.

Limited capacity for further bus growth in the city centre: 'Transform Oxford' improved the city centre and conditions for pedestrians and cyclists partly by restricting the number of buses entering the area while slightly increasing capacity by moving to double-decker buses. With the road space available there is limited scope for further increasing bus capacity without once again worsening the ambience and conditions for pedestrians and cyclists.

Limited public transport interchange and inadequate passenger facilities: There is generally a poor level of interchange between different bus routes and between bus and rail in the city centre and very little outside the centre. This makes passenger interchange costly in terms of the time and distance penalty involved and discourages bus use for some journeys within Oxford and also some outbound journeys. In addition, there are insufficient conveniently located, high quality facilities for bus passengers and space for buses and coaches to wait and offload and a need to improve connections between interchanges.

Limited bus connectivity to and within the 'Eastern Arc': The main commuting flows to Oxford are from north, west and south-west directions but a large proportion of employment is located in the east and south-east parts of the city (the so-called 'Eastern Arc'), accessible by only a few river crossings. Consequently within the city, and Eastern Arc in particular, there is currently insufficient orbital connectivity, leading to poor access by all transport modes and worsening congestion on the Ring Road and within the built up area. At the moment, most travel to the Eastern Arc from West Oxfordshire and Cherwell necessitates a difficult interchange in the city centre, although there are a few direct services which lack good bus priority. Bus travel to/from these areas is therefore relatively unattractive.

Acute sensitivity of bus services to disruptions on the road network: Unplanned and planned events both inside and on the edge of the City often lead to virtual gridlock for extended periods affecting bus services as well as general traffic.

107. With the scale of housing and employment growth expected in the City and surrounding area the City's existing public transport system faces major challenges in the future. Without decisive action to further transform public transport infrastructure and improve sustainable travel options, traffic conditions, particularly at peak hour, would be likely to deteriorate significantly. The bus strategy which follows is an important component of our overall, integrated approach to develop a sustainable transport system and travel choices.

Strategy

108. The Council's vision of the strategic bus network in Oxford and the surrounding area in is shown below. The strategic network and the categorisation of routes and services will be kept under constant review as circumstances change and new opportunities arise. Proposals are likely to evolve over time in response to changing circumstances and opportunities, however by 2031 they are likely to include the following elements (described in greater detail in the Oxford Transport Strategy):

Enhanced bus network connectivity, integration, and access:

- New outer-ring of Park & Ride sites further away from Oxford on main radial routes to intercept trips closer to their point of origin, prior to reaching the Ring Road
- Redevelopment of existing Park & Ride sites inside the ring road / A34
- Development of bus hubs/interchanges within the City linking services and providing for healthy and active journeys (walking and cycling), using best practice models
- Better transport interchanges at railway stations including Oxford, Oxford Parkway and proposed new stations on the Cowley Branch line.
- New city centre bus terminals.
- Expanded and improved integrated smart payment systems.

Development of Rapid Transit routes and services:

- Three routes have been designated as future 'Rapid Transit' (RT) routes traversing the City and terminating at the new 'outer' Park & Ride sites.
- RT services in Oxford are likely to have the following general features: higher levels of frequency; enhanced on-route bus priority or (where circumstances require) grade segregation; off-board ticketing; separate passenger entrance and exit doors for speeded up loading/off-loading; overall faster journey times; higher capacity and high

quality vehicles; zero emission technology (i.e. at point of use); comprehensive use of intelligent transport systems; good cycling and walking links (including secure cycle parking) to interchange points, high quality passenger facilities at stops, termini and other interchanges, and a strong, unique public image.

Traffic management:

- Various priority measures e.g. reallocating road space, improving junction, and access restrictions to improve flow conditions and access for conventional buses, especially on designated Premium bus routes.
- Enhanced contingency planning to deal with traffic disruptions, in time utilising the potential of intelligent transport systems.

Other measures to enhance and promote bus travel:

- Extension of the smart payment system
- Enhanced real-time bus information, including innovative advanced journey planning systems.
- Work with local bus operators through a Quality Bus Partnership
- Strong marketing/branding campaigns carried out with local bus operators.
- Improved passenger facilities in accordance with standards set out in the bus network hierarchy.
- Further Improvements in the quality and comfort of bus vehicles and vehicle emission standards.

Banbury

Introduction

109. Banbury is the second largest town in Oxfordshire, with a population of nearly 47,000 and over 28,700 jobs, accounting for 42% of the total jobs in Cherwell District.[1] In addition to Oxford, Banbury is currently the only settlement in Oxfordshire to have more jobs than employed residents. Located in north Oxfordshire, close to the M40 motorway and several 'A' roads and with good long-distance rail connections, Banbury acts as a Primary Regional Centre in its own right with an extensive catchment area.

[1] Source: *Cherwell Economic Analysis Study*, 2014 (presented as evidence at the Cherwell Local Plan hearing)

110. The *Cherwell Local Plan* anticipates that Banbury will continue to grow significantly, with an additional 7,000 houses and 3,500 jobs in the town by 2031. Key residential sites are proposed in the south, west and north-west of Banbury. Proposed employment sites are located on the east side of Banbury, close to M40 Junction 11.

111. Given its prime location in relation to the wider region, excellent strategic transport links, and the size and diversity of its economy, Banbury employment sites attract commuters from a wide area. In 2011 its employees had the longest average commuting trip of all the main Oxfordshire settlements (see Table 11 below).

Banbury	Bicester	Witney	Abingdon	Didcot	Oxford
16.1	**14.9**	**11.5**	**14.6**	**10.6**	**14.9**

Bus Strategy Table 11: Employees' average travel to work distances (straight-line distance between postcodes) in major Oxfordshire settlements, 2011 (km) (Source: Census)

112. Banbury has a high level of employment self-containment, with associated shorter commuting distances: 60% of journey-to-work trips are currently undertaken within the town, with a home origin and work destination in Banbury. However, whilst 32% of these trips are undertaken on foot and 57% of by car only 3% are by bus. The levels of in-commuting and out-commuting by bus are only slightly better than this at about 4%.

113. Collectively these statistics suggest that there is considerable potential for encouraging sustainable travel both within the town and the immediately surrounding area. Creating a bus network that better serves journeys to work forms a key strand of the town's Sustainable Transport Strategy (see LPT4 Volume 2 Section ii).

Strategy

114. The Banbury Bus Strategy objectives aim to address the following issues:

Objective One: Commuting by Bus

Issue: The current network of town bus services does not provide direct or frequent services for trips to work within Banbury, as bus services do not run directly from residential areas to employment sites.

Objective: To provide direct and frequent commercial cross town services between residential and employment sites to ensure that the bus is a genuinely viable alternative to the car for trips to work within Banbury.

Objective Two: Reliable Journey Times

Issue: Unreliable bus journey times, caused by buses getting stuck in congestion, has led to bus operators implementing irregular bus timetables which are not intuitive or helpful for bus users. Unreliable bus journey times also dissuade people from taking the bus as they cannot be certain of arriving at their destination on time.

Objective: Improve bus journey time reliability though measures, such as, routing buses away from key congested junctions; routing buses through bus only roads; provide bus priority measures on congested corridors and junctions to ensure operators run frequent and reliable commercial services which are attractive for users, particularly commuters.

Objective Three: Buses serving Banbury Rail Station

Issue: Poor access by bus to Banbury Rail Station.

Objective: Serve Banbury Rail station with an increased variety of bus services by firstly routing buses from the town centre to the Thorpe Way employment area via Higham Way, thus serving the new station entrance in the multi-storey car park; and secondly exploring with landowners opening Station Approach and Tramway Road to through bus services, most likely north-south bus services in the first instance.

Objective Four: Banbury Bus Station

Issue: Banbury bus station does not provide easy interchange between bus/coach and other modes of transport. The bus station is difficult to walk or cycle to, and has no designated car/taxi drop off facility. The bus station is underused by operators, many of which prefer to use on street bus stops.

Objective: In line with the Banbury Masterplan explore options for the current bus station layout and access arrangements, as well as whether a bus station at a different location or as a series of on street bus stops can provide an improved offer.

Objective Five: Serving new developments

Issue: Serving new residential and employment developments with high quality commercial bus routes.

Objective: Ensure the location and layout of new developments enable high quality commercial public transport services to serve the development.

Bicester and surrounding area

Introduction

115. Bicester has a population of almost 33,000 people and over 13,000 jobs in 2011 and is the fastest growing town in Oxfordshire. It has an increasingly diverse and strong economy that includes Bicester Village shopping outlet which has become a major UK tourist attraction, drawing in nearly six million visitors a year.

116. The town possesses excellent road links via the A34 and the M40, and rail links to Oxford, London Marylebone, High Wycombe and Birmingham (and in the near future, also Milton Keynes), and has a highly advantageous location in relation to major areas of economic growth in Oxford and Science Vale, the Oxford-Cambridge Arc, and the Northamptonshire Arc.

117. Bicester has major ambitions for growth. The Cherwell Local Plan seeks to exploit Bicester's potential to deliver jobs-led growth, supported by housing, with approximately 10,000 new homes and up to 9,000 additional jobs planned up to 2031. The Plan also seeks to strengthen the town centre economy. The town is also to become a new 'Garden City' with up to 13,000 new homes.

118. Given the compactness and current size of the town a relatively high proportion of residents that work in the town currently walk and cycle to work. However the level of bus commuting is extremely low – less than 2% in 2011. Residents that work locally however represent only a minority of the town's commuters: because of a shortfall in the number of local jobs and the town's location, the level of out-commuting is relatively high, and of these 77% were car drivers. Similarly 80% of in-commuters were car drivers. The levels of in- and out-commuting by bus were 4.5% and 6.3% respectively.

119. The challenges to the further growth of bus use in the Bicester area are:

An inadequate existing local bus network: There is currently a low level of bus frequency and poor coverage of many residential and employment areas in the town and to settlements in its immediately surrounding travel to work and shopping/service catchment area.

Traffic congestion: There is acute traffic congestion on key main routes through and in the town, and at specific locations at certain times e.g. the junctions in the vicinity of Bicester Village. There are currently virtually no significant bus priority measures within the town.

Car dependent local attitudes: According to the *Bicester Movement Study* there is currently a lack of popular support for demand management measures e.g. road space reallocation and parking restraint that would constrain car use and support increased bus use.

120. With the scale of planned growth in jobs and housing in the town, it is clear that decisive action to further transform public transport infrastructure and travel options, as well as increase existing overall transport capacity, will be necessary to avoid a further deterioration in traffic and environmental conditions in Banbury. The bus strategy which follows is an important component of our overall, integrated approach to develop a sustainable transport system and travel choices.

Strategy

121. Oxfordshire County Council's vision of the strategic bus network in Bicester and the surrounding area in the short to medium term is shown in figure 13. The strategic network and the categorisation of routes/services will be kept under constant review as circumstances change and new opportunities arise.

The Bicester Transport Strategy will support the development of local and inter-urban bus services through a combination of integrated transport strategies and policies. Proposals are likely to evolve over time in response to changing circumstances and opportunities however they are likely to consist of the following elements: **Enhancement of the town's bus network:**

- Improving bus services along key routes to connect residential areas with existing and future employment centres, as well as the railway stations, town centre, Bicester Village and the Park & Ride site. This will be achieved by using funding from development to enhance the quality and frequency of existing services, with the aim of services reaching full commercial viability.

- Growth at Upper Heyford will need to be considered in terms of improved public transport frequency and connectivity with Bicester.

- Prioritise highway improvements and bus priority measures at key congestion pinch points on designated Premium bus routes and other places where there are identified needs arising from strategic development sites. For example, a bus priority scheme on Bucknell Road-St Johns Street-Manorsfield Road is vital to deliver an improved bus service to service the major North West Bicester development.

- A comprehensive review of town bus operations will identify other short, medium and long term infrastructure and service improvements required.

Enhancement of bus interchange facilities:

- use the opportunities offered by the redevelopment of Bicester Village Railway Station to create a 'state-of-the-art' multi-modal interchange offering high quality facilities for pedestrians, bus users and cyclists.

- Fully utilise the potential of the new Park & Ride site at South West Bicester to promote bus use to as wide a possible range of destinations inside and outside the town, especially to promote both in and out-commuting by bus. Within Bicester the P&R should be directly linked to Bicester town centre, key employment centres, and Bicester Village.

Other measures to enhance and promote bus travel:

- Extension of integrated multi-modal, multi-operator smart payment to the area
- Enhance real-time bus information

- Work with local bus operators through a Quality Bus Partnership (see section 2.7). In particular co-operate with local bus operators and key local stakeholders to carry out a strong marketing/branding campaign promoting the Bicester P&R and bus connections to EW Rail and the Garden Town vision

- Improved passenger facilities in accordance with standards set out in the bus network hierarchy.

- Improvements in the quality and comfort of buses and vehicle emission standards.

Other changes that would benefit bus travel:

- Expand capacity on new and existing peripheral routes to encourage their greater use for employment purposes and longer distance traffic. This would help reduce congestion

in the town centre and central corridor, and thus help facilitate improved conditions for bus movement on these routes and in these areas.

- New link roads to enable new routes/services (e.g. through the SE Bicester development area). Peripheral developments should enable attractive inter-urban bus travel along new links.
- Review of parking provision, management and information
- Better connections to bus stops, e.g. walking/cycle links to improve Door to Door multi modal travel for longer trips, as outlined in the Active & Healthy Travel Strategy.

Science Vale and surrounding area

Introduction

122. This Plan contains an area transport strategy for Science Vale; however for the purposes of strategic bus planning we have defined a slightly larger area south of Oxford consisting of not only the Science Vale area (including Grove, Wantage, Didcot and the high-tech business parks at Harwell Campus, Milton Park and Culham Science Centre) but also Abingdon and Wallingford.

123. In 2011 this area had a population of approximately 117,000 and over 54,000 jobs. The Oxfordshire Strategic Economic Plan has also recommended that approximately 20,000 new homes and 20,000 additional jobs be concentrated in the Science Vale area by 2031 – the majority likely to be located around Didcot and Grove/ Wantage. This would mean an increase of approximately 55,000 residents, almost a 50% growth in population.

124. The major business parks in Science Vale possess a very high concentration of employment in high-tech industries and therefore attract employees from a very wide catchment area as well as generating a large number of national and international business trips. In 2011 the jobs located in the area generated about 47,000 commuter journeys of which 57% were internal, and about 52% of employed residents of the area worked locally.

125. Although a relatively high proportion of residents work in the area, the level of bus commuting to workplaces within the area is currently extremely low: only about 4% of employees in the area commuted to work by bus in 2011, whereas over 62% of internal commuters and 82% of commuters from outside the area were car drivers. The level of bus commuting to workplaces outside the area was slightly better: about 7% travelled by work by bus (and 73% were car drivers).

126. The following factors present challenges to the further growth of bus use in - and to – Science Vale and the surrounding area:

Limited bus connectivity between major settlements in the area and employment areas: many services between important destinations are currently relatively infrequent and slow, and in some cases do not exist at all. Connections to the centre of Oxford are more frequent; however those to other areas, especially major employment areas in the Oxford Eastern Arc are relatively poor.

Traffic congestion and lack of bus priority measures on busy, main connecting routes

Weak car demand management policies and measures: little or no strategic use of parking policies to manage demand and encourage sustainable modes of transport, despite the number of users already cycling in the area,

Limited public transport interchange and inadequate passenger facilities: With the exception of Didcot railway station there are currently few high quality interchange facilities enabling transfer between different bus services, between bus and rail, and park & ride.

Lack of integrated ticketing: There is currently no system of multi-operator and multi-modal ticketing for public transport services within the area.

127. With the scale of housing and employment growth planned in the area it is clear that without decisive action to further transform public transport infrastructure and improve sustainable travel options, traffic conditions, particularly at peak times, would be likely to deteriorate significantly. The bus strategy is an important component of our overall, integrated approach to develop a sustainable transport system and travel choices.

Strategy

128. The Council's vision of the strategic bus network in Science Vale and the surrounding area in the short to medium term is shown in figure 14. The strategic network and the categorisation of routes/services will be kept under constant review as circumstances change and new opportunities arise.

129. To support planned growth and cope with the predicted growth in travel demand it is vital to develop a much improved bus network within the area and, together with the railway network, connect it (through the 'Science Transit network') to other parts of Oxfordshire, especially the 'Knowledge Spine' and wider region. Other complementary measures to encourage and facilitate sustainable travel will also be important.

130. The Science Vale Transport Strategy will support the development of local and longer-distance bus services through a combination of *integrated transport strategies and policies*. Proposals are likely to evolve over time in response to changing circumstances and opportunities however by 2031 may consist of the following key elements:

A major new north-south transport corridor linking Didcot and the eastern side of Science Vale with east Oxford:

- A potential new road link and Thames River crossing with bus priority where required running between north Didcot, Culham Science Centre and the east side of Oxford).

Traffic management:

- Various measures to improve traffic flow and give greater priority to buses on strategically important local routes and at junctions (esp. on Premium bus routes – see map and above)
- Bus priority measures where required on the Harwell Campus - Didcot - Milton Park - Abingdon – A34 South Corridor P&R – Oxford route, which is seen as the 'spine' of the bus network in the area linking the two main towns and most major employment sites

Development of new and enhanced commercial bus services, focusing on high quality, high frequency Premium services on the following core north-south routes:

- Harwell Campus- Didcot - Milton Park - Abingdon – A34 South Corridor P&R - Oxford
- Harwell Campus- A34 South Corridor P&R - Oxford
- Wantage - Grove - Oxford

Development of high quality commercial services on the following 'Connector' Bus Routes (with the following routes our initial priority):

- Wantage - Grove - Abingdon
- Wantage - Grove - Milton Park
- Grove - Wantage – Harwell Campus
- Wallingford – Didcot

New and better quality bus interchange facilities:

- Improved and expanded bus-rail interchange as part of a redeveloped Culham railway station.
- Proposed Park & Ride site and bus 'hub' on the A34 South corridor.
- Provision of a bus-rail interchange at the potential new railway station in the Grove area.
- Enhancement of bus and passenger waiting facilities in Didcot, Abingdon, Wantage, and Wallingford town centres to meet projected demand by 2031
- Better facilities for integration between bus and cycling and walking including safe, accessible routes, street lighting, and cycle parking at key bus stops.

Other measures to enhance and promote bus travel:

- Extension of integrated multi-modal, multi-operator smart payment to area
- Enhanced real-time bus information, including innovative high-tech journey planning systems.
- Work with local bus operators through a Quality Bus Partnership
- Strong marketing/branding campaigns carried with our partners at major employment sites and local bus operators.
- Improvements in quality and comfort of buses and vehicle emission standards.

Integrated land use-transport planning measures

131. The strategy gives priority to north-south Premium routes and services, as this is where the greatest demand and growth potential currently lies. While we would also like to see Premium level bus services on key east-west routes within the area there is currently insufficient actual and potential demand for these. Realistically given present circumstances our goal is to develop and maintain services at a 'Connector' standard (i.e. at least 2 buses per hour) on the priority routes mentioned. The key factor in achieving Premium standard on east-west bus routes would be additional residential and/or employment development on a sufficiently large scale in the Grove/Wantage area (perhaps linked with the development of a new railway station at Grove).

Witney and Carterton

Introduction

132. This Plan contains separate area transport strategies for Witney and Carterton. In terms of strategic bus planning however it makes sense to look at the two towns together given their close proximity and the strong travel and bus connections between them.

133. Witney is the largest town in West Oxfordshire with a population in 2011 of about 27,500. It is the main commercial and service centre for the predominantly rural district of West Oxfordshire and possesses a relatively strong and diverse economy. In 2011 Witney was home to about 12,300 jobs. Carterton, the second largest settlement with a population of just under 15,800 is a relatively modern town which has grown, in the main, to serve RAF Brize Norton. It has a small but varied economy, largely focused around the provision of local services.

134. Both Witney and Carterton are identified as a growth areas by West Oxfordshire District Council with opportunities for both residential and employment growth. The two towns enjoy a frequent, high quality Premium bus service to Oxford, however the range of other destinations in West Oxfordshire and in adjacent local authority areas that are served by bus is very limited and the services generally infrequent.

135. Both towns currently experience fairly high levels of out-commuting: in 2011 some 58% of Witney's and 62% of Carterton's employed residents worked outside their respective home towns. In- and out-commuting in Witney is strongly car based: about 81% of in-commuters and 78% of out-commuters travelled to work by car; the proportions commuting by bus were respectively 6.7% and 7.8%. Internally though, given the compactness and size of Witney, a relatively high proportion of residents that work in the town currently walk and cycle to work. The level of bus commuting is however extremely low – less than 2% in 2011. Commuting in Carterton is very similar to Witney.

136. Despite the high rate of out-commuting, of all the main Oxfordshire settlements Witney has the greatest proportion of employees (72%) living within 10km of their workplace. Many of these employees live in Carterton and a smaller proportion in surrounding villages. This suggests that there is strong potential for increased bus commuting between the two towns and to Witney in general, which is likely to increase significantly with the housing and employment growth planned.

Strategy

137. The Council's vision of the strategic bus network in Witney and Carterton will support the development of local and inter-urban bus services in these towns through a combination of integrated transport strategies and policies. Proposals are likely to evolve over time in response to changing circumstances and opportunities. They are likely to consist of the following elements:

Objective One: Commuting by Bus

Issue: The current bus network serving Witney and Carterton does not link residential areas to employment sites. This is particularly the case in Witney, where the large employment areas at Range Road and Station Lane are not directly served by buses.

Objective: To provide direct commercial services between residential and employment sites to ensure that the bus is a genuinely viable alternative to the car for trips to work.

Objective Two: Reliable Journey Times

Issue: Unreliable bus journey times, caused by buses getting stuck in congestion, dissuade people from taking the bus as they cannot be certain of arriving at their destination on time. This particularly affects buses running between Witney and Oxford on all routes. Bus operators have tried to remedy the variability in bus journey times by building more time into each timetable to make it more resilient, however this in turn makes their operations inefficient.

Objective: Improve bus journey time reliability though implementing measures specific to the section of routes that are inter-urban from those within towns/villages to ensure operators run frequent and reliable commercial services which are attractive for users, particularly commuters. Measures proposed for the A40 corridor include:

- An eastbound bus lane between Eynsham Roundabout and the Duke's Cut, Wolvercote;
- Westbound bus priority on the approaches to Cassington traffic signals and Eynsham Roundabout;
- A Park & Ride on the A40 West Corridor;
- Junction improvements along the A40 between Witney Bypass and Eynsham Roundabout,
- Bus priority on the approach to Swinford Tollbridge;

In towns and villages measures such as routing buses away from key congested junctions; routing buses through bus only roads; provide bus priority measures on congested corridors and junctions may be explored. Including:

- through Witney particularly along Corn Street, Market Place, Bridge Street and Newland;
- joining the A40 eastbound at B4044 Shores Green.

Objective Three: Improve the frequency of bus services

Issue: Bus services that run infrequent timetables can be unattractive to users.

Objective: We will seek developer funding to improve the frequency of bus services to produce commercially viable bus services on the following routes:

- Between Carterton, Witney and Oxford; including City Centre, hospitals and Oxford Brookes University;
- Between Carterton, Witney and rail stations, in particular main stations on the Cotswold Line such as Hanborough, but also Oxford, and Oxford Parkway rail stations.

Objective Four: Serving new developments

Issue: Serving new residential and employment developments with high quality commercial bus routes.

Objective: Ensure the location and layout of new developments enable high quality commercial public transport services to serve the development.

Objective Five: Measures to enhance and promote bus travel

Issue: Ensuring bus travel is accessible

Objective: To take opportunities to seek measures to enhance and promote bus travel to make it accessible including:

- Enhance town centre bus interchange facilities
- Provide new bus stops to better serve employment sites such as RAF Brize Norton.
- Extension of integrated multi-modal, multi-operator smart payment ticketing to the area
- Enhance real-time bus information, including innovative advanced journey planning systems.
- Improved passenger facilities at bus stops, and access to these on foot and by bicycle.
- Improvements in the quality and comfort of buses and vehicle emission standards.

CONNECTING OXFORDSHIRE

Volume 3: Rail Strategy

Local Transport Plan 2015-2031

OXFORDSHIRE COUNTY COUNCIL

Contents

Chapter 1
Introduction

This document sets out Oxfordshire County Council's strategy for the county's rail network up to 2034, and is a component part of *Connecting Oxfordshire* – our Local Transport Plan setting out our policy and strategy for developing the transport system in Oxfordshire up to 2031. Its end year of 2034 is significant as it covers the next four five-year control periods; the planning and investment cycles used by the government and Network Rail.

The rail strategy sets out how investment should play a key role in supporting Oxfordshire's economic development and the opportunity for the railway to establish itself as part of the backbone of Oxfordshire's transport network. It can link the key settlements in the Oxfordshire Knowledge Spine - Science Vale around Didcot, Oxford and Bicester – with each other and with the rest of the United Kingdom and the World. Rail is a genuine alternative to using congested roads for journeys to, from and within the 'Spine'.

The rail strategy provides a framework through which the county council can:

- develop local transport policy, including better integration between rail and other travel modes – cycle, walk, bus, motorcycle, and car;
- identify and seek service and infrastructure improvements;
- lobby to influence sub-regional rail policy and planning;
- support growth initiatives by integrating rail investment with decisions on land use, housing and economic development; and
- respond to consultations.

The rail strategy takes a high-level strategic approach, and identifies potential interventions that the county council and its partners will support the rail industry to develop and deliver, rather than developing detailed options.

The rail strategy considers:

- Passenger train services only;
- The "operational rail network" (i.e. the assets that are owned and managed by the various organisations that make up the rail industry);
- Access to the rail network, and trip generators such as housing / employment; and
- Travel planning.

Roles and responsibilities

The county council has no statutory responsibility for specifying or funding the railways, and we are not involved in setting timetables or fares so it may seem as if we have a limited role when investment decisions are made.

But as the local transport authority we have an important role to influence decisions taken by organisations within the rail industry by working in partnership with them and representing the people who live and work in Oxfordshire with a single voice. To meet our ambitious plans for growth we will lobby for an adequate share of the rail funding pot to deliver strategic improvements that bring benefits to local communities and businesses for generations to come.

It is important to understand the different organisations involved in running the rail network within the UK, which collectively we term "the rail industry". This rail strategy has been prepared to influence the decisions taken by the major players within the rail industry:

The Department for Transport (DfT) – decide on the level of service and the award of passenger service franchises; the allocation of rolling stock between train companies; and is ultimately responsible for implementing government decisions on investment;

Network Rail (NwR) – lead on long-term industry planning; manage track access and capacity utilisation by timetable approval; responsible for operating, maintaining and renewing the track, signalling, level crossings, bridges and tunnels, and for overall performance;

Train Operating Companies (TOCs) – operate the franchise train service specified by DfT, manage the operation of stations and day-to-day maintenance of trains. TOCs operating in Oxfordshire are: GWR, Chiltern Railways and CrossCountry Trains;

Freight Operators (FOs) – private companies who provide rail freight services to commercial customers who wish to move their goods by rail. The operators running trains through Oxfordshire include Colas Rail, DB Cargo UK, Freightliner and GB Railfreight; and

The Office of Rail and Road (ORR) – an independent organisation whose role is to ensure the Government receives value for money for its investment; validates the income needs of Network Rail every five years and is responsible for rail safety.

Train operating companies

Franchised

The majority of passenger rail services in Great Britain are contracted by the government and operated by one of the 15 rail franchises. The Department for Transport is responsible for specifying and letting franchises, and for managing franchisees' performance against a franchise agreement. A franchise contract is usually awarded for up to 8 years, although there is a move towards longer contracts. Under European law, a rail franchise may be awarded for 15 years, but may be extended for a further 7½ years in some circumstances.

A franchisee (known as a train operating company) earns revenue from passenger fares and any subsidy it receives. The stations are generally owned by Network Rail and leased to the franchisee to manage and operate, and they can earn rental income from sub-letting part of their stations to retailers. Franchisees' main costs are the track access charges they pay to Network Rail, the leasing costs of stations, property and rolling stock and employing staff.

Passenger services through Oxfordshire are provided by three franchises. In 2013/14, the Chiltern Railways and Great Western franchises made premium payments to the Treasury of £5 million and £73.8 million respectively. The CrossCountry franchise received financial support (subsidy) of £32.4 million.

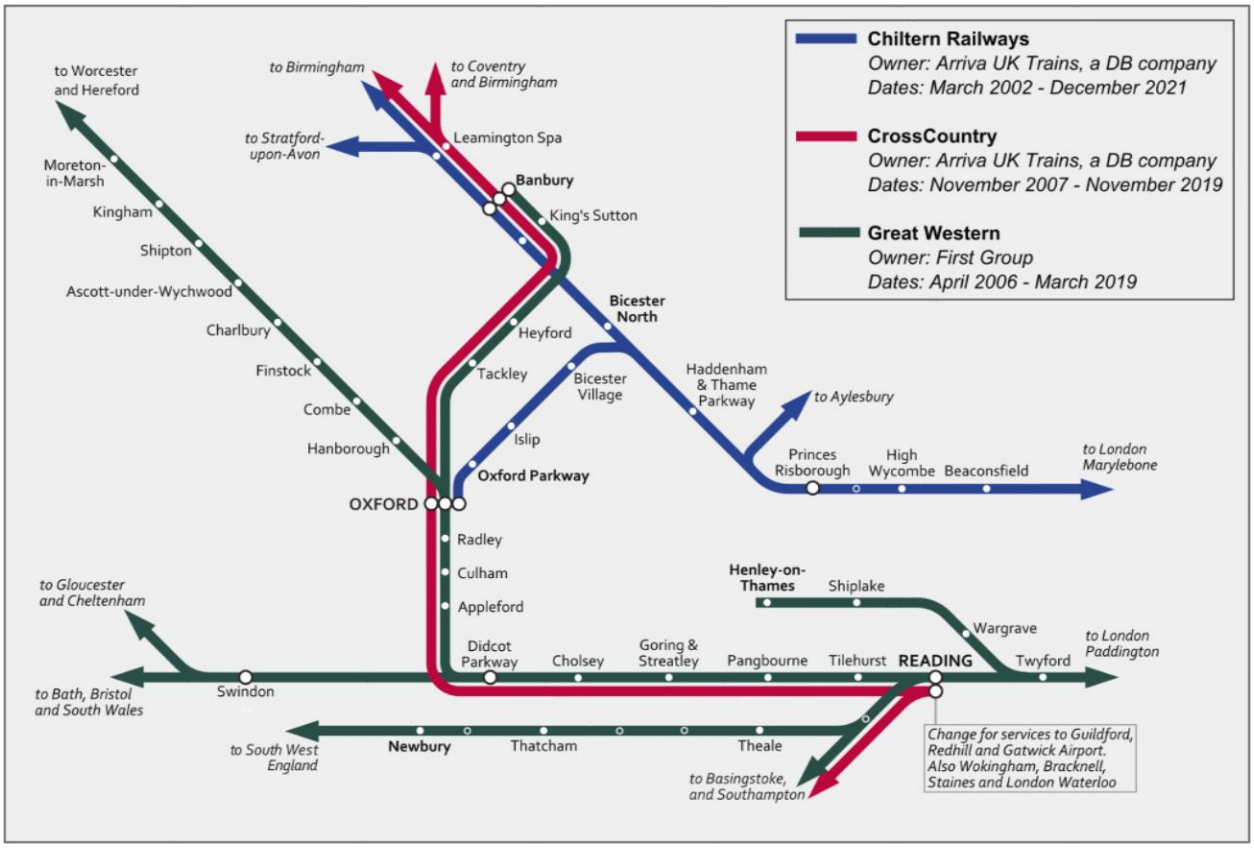


Figure 1: Passenger Rail Franchises in Oxfordshire

Open access

Other passenger services can be operated by open access operators who bid for 'slots' to operate their own passenger services where they have identified a commercial opportunity not met by one of the franchises. Their services are often to new destinations and can offer new direct travel opportunities, for example, between Humberside and London. There are few open access operators as the legal and financial requirements are quite onerous.

When considering applications Network Rail and the Office of Rail and Road will need to ensure that an open access operator does not:

- reduce the future attractiveness or value of a franchise, for example by abstracting passengers and lowering revenue;
- have an adverse impact on the operation of other freight and passenger services, particularly on already congested tracks;
- use rolling stock that is not compatible with optimal use of the infrastructure, for example, by having limited capacity or a lower maximum speed; or
- risk network efficiency, for example, by using scarce capacity or restricting opportunities for maintenance.

Rail planning and investment cycles

A key element in taking forward the rail strategy is to appreciate the rail industry timescales for securing funding for major rail schemes.

Every five years, the Office of Rail and Road (ORR) set regulatory targets and validates the income required by Network Rail to operate, maintain and renew the railway in the following five years. These 'periodic reviews' are important as they mean that rail planning horizons can be lengthy. Whilst this is good for the industry, in that it can plan with some certainty of funding for that period, it means that major infrastructure schemes often have to be planned with more than five year lead times. These five-year funding periods are known as Control Periods.

Control Period 5 started in 2014 which means any new investment will be allocated in a future Control Period. Planning for investment between 2019 and 2024 will begin later in 2016, and a summary of the timescale is shown in **Error! Reference source not found.**.

Table 1: Control Period 6 - Development Key Dates

Date	Activity
May 2016	ORR commences periodic review consultation.
July 2016	ORR publishes guidance on how it will assess efficient expenditure and a review of open access operators on rail competition.
September 2016	The **Initial Industry Advice** (or IIA) is published. It sets out choices for the government to consider funding based on what the industry believes its necessary to deliver to the capacity and capability required during the control period, and at what cost.
October - November 2016	ORR seeks informal views on the IIA.
February 2017	ORR publishes advice to ministers and decisions on the framework for setting outputs and access charges.
July 2017	Secretary of State for Transport publishes the **High Level Output Specification** (HLOS) and **Statement of Funds Available** (SoFA).
January 2018	Network Rail publishes its **Strategic Business Plan**.
January - April 2018	ORR consults on Network Rail's Strategic Business Plan
June 2018	ORR publishes its Draft Determination on Network Rail's outputs and funding requirement.
June – September 2018	ORR consultation on their draft determination
October 2018	ORR publishes its **Final Determination** on Network Rail's outputs and funding requirement.
March 2019	Network Rail publishes its **Delivery Plan**
April 2019	Commencement of Control Period 6

The importance of prioritising and developing projects so they can feed into the five-year cycle of rail industry funding must always be considered in rail development.

Investment in major enhancement projects, such as a new or rebuilt station or opening new rail lines, can take several years of development before a project is sufficiently robust to be considered for funding. Ideally, projects should have a strong operating and economic case so they are supported by the rail industry by the time it puts together its Initial Industry Plan.

There are often opportunities to secure service enhancements and station improvements directly with a train operating company through commitments written into their franchising agreement with DfT. Recent schemes have included car park extensions and customer information systems.

Hendy Review 2015

Network Rail is delivering an ambitious £38 billion investment programme in Control Period 5 to operate, maintain, renew and improve the rail network across England and Wales. It is funded by the UK Government, and the biggest programme of railway modernisation since the Victorian era.

The cost and delivery for some significant enhancement projects, including electrification, had increased beyond expectation due to over optimism on costs, poor planning, lack of resources and changes in project scope. Network Rail was reclassified as a public body which now prevents it from accessing funds on the open market to cover increase costs.

Sir Peter Hendy was appointed Chair of Network Rail in July 2015 and the Secretary of State asked him to conduct a review of the enhancement programme to see what could be delivered in an affordable and timely way within the funding period to 2019 with the benefit of a better understanding of cost and delivery challenges. His report, *"Re-planning Network Rail's investment programme: A report from Sir Peter Hendy to the Transport Secretary"* was published in November 2015.

The re-planned programme is still more expensive than the financial settlement that Network Rail received in 2014, so Network Rail is planning to release £1.8 billion of funding through the sale of some non-core and lower value assets, including selling off some of the Network Rail managed stations and other property assets.

A draft Enhancement Delivery Plan was published in January 2016. Some projects have been rescheduled to the end of the plan period, including electrification of the line between Didcot-Oxford which is delayed by three years, although most projects will be delivered as originally planned by 2019. There is some uncertainty on when East-West Rail Phase 2 will be completed with the plan committing only to complete scoping of a single option by 2019 rather than delivery, with the new railway opening sometime after 2020.

Chapter 2

Rail Objectives

Introduction

Our objectives for rail development are aligned with the goals we have set for *Connecting Oxfordshire*, but also need to have cognisance with national railway planning and policy. In particular, we have considered Network Rail's Long Term Planning Process, and especially the new route studies, as well as the market assessments that have informed them.

We also have to consider the Local Plans that are being prepared by the district councils as we need to take a more strategic, planned approach to investment in the rail network and better align this with future land use so both can benefit each other.

A comprehensive approach is needed as the business case for future rail investment may depend on rethinking some land use plans to create the conditions where there is potential for rail to support existing and planned communities, through new or existing stations, and developments can provide the critical mass in demand to justify enhanced train services.

Local Transport Plan

This rail strategy forms part of *Connecting Oxfordshire*, our Local Transport Plan setting out our policy and strategy for developing the transport system in Oxfordshire up to 2031. The end date ties in with the period of most of the Local Plans being put in place by the district councils.

Oxfordshire faces a huge challenge to enable people to make the journeys they need to as the population grows, whilst avoiding chronic congestion that could damage our economy. We realise there needs to be a significant shift away from dependence on private cars, and to do that we intend to transform travel by walking, cycling or public transport to make these equally if not more attractive than using the car, for the majority of people.

Connecting Oxfordshire has been developed around a set of over-arching transport goals, and the specific policy relating to rail is shown in

Table 2: LTP Policy Relevant to Rail

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Table 2: LTP Policy Relevant to Rail

Policy 9	Oxfordshire County Council will work in partnership with the rail industry to seek enhancements to the rail network in Oxfordshire and connections to it, where this

supports the county's objectives for economic growth.

Rail is an integral part of the county council's long term transport strategy, and there are a number of ways in which rail can contribute to meeting the five LTP goals. Accessibility in the context of both getting to the station, and using the network, is fundamental and better connectivity between centres of growth and regional centres and international gateways will support growth and sustainability. **Error! Reference source not found.** outlines how rail contributes to our LTP goals.

Table 3: Contribution of Rail to LTP Goals

LTP Goal	Contribution of Rail
Goal 1 - To support jobs and housing growth and economic vitality	• Enable travel between employment sites and urban centres for work, education, health and shopping; • Deliver capacity to meet future demand; • Reduce journey times; • Improve service reliability and resilience; • Integrated and seamless multi-modal ticketing; and • Improve global competitiveness by providing links to international gateways.
Goal 2 - To reduce emissions, enhance air quality and support the transition to a low carbon economy	• Make rail an attractive alternative to using air travel or car for long distance journeys; • Reduce energy consumption and increase use of recycled materials on trains and at stations; • Reduce emissions from rolling stock; • Station facilities for electric vehicle charging and multi-occupancy cars; and • Maximise the value of investment
Goal 3 - To protect and enhance the environment and improve quality of life (including public health, safety and individual wellbeing)	• Mitigate the impact of railways on the local built, historic and natural environment, including noise and lighting; • Provide accessible trains and stations to remove barriers faced by older and disabled people; and • Encourage health and wellbeing; providing safe and secure facilities and policies that make walking and cycling more attractive.

Strategic Economic Plan

Oxfordshire is already recognised nationally for its universities and the strength of its science-based knowledge industries. The ambition of the Oxfordshire Local Enterprise Partnership (OxLEP) is to further develop the county as the economic powerhouse of the UK and a global leader in 'Big Science' by creating the right conditions and infrastructure for businesses to invest and grow.

OxLEP is planning for, strong economic growth with up to 100,000 new homes and 85,000 new jobs by 2031, and the Strategic Economic Plan sets out the investment required in the provision of new homes, developing education and skills and improved connectivity. The main focus for this growth is the "Oxfordshire Knowledge Spine", linking Bicester, Oxford and an area known as Oxford Science Vale, with the high-tech sectors expected to create most of the new jobs. Figure 2: Oxfordshire Knowledge Spine shows the spine through the centre of Oxfordshire, and the main areas of economic activity in the county.

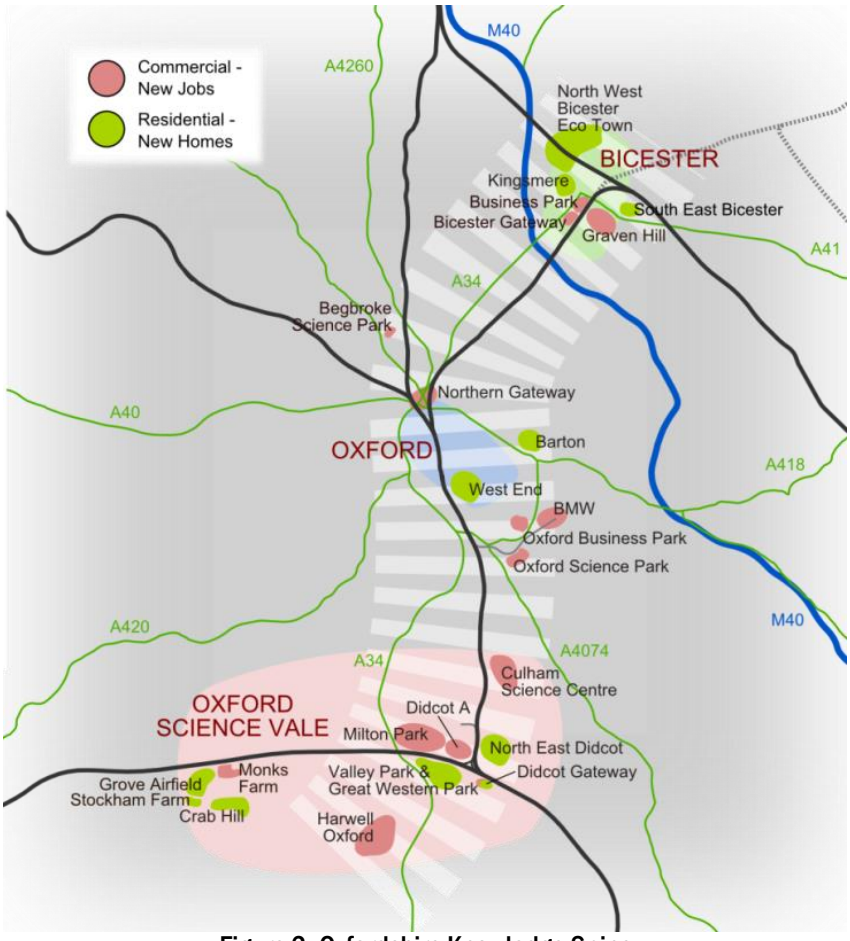


Figure 2: Oxfordshire Knowledge Spine

To help businesses retain and attract a large, skilled workforce, there will need to be excellent links between businesses and research establishments in the county, as well as to research establishments, suppliers and customers elsewhere in the UK and globally to achieve the agglomeration benefits of locating in Oxfordshire. Rail is therefore critical to realising this ambitious level of growth.

The Strategic Economic Plan provides:

- A mechanism to identify and prioritise infrastructure projects based on value for money and delivery of key economic growth objectives;
- The framework to encourage and facilitate co-ordination of investment decisions across the various agencies, such as Network Rail and Highways England; and
- The basis upon which the majority of central government funding is now sought and allocated for transport improvements via the Local Growth Fund, part of the City Deal.

In addition to funding from the Local Growth Fund, the government is investing in strategic infrastructure that will improve access to the Knowledge Spine from important centres in Oxfordshire, the United Kingdom and overseas. These include schemes such as East-West Rail, electrification and direct rail access into Heathrow.

As part of *Connecting Oxfordshire*, this rail strategy supports the Strategic Economic Plan. Crucially, improvements to rail infrastructure and services can assist economic activity by:

- enabling business to locate closer together and work in clusters;
- increasing labour market catchment areas and broaden the pool of available workers for existing and future jobs;
- improving access to national and international markets to help maintain global competiveness;
- reducing the pressure on the road network and reducing congestion;
- ensuring that new housing and employment growth is integrated with investment in strategic transport infrastructure; and
- Stimulating further inward investment to make Oxfordshire an easy place to access and move around - promoting greater travel choice.

In 2016, OxLEP will carry out a refresh of the Strategic Economic Plan to reflect Oxfordshire's latest economic environment. Their connectivity priorities to 2020 include ensuring transport investment programmes are:

(a) focused on overcoming current capacity bottlenecks;
(b) linked to the scale and location of planned housing and employment growth; and
(c) support the implementation of Oxfordshire's Science Transit Strategy.

Wider Rail Objectives

To ensure this rail strategy meets our LTP goals and wider rail objectives we have reviewed relevant planning and policy documents, at both a local and national level. **Error! Reference source not found.** shows the common themes, and in **Error! Reference source not found.** we have matched these with our LTP goals to ensure we have a cohesive rail strategy.

The documents reviewed include:

1) Local Transport Plan - *Connecting Oxfordshire* (May 2015)
2) *Driving Economic Growth through Innovation*: Strategic Economic Plan (Oxfordshire Local Enterprise Partnership, 2012)
3) Oxfordshire 2030 – our Sustainable Community Strategy
4) Rail Command Paper (Department for Transport, 2012)
5) White Paper: *Creating Growth, Cutting Carbon*: Making Sustainable Local Transport Happen (Department for Transport, 2011)
6) Electrification Route Utilisation Strategy (Network Rail, 2009)
7) Great Western Route Utilisation Strategy (Network Rail, 2010)
8) London and South East Route Utilisation Strategy (Network Rail,2011)
9) Western Route Study (Network Rail, 2014)
10) Draft West Midlands and Chilterns Route Study (Network Rail, 2015)

Table 4: Key themes

Source	Theme
Local Transport Plan	Economic vitality and sustainable growth Integrated transport network A low carbon economy Enhance the environment and improve quality of life, including social inclusion and health & wellbeing.
Strategic Economic Plan	**People** – a better qualified workforce with flexible skills **Place** - accelerated housing delivery and improved quality of life **Enterprise** - accelerated economic growth and increased business growth and productivity **Connectivity** - better integrated transport allowing people to move freely
Oxfordshire 2030	World class economy for Oxfordshire Healthy and thriving communities Protect the environment Reduce inequalities
White Paper: *Creating Growth, Cutting Carbon*	An engine for economic growth Greener transport
National Planning Policy Framework	Reduce greenhouse gas emissions Reduce congestion
Rail Industry	Value for money Support economic growth Carbon reduction and modal shift Effective and efficient use of network capacity Provide capacity to meet demand up to 2043

It is evident that the documents reviewed have some common themes, and these can be summarised as a set of wider rail development objectives, shown in **Error! Reference source not found.**. It is also clear that the goals we have set for *Connecting Oxfordshire* closely match these wider objectives as shown in **Error! Reference source not found.**.

Table 5: Wider rail development objectives

Economic growth and global competitiveness
A transport network to accommodate growth
Reduce environmental impact
A healthy and inclusive society

Table 6: Alignment of wider rail objectives with LTP goals

Development Objective for Rail	LTP Goal
Economic growth and global competitiveness	To support jobs and housing growth and economic vitality
A transport network to accommodate growth	
Reduce environmental impact	To reduce emissions, enhance air quality and support the transition to a low carbon economy

A healthy and inclusive society	To protect and enhance the environment and improve quality of life (including public health, safety and individual wellbeing)

The Environment

Rail has environmental advantages over many other modes of transport, which is a key reason why we want to promote its use in Oxfordshire. With congestion increasing on the road network, more people than ever are now choosing to travel by train and businesses recognise the time saving benefits of transporting their goods by rail.

The most significant environmental impacts associated with (diesel) rail are:

- Emissions of carbon dioxide (CO_2);
- Emissions of air pollutants, in particular nitrogen oxide (NOx), particulates and sulphur dioxide (SO_2); and
- Environmental Noise.

All motorised transport produces carbon dioxide – one of the 'greenhouse gases'. Rail produces relatively less CO_2 emissions than other modes, with emissions per passenger kilometre being on average half that of travel by car. Carrying freight by rail results in an 80% cut in CO_2 emissions per kilogram carried compared to road haulage. Trains are an energy efficient means of moving passengers and freight, particularly over long distances, as they use far less energy per passenger than road.

Trains emit relatively low levels of pollutants into the atmosphere, and this could be reduced further if diesel engines were switched off when stationary for more than a few minutes. By 2018, many services in Oxfordshire will be operated by electric trains which are pollutant free at point of use and do not contribute to local air quality problems.

Railway noise can take many forms and whilst technology has reduced some causes of noise, there is no evidence that overall noise impacts have improved. The main sources of noise are the sound of trains passing, accelerating or braking, diesel engines (but newer diesel trains are much quieter and electric trains virtually noise-free), the wheel-rail interface on tight curves (squeal), points (clatter) or surface irregularities, overnight maintenance and warnings at level crossings.

Summary

The elements of our rail strategy can be summarised as follows:

- Explain how an efficient and accessible rail network will help deliver wider economic policy priorities for the county; in particular the creation of new jobs and sustainable new housing;
- Present a coherent and realistic set of investments that the county council and its partners would like the rail industry to plan and develop in partnership with local stakeholders, and for the rail industry to deliver in future control periods;

- Identify rail as an integral part of local, regional and national transport networks by providing a choice of alternatives to road for strategic movements;
- Give a clear view on investment priorities so the rail industry know where it is likely to receive political support from the county council; and
- Enhanced partnership working with local planning authorities and use of the planning system to achieve better coordination between land use planning and investment in rail infrastructure and services.

Chapter 3
Baseline

Introduction

This chapter summarises the baseline situation. It sets out some key facts about the rail network in Oxfordshire, including:

- The railway and its context within Oxfordshire's wider transport network;
- How many people travel by train; and their origin and destination;
- The importance of local and national rail connectivity;
- The available capacity of the network in relation to travel demand;
- How the network is currently performing in terms of passenger satisfaction; and
- The capacity challenge and meeting future passenger demand.

Oxfordshire's rail network

Oxfordshire occupies a pivotal point in the UK rail network, with rail lines heading north, south, east and west passing through the county. The railway is a national network but a vital local asset without which we would see many more cars and lorries on our roads. In this respect, rail has an important role in reducing congestion and carbon emissions.

There are 23 stations, ranging in size from the smallest rural 'halt' with just a handful of weekday passengers to busy urban stations with several million passengers passing through every year. There are seven freight facilities handling automotive, aggregates (sand/gravel), household waste / recycled aggregate, defence and general goods, whilst many more trains pass through the county on their way to and from the Port of Southampton. Figure 3 shows the location of these passenger stations and freight facilities.

There are also many different demands from customers. Long distance passengers want services to be as fast as possible by minimising the number of stops. Local communities want to see more stops at their particular station – before having as fast a journey as possible thereafter. There is an increasing demand for freight traffic

as the advantages of rail over congested roads become more apparent to people who need to move goods, but they also need to have reliable 'just in time deliveries'. Balancing these demands is a challenge; and as the rail network becomes more crowded with a mix of services the potential for delays and cancellations, as a result of something going wrong, increase.

The railway provides connectivity locally and across the UK and is vital for Oxfordshire to be competitive in economic terms.

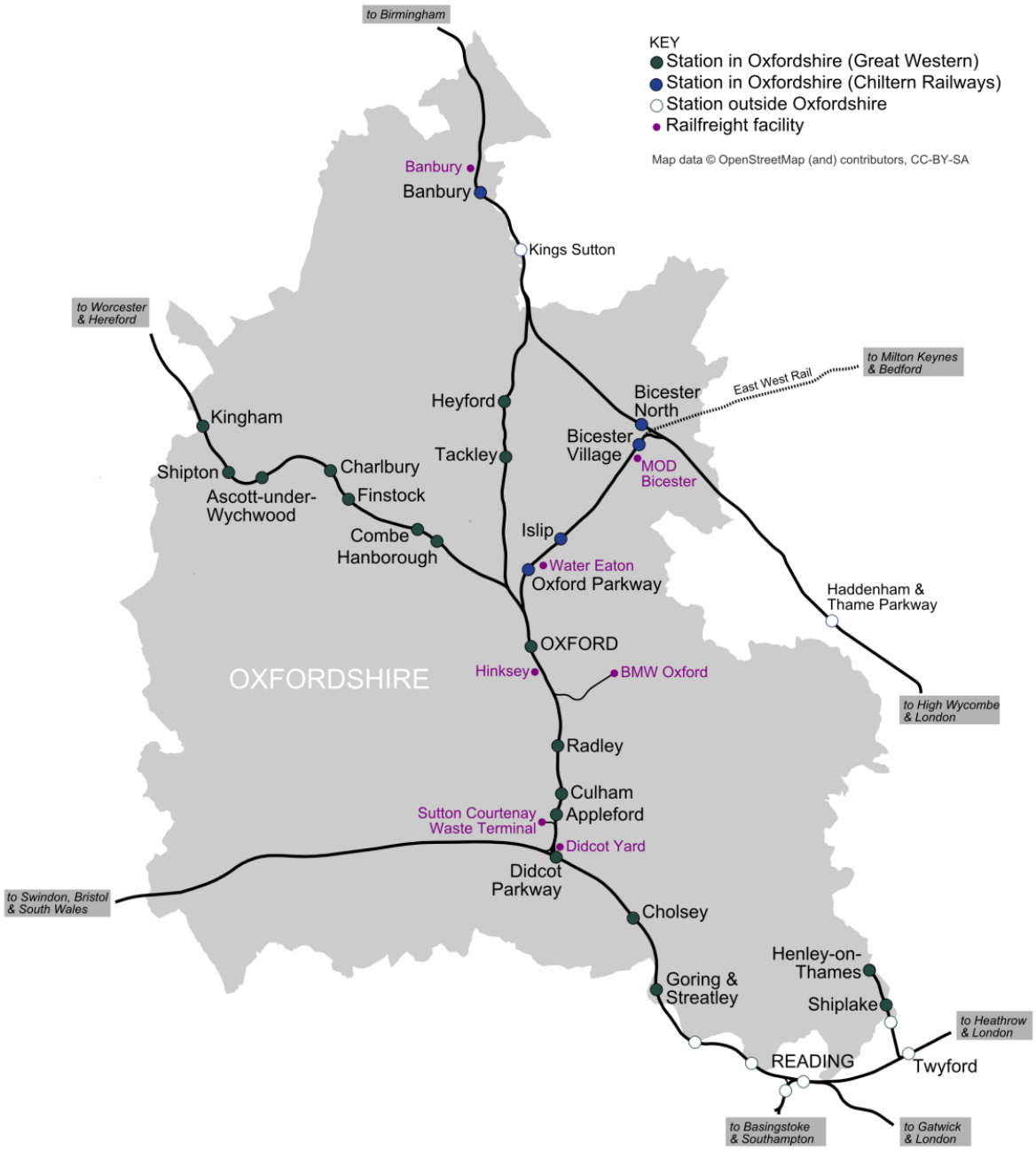


Figure 3: Oxfordshire Rail Network

Rail Connectivity

The rail network is a vital component in supporting Oxfordshire's economic development by linking key locations in the Oxfordshire Knowledge Spine - Science Vale, Oxford and Bicester – both with each other and with the rest of the United Kingdom and the World. Rail is a genuine alternative to using congested roads and has the great potential to become part of the backbone of Oxfordshire's transport network.

The railway is an efficient way of commuting to work, travelling to business meetings and enjoying leisure days out, and high-technology science and research businesses can thrive and prosper if they have good access to an agile workforce, supply chains, customers and specialist knowledge from across the UK and internationally.

We are fortunate that there are some good direct rail connections from Oxford, although direct rail services from the enterprise zones around Didcot to other parts of the UK are limited to services towards London and Bristol.

Figure 4 shows that connections with London, Birmingham and Bristol are relatively good with frequent, regular services. Direct links with cities making up the northern powerhouse of England are less frequent, and often no more than hourly. Connectivity with eastern England and with international gateways is at best convoluted and unattractive, or even non-existent.

Figure 4: UK rail connectivity

It is notable that there is a lack of direct train services to important cities including Leeds, Liverpool, Nottingham and Cambridge, and to Heathrow and Gatwick airports.

Oxfordshire's transport network

The railway is an important part of our wider transport network, offering an attractive alternative to using the car for shorter-distance trips within the A34 corridor (Didcot, Oxford and Bicester), and facilitating longer-distance journeys by train rather than car.

The Great Western Main Line from Didcot Parkway is an alternative to the M4 motorway for journeys into central London, and to Bristol and South Wales, whilst the Cotswolds & Malverns Line broadly follows the A44 towards Evesham and Worcester. Travelling to the West Midlands by train from Oxford or Banbury is comparable to the M40 motorway, but with less stress and greater reliability. Figure 5 shows the primary road and rail network in Oxfordshire.

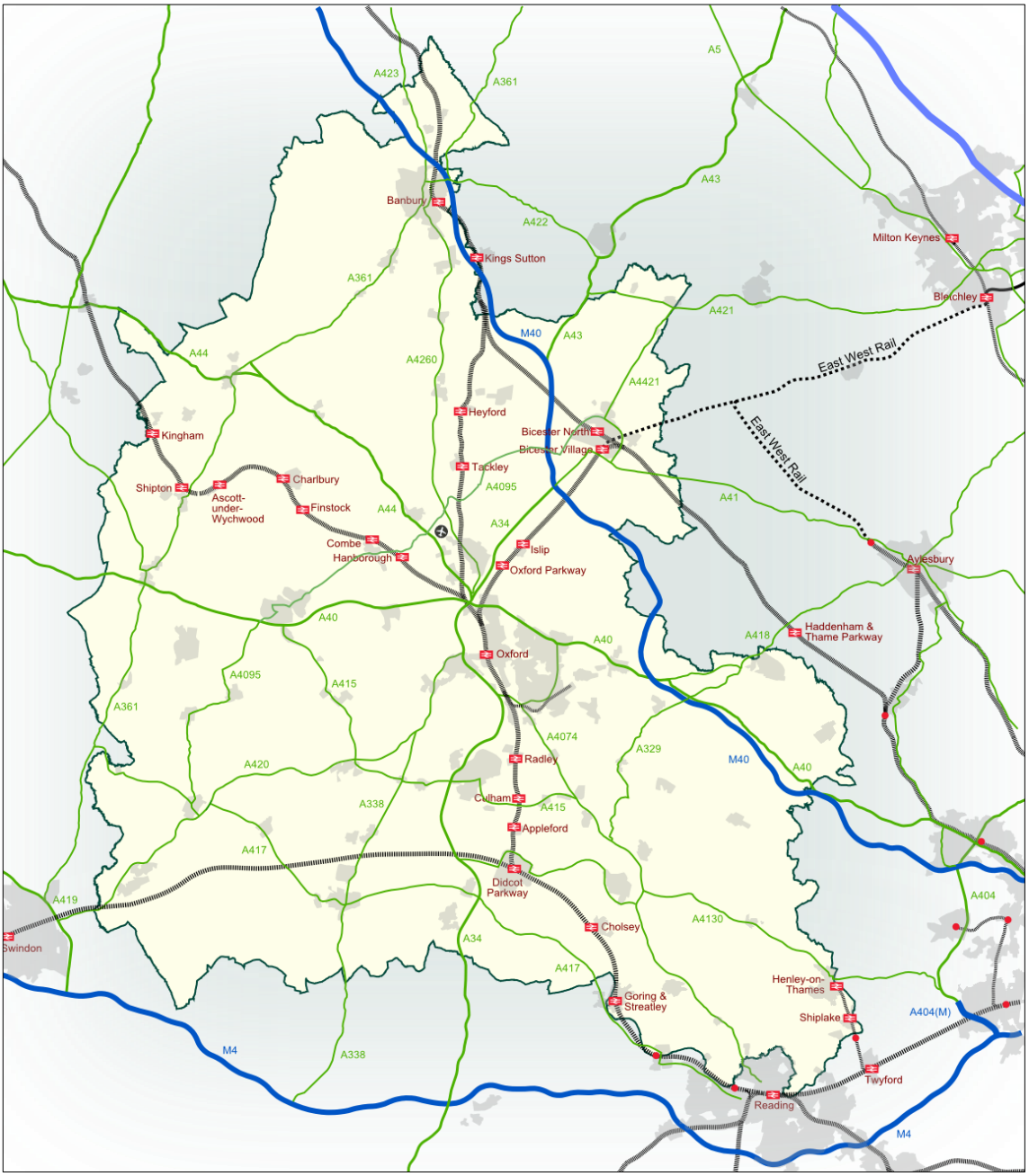


Figure 5: Oxfordshire's Strategic Transport Network

On some axis, and importantly the Oxford-Milton Keynes-Cambridge arc, the rail network does not provide direct links that are of comparable quality to travelling by road:

- Milton Keynes and the South East Midlands (Northampton and Corby);
- Central Buckinghamshire (Aylesbury and High Wycombe);
- East Anglia (Cambridge and Ipswich); and

- International hubs, such as Birmingham, Heathrow and Gatwick airports.

Although there are scheduled coach services to Heathrow and Gatwick airports, these are only available from Oxford or Lewknor at junction 6 on the M40. There is also a regular coach service from Oxford to Cambridge.

Oxfordshire's location means that its roads and its railways convey large volumes of traffic between the South East and the North, connecting the two national powerhouses. It has a vital role in the national economy. Of particular importance is the need to strike a balance between the need for local movements between places where people live and work, and accommodating strategic long-distance through travel by road or rail.

Rail Passenger Numbers

Rail as a means of travel is a success story. Passenger journeys nationally have soared by 70 per cent since 2002, and Britain's trains are filling up faster than anywhere in Europe. In Oxfordshire, we have seen above average growth of 92 per cent over the same period.

In part this is because more people are now considering rail as a more pleasant alternative to travelling on our increasingly congested road network. The level of growth we have seen in recent years shows no sign of slowing down and is now beginning to create problems of its own. In particular, peak-time overcrowding is commonplace into Reading and London Paddington, and the layout of track and signalling restricts the number of trains that can be operated, especially north of Didcot towards Oxford. Unless these constraints are removed they will become barriers that could stop the railways from fulfilling their potential to enable sustainable, economic growth.

The latest information on passenger numbers issued by the Office of Rail and Road covers the twelve months ending in March 2015 and can be summarised as follows:

- Number of passenger journeys at Oxfordshire stations: **17.59 million.**
- Rail usage at Oxfordshire stations has **increased by 92% since 2002.**
- **Five stations account for 89% of passenger journeys**: Oxford, Didcot Parkway, Banbury, Bicester North and Henley-on-Thames.

Error! Reference source not found.shows that rail in Oxfordshire is a significant success story, and shows the entries and exits at each of the 22 stations in 2014/15 compared with 2002/03. Several railway stations are not located in Oxfordshire, but are used regularly by residents of the county. **Error! Reference source not found.** summarises the total passenger numbers at these stations – although it should be remembered that only a proportion of these users would live in Oxfordshire.

Table 7: Railway Station Usage – Oxfordshire Stations[1]

Station	2002/03	2014/15	% Change
Oxford	3,651,099	6,850,857	+88
Didcot Parkway	2,049,057	3,574,826	+74

[1] Source: Office of Rail and Road

Banbury	924,617	2,698,924	+192
Bicester North	634,639	1,696,402	+167
Henley-on-Thames	675,868	771,406	+34
Goring and Streatley	358,047	401,356	+12
Charlbury	235,592	305,284	+30
Cholsey	216,785	272,430	+26
Bicester Town#	54,278	207,896	+283
Hanborough	71,934	243,568	+239
Kingham	124,661	180,536	+45
Radley	56,728	138,896	+145
Shiplake	103,402	92,580	-10
Culham	35,259	63,210	+79
Heyford	28,187	38,068	+35
Islip#	19,689	27,018	+37
Tackley	19,383	22,612	+17
Appleford	7,284	7,738	+6
Shipton	5,098	4,884	-4
Ascott-under-Wychwood	1,613	4,026	+150
Finstock	1,796	1,804	0
Combe	1,559	1,248	-20
Total	9,176,575	17,585,409	+92

Table 8: Railway Station Usage - Non-Oxfordshire Stations[2]

Station	2002/03	2014/15	% Change
Haddenham and Thame Parkway	379,970	762,680	+101
Tilehurst	387,422	546,658	+41
Pangbourne	344,056	431,404	+25
Kings Sutton	39,745	63,340	+59
Total	1,151,193	1,804,082	+57

Origins and Destinations

Ticket sales data provided by GWR gives an insight into the journeys that Oxfordshire rail passengers are making. Figure 6 shows the destinations of passengers travelling from eight selected Oxfordshire stations. Not surprisingly the most popular destinations are the places that have a direct train service to and from the station, for example Bicester North and Henley-on-Thames to central London, or between centres of employment within or just outside the county boundary, such as Charlbury to Oxford or from Didcot to Reading.

Due to route modernisation, Bicester Town and Islip stations were not open during 2014/15, and passenger numbers shown are for 2013/14.

[2] Source: Office of Rail and Road

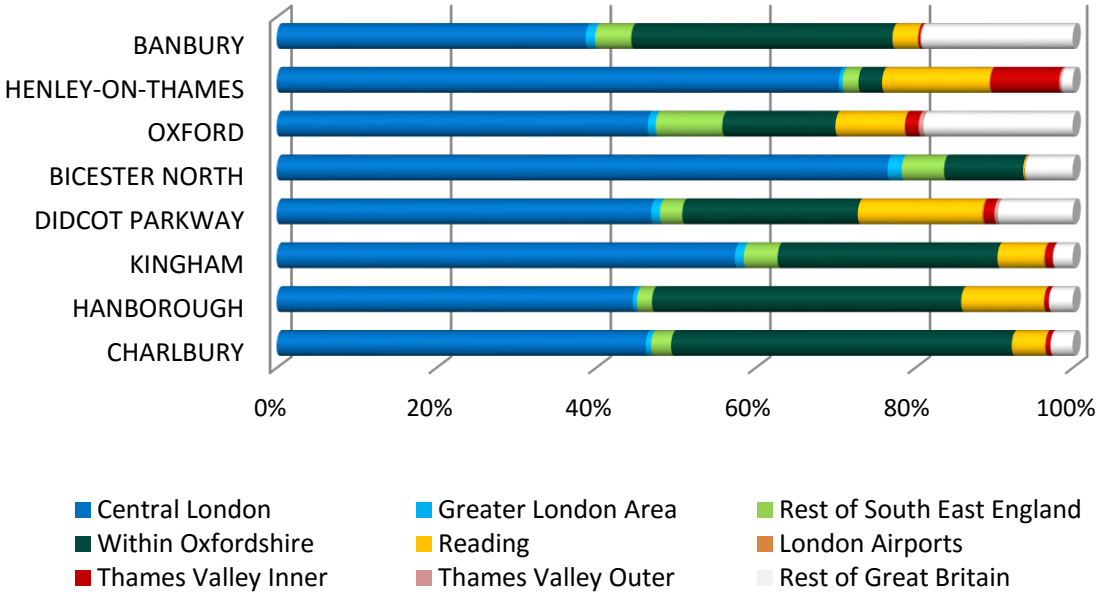


Figure 6: Destinations of passengers boarding at selected Oxfordshire stations (2014/15)[3]

The predominance of London revealed in the ticket sales data was supported by Census travel-to-work data that records the work destinations of Oxfordshire residents. According to the 2011 census, the capital is the most popular work destination outside the county from all five district areas. After that, the pattern of travel reflects historical geography with travel from the southern area of the county dominated by Reading (to the east) and Swindon (to the west), whilst there is already a strong relationship between Cherwell and Milton Keynes – a link that will be strengthened further with East West Rail.

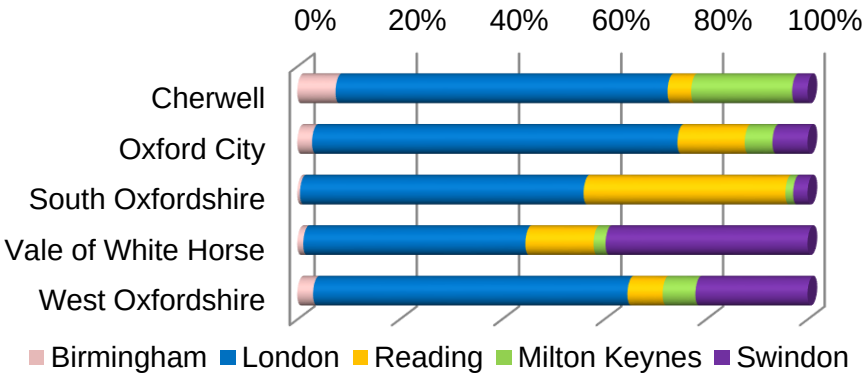


Figure 7: Top five work destinations outside Oxfordshire[4]

Passenger satisfaction

Tables 9 and 10 show how the three train operating companies compared against some key indicators. The results are for the whole franchise and not just Oxfordshire, but show how passengers view existing services.

Table 9: Summary of Passenger Satisfaction with Stations[5]

[3] Source: Great Western Rail/LENNON
[4] Source: 2011 Census
[5] National Rail Passenger Survey – Autumn 2015 (Transport Focus)

Performance Measure - Stations	Chiltern Railways	Great Western Railway	Cross Country
Overall satisfaction with the station	88%	81%	88%
Ticket buying facilities	80%	80%	85%
Provision of information	85%	85%	90%
Connections with other public transport	79%	73%	80%
Facilities for car parking	72%	59%	55%
The availability of station staff	64%	70%	77%

Table 10: Summary of Passenger Satisfaction with Trains

Performance Measure - Trains	Chiltern Railways	Great Western Railway	Cross Country
Overall satisfaction with the train	92%	81%	84%
Punctuality / reliability	90%	79%	86%
Journey time	88%	85%	86%
Value for money	52%	53%	58%
Sufficient room for passengers to sit/stand	71%	67%	66%
How well train company dealt with delays	54%	45%	54%

Car parking scores less than connections with other forms of public transport, mainly due to the added cost of parking and limited availability. There is general satisfaction with ticket buying facilities but station staffing is seen as an issue. The relatively low satisfaction levels with value for money for the price of the ticket probably reflects dissatisfaction with the Government fares policy where passengers using the railway are now expected to pay more of a contribution towards the cost of running the railways than the taxpayer.

Figure 8 shows the overall passenger satisfaction for the three train operators compared against the national average. Our three train operating companies are currently above the national average.

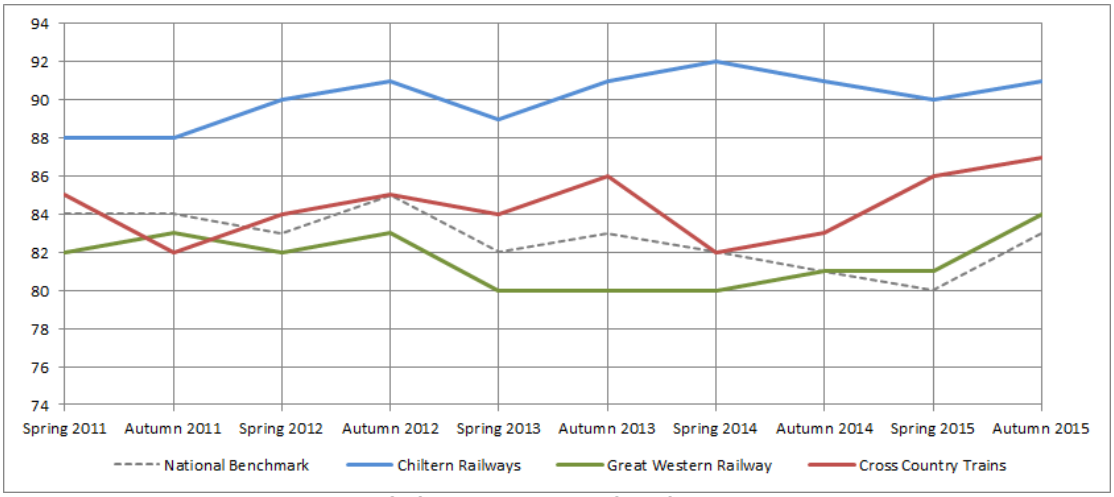


Figure 8: Overall Passenger Satisfaction Trend

Road capacity

Oxfordshire already suffers from a high volume of through traffic which can result in delays to local road journeys. As new housing and jobs are created it is increasingly important to have the essential connectivity needed to support Oxfordshire's economic prosperity. More commuting and business travel will add pressure to an already congested road network; it will make journeys slower and unreliable, and create more traffic congestion.

As the focus of housing and employment growth will be through the Oxfordshire Knowledge Spine between Didcot, Oxford and Bicester, the railway can potentially provide an efficient and sustainable alternative as part of an integrated transport network. It can link all three growth areas without adding traffic to the nationally-important A34 which is used by up to 70,000 vehicles per day, including many lorries from to/from the Port of Southampton.

Railway capacity

Congestion is not a problem unique to road travel, however. Many trains into urban centres such as Reading and London are becoming overcrowded at the busiest times of day and it is increasingly difficult to get a seat during peak periods on weekdays.

As well as on-train crowding, there is limited infrastructure capacity on the rail network. Between Didcot and Banbury, and through Oxford station itself, the physical extent of the network with only two main tracks and two through-platforms means that it is now very difficult to increase the number of trains without major investment. This constraint will become a major constraint to potential growth in the enterprise zones and the Knowledge Spine that underpins our growth strategies.

What is passenger capacity?

Capacity does not refer to on-train seating capacity alone, but seating plus an allowance for standing room (one passenger per 0.45 m^2). Transport for London define the level of crowding as the typical number of passengers standing per square metre, and considers crowding to be 'high' when there are three or more passengers per square metre.

Demand vs. Capacity

Forecast rail passenger demand for Relief Line services between London Paddington and Reading shows that with the introduction of Crossrail services, there is sufficient capacity to accommodate the forecast demand until 2023. Beyond 2023, additional capacity will be required, and this will need to increase again from 2026 to meet demand following the opening of the proposed HS2 station at Old Oak Common.

Beyond 2024, the forecasts suggest an increase in rail passenger demand into London Paddington of 298% on Relief Line services and 99% on Main Line services to 2043.

Table 11: Market Study rail passenger demand forecasts (0700-0959)[6]

Service Group	2012-2023	2012-2043
Demand growth into London Paddington on Relief Line 'Inner Suburban' services	198%	298%

[6] Source: London & South East Market Study (Network Rail, 2013)

Demand growth into London Paddington on Main Line services	29%	99%

Table 12 shows the anticipated capacity provided in 2019 with predicted demand for 2023 and 2043. It also shows that extra capacity will be required to accommodate forecast rail passenger demand and minimise on-train crowding in 2023 and 2043.

Table 12: Three-hour peak Main Line arrivals into London Paddington (0700-0959)[7]

Service Group		Total capacity assumed 2019	2023 estimated demand	2043 estimated demand
15x Oxford	6 suburban stopping services	2,880	2,000	3,000
	6 fast from Oxford	2,160	1,300	2,000
	3 from Worcester	1,890	1,600	2,400
3x Cheltenham via Swindon		1,890	1,700	2,600
6x Bristol Temple Meads via Bath Spa		3,762	4,000	5,300
5x Bristol Temple Meads via Bristol Parkway		3,150	2,500	5,000
6x from Swansea		3,762	3,900	5,700

Analysis has shown that at London Paddington the three-hour morning peak period (0700-0959) and the three-hour evening peak period (1600-1859) have similar levels of demand.

Table 13 shows that additional capacity will be required by 2023 to accommodate demand and minimise on-train crowding on Main Line services into Reading from the Didcot corridor into Reading, and on-train crowding is forecast on Cross Country services from the North of England passing through Oxford. By 2043, the majority of services into Reading will require additional capacity.

Table 13: Three-hour peak arrivals into Reading (0700-0959)[8]

Service Group	Capacity Assumed	Estimated Demand	
	2019	2023	2043
6x Relief Line - calling at all stations between Didcot and Reading	2,844	2,100	3,100
12x Main Line - either from Oxford (3x) or Swindon (9x)	7,542	8,400	12,800
4x Cross Country	773	1,000	1,400

[7] Source: London & South East Market Study (Network Rail, 2013)
[8] Source: Regional Urban Market Study (Network Rail, 2013)

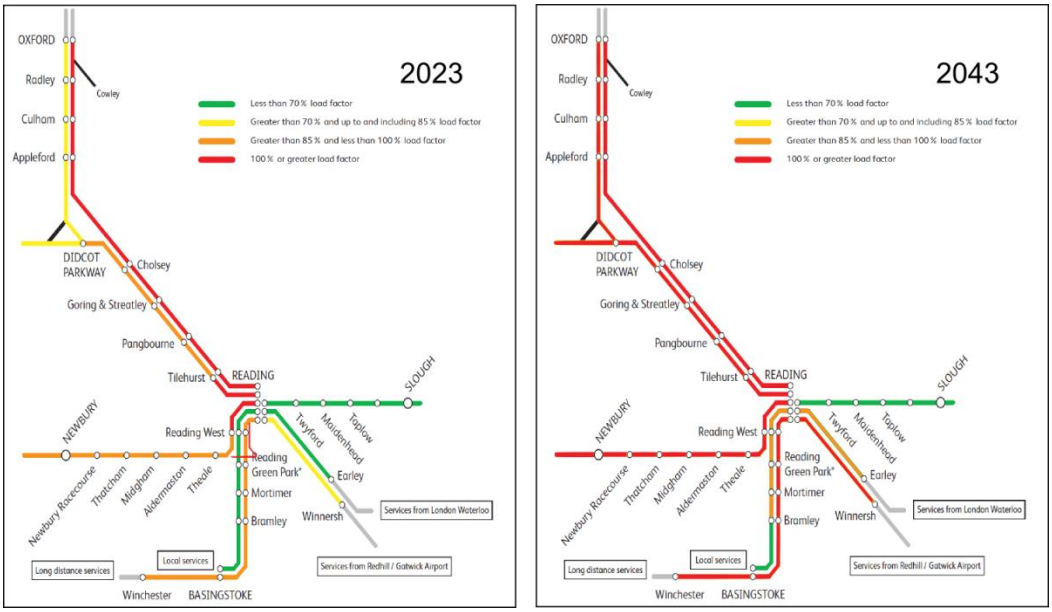


Figure 9: Average peak-hour loadings into Reading (0800-0859) *(Network Rail)*

Optimising the use of the available track capacity of the lines into Reading and London Paddington through train service and infrastructure enhancements will be necessary to meet future demand and mitigate on-train crowding. It will shape the pattern of services in the Outer Thames Valley in the years ahead.

Oxfordshire Demand Forecasting Study

In 2013, the county council commissioned work to assess the likely increase in patronage arising from the committed investments planned up to 2019. These include electrification, East-West Rail and Crossrail. The objective of the study was to understand the increase in passenger demand resulting from population and employment growth and fuel prices, as well as scheme specific growth.

The results indicated that passenger demand at Oxford could increase by 68%, or 3.3 million journeys, by 2026, with most of this growth being generated by new rail investment, such as East-West Rail and the introduction of Super Express Trains. The greatest overall increase is expected between Oxford and London, where a choice of routes and increase in services resulting from the opening of East West Rail (Phase 1) and a new Oxford Parkway station, will generate 47% more demand, or over 1 million annual trips.

East West Rail (Phase 2) will generate half a million new rail trips linking Didcot, Oxford, Bicester and continuing to Milton Keynes and Bedford. Western Rail Access to Heathrow is expected to generate around 200,000 new rail journeys.

Rail Industry Long-Term Planning Process (LTPP)

The Long Term Planning Process builds on previous rail industry planning work that culminated in publication of Network and Route Utilisation Strategies (RUSs) in 2010/11. The purpose of the long-term planning process is to set out a strategic vision for the rail network for the next 30 years by planning the long-term capability of the network and providing choices to funders, primarily the government, that deliver capability and meet capacity.

Its four strategic goals are to:

- Enable **economic growth**
- Reduce **environmental impact**
- Improve **quality of life** for communities and individuals
- Improve **affordability**

The LTPP considers planned economic and population growth, government and industry aspirations, and the need to meet passenger and freight demand in Control Period 6 (2019-2024) and beyond. The LTPP is a key part of the evidence base for future investment in the rail network.

Market Studies

In 2013, Network Rail published four Market Studies which include demand forecasts for likely passenger and freight traffic at 10 years (2023) and 30 years (2043). The capacity and capability requirements for the railway to meet the forecast demand are presented as conditional outputs, which set out the aspired levels of service in terms of frequency and/or journey time and/or passenger capacity. The key requirements for the Thames Valley can be summarised as:

1. Provide sufficient capacity for passengers travelling to Reading to 2043
    - 25% increase by 2024
    - 90% increase by 2043
2. Provide sufficient capacity for passengers travelling to London Paddington to 2043
    - 30% increase by 2024
    - 100% increase by 2043
3. Provide capacity for growth of all freight commodities to 2043
4. Provide better access to Heathrow Airport and HS2 interchange
    - Aspiration for sub-hour journeys to airport
5. Better access to tourist infrastructure and educational establishments
6. Improve connectivity with regions other than London

Capacity relates to the ability of the infrastructure and rolling stock to meet the demands placed upon them, including layout of track and junctions, length of platforms, stations or signalling , the number and length of trains and the availability of seating. Capability is defined as the ability of the rail network to satisfy the needs of passengers, including journey times, service frequency, fares and ticketing, accessibility, station facilities, staffing and security.

Western Route Study

The Western Route Study is a key part of Network Rail's Long Term Planning Process and translates the outputs from the market studies into a train service specification that meets the capacity and connectivity requirement in 2023, 2033 and 2043 for a geographical route, but subject to further feasibility into affordability and deliverability.

The baseline for the Western Route Study includes those schemes that had funding committed in Control Period 5 (CP5, 2014-2019), and are therefore assumed to have been delivered by 2019, including Crossrail and East West Rail (Phase 2). It also includes major projects that will require significant changes on the existing railway network over the next ten years, such as the Western Rail Link to Heathrow and High Speed 2.

The 2019 baseline used for the Western Route Study has already altered following the Hendy Review of Network Rail's Control Period 5 enhancement programme, but with the study having a longer-term view, the implications are limited to when the committed schemes are delivered rather than the need for them. The exceptional growth seen since the mid-1990's is forecast to stabilise but will continue and it the railway it is important that further capacity is provided up to 2043.

The Route Study gives priority to schemes necessary to accommodate passenger and/or freight demand before 2024, and/or where there is an opportunity to bring forward a scheme to achieve more cost effective delivery, and/or where funding priorities require earlier implementation. By doing so, it informs the development of the Initial Industry Advice for Control Period 6 (CP6, 2019-2024), and sets out a longer-term investment strategy.

Delivering Capacity in the Outer Thames Valley

Initially the focus will be on how to make the best use of the existing network before identifying options for new infrastructure. There are several different ways to optimise the capacity available on the existing network and the following options are likely to be considered:

- **harmonising train speeds and rolling stock capabilities** so faster trains are not hindered by slower trains using the same track;
- **optimising calling patterns** to support the delivery of overall requirements;
- **the ability to handle high passenger volumes at key stations**, such at London Paddington and Reading;
- **minimising conflicts** caused by trains crossing or merging from one line to another by ensuring that all trains using the Main Line tracks have the same calling pattern and are capable of 125mph; and
- **increasing train length and train occupancy** with services at intermediate stations served by 4-car or 8-car trains, using the Relief Line to Reading, and with Oxford and Didcot Parkway served by 12-car trains using the Main Line. Platform lengthening will be required at every station between Radley and Tilehurst (inclusive) to accommodate these longer trains.

These options alone will not deliver the change required to meet future demand and new infrastructure will have to be considered. Physical constraints already exist on the approach to London Paddington, due to track layout and capability of the junction at Ladbroke Grove. The Main Line capacity east of Airport Junction (where the line to Heathrow Airport joins the main line) means there is minimal capacity to operate additional train services and that may require a revised junction layout to create capacity for higher-capacity long-distance services from the Outer Thames Valley.

Other new infrastructure may include extra platforms, additional tracks, grade separation to remove conflicting movements, revised junction layouts, line speed improvements and train depots or overnight stabling facilities.

Chapter 4

Rail Priorities

Introduction

Rail has the potential to play a much bigger part in meeting the Oxfordshire growth agenda, particularly as an alternative to the A34 for connecting our three main growth areas; Didcot, Oxford and Bicester. The county council has worked with Network Rail as part of their long term planning process and acknowledges there are various constraints on the rail network which restrict the ability to achieve more frequent or faster train services.

This chapter identifies our priorities for dealing with these constraints so the full potential of the railway can be realised in Oxfordshire. Our strategic rail priorities include:

- Supporting the development and delivery of East West Rail Phase 2 and progressing future phases working with Network Rail and the East West Rail Consortium;
- Increased passenger and freight capacity between Didcot and Oxford, including opportunities for an expansion of Culham station;
- Promotion of a major upgrade to Oxford station, including additional platforms, through lines and a new station building and transport interchange;
- Development of the next stage of upgrades to Didcot Parkway, including new multi-storey car park, northern entrance and new station building;
- Reopening the Cowley Line to passenger services, with new stations to serve the Oxford Science Park and Oxford Business Park;
- Promotion and support for direct rail services from Oxford and Didcot Parkway to Heathrow Airport;
- Supporting further capacity and service enhancements on the North Cotswold Line;
- Better integration of rail and strategic bus networks as part of Science Transit;
- Enhancing access to local rail stations by supporting appropriate expansion in car parking and the provision of secure and accessible cycle parking;
- Development of a business case for a proposed new station in the Grove/Wantage area.

Priority Projects

East West Rail

East West Rail is vital to Britain's economic success, and will establish a strategic railway connecting the Thames Valley with the South East Midlands and East Anglia. It is a vital missing piece in our country's strategic rail network, and will improve connectivity in the region by establishing a rail route from Oxford to Ipswich via Milton Keynes, Bedford and Cambridge.

East West Rail will lead to the restoration of a strategic transport corridor of regional and national significance - essential to drive growth in the economy of England.

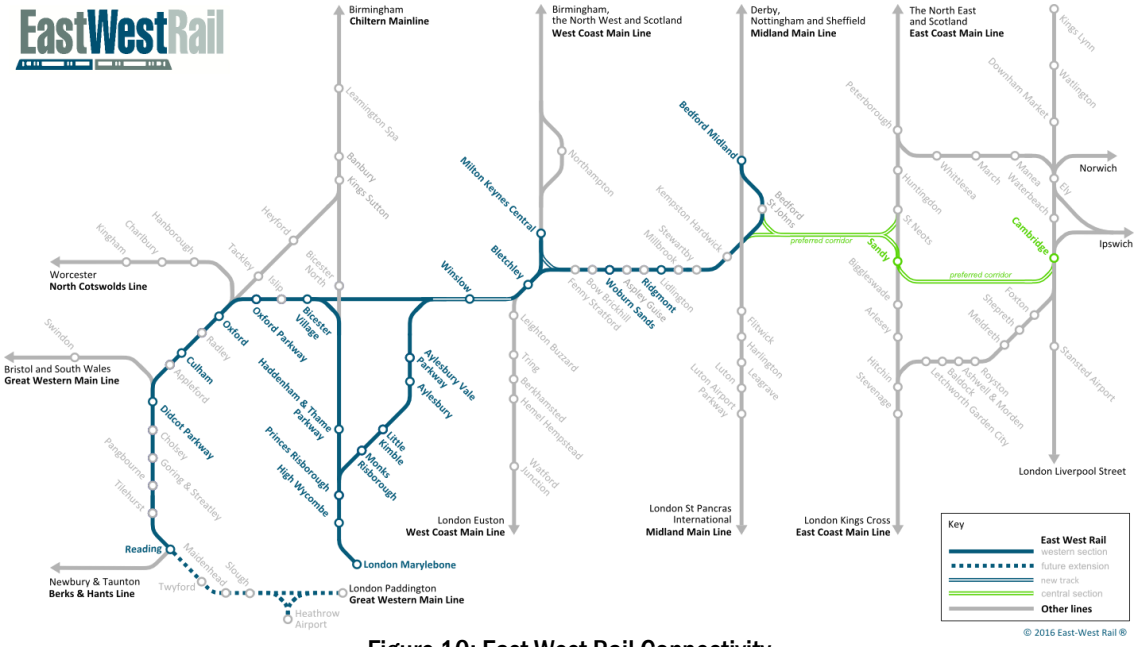


Figure 10: East West Rail Connectivity

The project will:

- Provide a strategic east-west route linking key centres of economic activity;
- Support ambitions for economic growth based on the creation of new jobs and the development of major areas of new housing; and
- Provide a connection between six radial rail routes out of London facilitating journeys without the need to travel through central London.

The project has been promoted by the East West Rail Consortium since 1995, and it is now working in partnership with Network Rail. It has support from Local Enterprise Partnerships in the South East Midlands, Oxfordshire and Berkshire Thames Valley; and strong political support in Westminster from an All-Party Parliamentary Group.

East West Rail is an important priority for government. In his 2016 Budget, the Chancellor announced that the National Infrastructure Commission will carry out a study to assess the strategic infrastructure priorities needed to unlock further growth, jobs and housing along the Cambridge, Milton Keynes and Oxford corridor.

The corridor contains four of the UK's fastest growing places, with global centres of science research expertise in Oxford and Cambridge and advanced manufacturing and logistics in Milton Keynes. The government wants to maximise the potential of the corridor as a single, knowledge intensive cluster that competes on a global stage, whilst protecting the natural environment and securing the homes and jobs. The study will review the economic case for investment in the Oxford to Cambridge corridor.

Western Section - Phase 1

Phase one started as a franchise commitment from Chiltern Railways, and they developed plans to upgrade the railway between Oxford and Bicester as part of a proposal to introduce a new train service between Oxford and London Marylebone.

A Transport & Works Act Order was submitted in 2010, followed by two public inquiries in 2011 and 2012. The Secretary of State for Transport granted permission to start work on the upgrade in October 2012 and was finally confirmed in the High Court in May 2013 after a judicial challenge by opponents to the upgrade was dismissed.

The upgrade was brought into the main project when the Department for Transport sought additional capability for the route, and a collaboration was created with Chiltern Railways, Network Rail and the East West Rail Consortium taking a joint project approach to ensure cohesive planning and more efficient delivery.

Construction work has included a new 1km section of railway to join the Chiltern Mainline with the East-West Rail line where they cross in Bicester and doubling over 18km of track along with the closure of 37 level crossings to improve safety, the construction of new road bridges and footbridges, and increasing the speed that trains can travel to 100mph. A new station has been built at Water Eaton called Oxford Parkway and a larger station has been built in Bicester and in Islip.

The train service commenced from Oxford Parkway to London Marylebone in October 2015 serving the rebuilt Bicester Town station (now renamed Bicester Village) with some trains also serving Islip. It is expected to deliver significant economic benefits for people living and working along the route and re-establishes a rail link between High Wycombe and Oxford. It is expected that services will be extended into Oxford from December 2016.

Western Section - Phase 2

The second phase will further improve connectivity by upgrading the mothballed section of railway between Bicester and Bletchley (including reinstating a section where the track was removed) and upgrading the freight-only track between Aylesbury and Claydon.

Phase 2 gained government support from the Chancellor of the Exchequer in the Autumn Statement 2011. It was subsequently included as a committed scheme in the Department for Transport's High Level Output Specification and funding was allocated in Network Rail's enhancement expenditure for 2014 to 2019.

The new train service on East West Rail is vital to support planned housing developments and the creation of thousands of new jobs. We envisage two trains each way every hour between Reading and Bletchley, with one train going to Milton Keynes and the other train going to Bedford. An hourly service between London Marylebone and Milton Keynes via Aylesbury is also proposed. The journey time from Oxford to Milton Keynes will be about 40 minutes. East West Rail will link Didcot, Oxford and Bicester.

An alliance comprising of Atkins, Laing O'Rourke, VolkerRail and Network Rail will design and construct Phase 2. Development work will continue to finalise the scope and develop more detailed designs with the aim of submitting a Transport & Works Act Order application to the Secretary of State for Transport in spring 2017 to gain the necessary permissions to carry out the upgrade. A joint delivery approach means that the combined expertise of Network Rail and the local authorities within the East West Rail Consortium is being used to accelerate delivery of the project.

The county council will support the development and delivery of East West Rail Phase 2 and will take an active role in the Joint Delivery Board working with Network Rail and East West Rail Consortium.

Didcot – Oxford Capacity Improvement

"The single biggest barrier to economic prosperity in Oxfordshire is the lack of capacity on the rail network forming the backbone of the Oxford Knowledge Spine, between Didcot and Oxford."

Didcot East is the point where the four tracks from Reading become two sets of tracks that diverge north towards Oxford and west towards Swindon. The railway between Didcot Parkway and Oxford is struggling to handle the number and mix of train services using the two-track railway, creating a 10-mile bottleneck on a major arterial route used by long distance freight and passenger trains linking the South with the Midlands and the North.

The line has a theoretical capacity of 11 trains per hour in each direction, assuming all trains have the same speed characteristics. This is not the reality as a train calling at the intermediate stations or a freight train will use considerably more capacity than a non-stop passenger train, as shown in Figure 11.

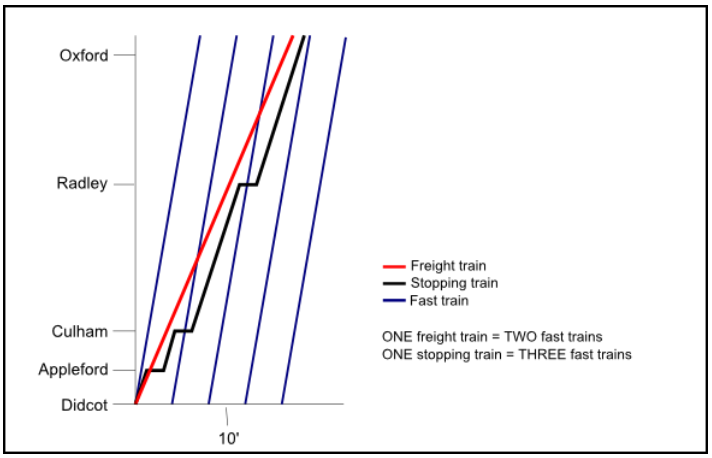


Figure 11: Track capacity utilisation by train type

The rail industry's long term planning work to 2043 has identified the capacity constraints as:

- The configuration and number of platforms and track layout at Oxford station creates conflict as trains generally arrive into the only through platform on the west side of the station, regardless of the route they take after departing the station. This creates conflict where the lines diverge north of the station;
- The variable speed and calling pattern of services between Oxford and Didcot, and between Didcot and Reading on the relief lines uses capacity and means these tracks are operating at near capacity ;
- The frequency and speed of services that need to cross from the main lines to the relief lines at Didcot East for services towards Oxford, which conflict with services heading towards London – much like a car turning right into a side road; and

- The future capacity at Oxford North Junction expected because of the new services planned to operate once the East West Rail route opens.

CrossCountry trains already use the slower relief lines between Reading and Didcot to avoid having to cross from the main line to the relief line tracks at Didcot East, and this adds time to the journey through this section.

Recognising the bottleneck is a significant issue, an Oxford Corridor Capacity Improvement scheme was to be delivered in the Network Rail enhancement programme for 2019-2024. Following the Hendy Review the scope was reduced to focus on delivering only the work needed to allow the Chiltern Railways service from Marylebone to be extended from Oxford Parkway into Oxford station, and for resignalling prior to future electrification.

If the existing infrastructure means it will not be possible to alter the stopping pattern of existing services to stop at more stations, or to run new services beyond those currently planned for 2019, it will have a major impact on the ability of Oxfordshire to grow its economy over the next decade.

Without extra infrastructure, Oxfordshire residents and businesses will not reap the benefits from East West Rail or the new western rail link into Heathrow Airport for many years, even though both projects will be complete.

- It will not be possible to introduce new inter-regional services to the East Midlands and South West without the provision of four tracks south of Oxford station, together with changes to the platforming of services at Oxford station. This creates the need to build a fourth through platform to enhance overall capacity.

- Neither will it be possible to add new services between Oxford and Heathrow Airport as part of connectivity improvements to provide a direct rail service from Oxfordshire without a grade-separated junction east of Didcot. The potential extension of services from Heathrow Airport may also drive the need for train stabling facilities near Didcot, bringing with it new skilled engineering jobs.

The kind of major infrastructure required can take many years to develop, which is why we are urging Network Rail to start planning now so they are ready to start delivering the infrastructure for these extra services in the early years of Control Period 6 (CP6, 2019-2024). The planned levels of growth, particularly in our enterprise zones, rely heavily on better connectivity and the ability to access new job markets and attract highly-skilled people. Our aspiration is to have four trains per hour between Oxford and Didcot (Science Vale) to support housing, retail and employment growth in these locations. Oxford cannot wait another 10 or 15 years for the rail infrastructure it needs to allow more services to reach the city.

One scenario may be to stage the enhancements but if so, all stages should be planned together and delivered without a lengthy delay between each stage, as follows:

- Stage 1- A firm commitment to deliver a major upgrade of Oxford station before 2024, including two additional tracks between the station and a point north of Radley, which can be built within the existing railway boundary. This will unlock the potential to develop the Cowley line for new passenger services.
- Stage 2 – a flyover or dive-under east of Didcot to reduce conflicting movement along with extra tracks to separate traffic flows (rather than sharing a section of track with other services);
- Stage 3 – two additional tracks between Didcot East and Radley, paired by speed to optimise capacity, with new infrastructure south of Oxford to separate and manage the flow of traffic that diverges north of

Oxford. The existing tracks would become the relief lines used by higher frequency services to Culham and Didcot, including East West Rail services, with the new main lines used by CrossCountry and fast services from Oxford to Reading, cutting five minutes from their journey time over this section.

It is critical for the economy of Oxfordshire and the United Kingdom that the rail industry rises to the challenge and removes these constraints by delivering the infrastructure to allow free movement of goods and people on this strategic section of the national network. Growth in intermodal freight and passenger services must not be supressed until 2025 or even 2029 if we want to maintain and grow our competiveness at home and abroad.

Other complementary measures may involve improved operational flexibility by increasing the maximum speed on the relief lines between Didcot and Reading so it is similar to the main lines to minimise the time difference between using either set of tracks. Also, in the short term, it will become increasingly important to make better use of the available capacity, with freight and passenger services considered on an equal basis. If station usage shows a trend of low use with limited potential to increase, freight will be a better use of the capacity – shifting freight onto rail results in fewer lorry movements, less congestion and better road safety overall. Where there is strong passenger use, or planned development, the level of service at those stations should be sufficient to encourage greater demand.

The county council expects Network Rail to deliver the infrastructure that is needed to support economic growth in the Oxford Knowledge Spine, and specifically to enable introduction of new train services to Heathrow Airport, and destinations on East West Rail, at the earliest opportunity in Control Period 6.

We will work with local partners including the Local Enterprise Partnership to support the rail industry in bringing forward firm proposals that add capacity and capability to the rail network.

Oxford Station

Oxford station has been recognised as being a major constraint within the Didcot-Oxford corridor, and its limitations affect the reliability of trains on the strategic national rail network. It is a major obstacle to dealing with the suppressed demand for rail travel and without expansion it will hinder economic growth in Oxfordshire.

The existing single-storey station building has limited passenger circulating and waiting space, basic facilities and a poor retail offering. It gives a negative first-impression for visitors to a world-class city. At the busiest times of the day it is difficult to move freely around the station, with crowding around the footbridge and ticket barriers. This may worsen with the introduction of new services to London Marylebone in 2016 and to Milton Keynes a few years later.

The operational bottlenecks are the track layout on the approaches to the station, which restricts flexibility of operation by requiring trains to cross the path of other trains north and south of the station to optimise use of the existing platforms, and the lack of through platforms. It is common for trains to be delayed waiting for a platform to become available due to the headway of trains in the timetable and terminating trains that can take several minutes to vacate a platform once passengers have alighted.

The County Council, Oxford City Council and Network Rail have worked together on a long-term vision for major improvement to the station and the public space around the station. The Masterplan was launched in July 2014, and its main features include:

- A new multi-level station building built over the railway on the north side of Botley Road;
- Two additional through platforms by creating two island platforms connected to the station building by lifts and escalators;
- A transport interchange for buses, taxis and cyclists;
- A multi-storey car park;
- Improvements to Botley Road bridge to allow widening of the carriageway and provision of new footpaths and cycle ways. It will also carry the extra tracks needed to serve the new platforms;
- Commercial development, with opportunities for food and beverage establishments, fitness and office accommodation; and
- higher quality public space, in and around the station.

The ambition of the masterplan is to create an exemplary gateway to the city and its delivery is vital to the city's plans for economic growth and regeneration. Along with other planned rail investments, the masterplan will transform Oxford Station into a major rail interchange, with improved facilities to meet passenger expectations. Once seen as the end of the journey for services from London, there will in future be more through services and the station needs to expand to accommodate an increase in train services and passenger growth.

Whilst the masterplan stands well as a concept, the redevelopment and expansion of the station will be driven by a clear need for additional rail capacity through Oxford that will allow the railway to evolve in support of the national and regional growth agenda. Resolving the network blockage through Oxford will act as the enabler to unlock a number of key projects in addition to the expansion of the station itself. Enhanced East West Rail and CrossCountry services, through services to Cowley and a further upgrade of the Cotswold Line become possible once the constraint is removed.

There remains a fundamental gap between what Network Rail is currently looking to provide by 2019 and what the station needs. In part this is caused by the way Network Rail is funded to deliver enhancements in five-year control periods. Their focus is therefore on delivering schemes that have funding secured. In the case of Oxford station, it is preventing progress on developing and planning the long-term solution.

Oxford station needs one comprehensive project that brings together the operational needs of the railway to improve capacity and performance and the spatial ambition set out in the masterplan, supported by a robust and affordable business case that all stakeholders can get behind.

There is a once-in-a-lifetime opportunity to remove a bottleneck that prevents growth in freight and passenger services and will increasingly threaten the local and national economy. A station development group could be formed to develop a single scheme, raising its profile and making sure its importance is clearly understood by planners, decision makers and funders. It should be recognised as being a nationally significant project and necessary to underpin delivery of UK government economic and transport policy.

The county council supports the establishment of a local development group with the aim of bringing together rail-industry projects and the spatial masterplan into a single plan, and to oversee development and delivery of the plan with the aim of securing full investment in Control Period 6.

We will support Network Rail in deferring (and ring-fencing) investment from Control Period 5 to Control Period 6 to enable partnership work to continue on a developing a plan to deliver a single overall solution.

Didcot Station

Didcot, with a current population of over 26,000 is the main growth area for Science Vale in Southern Oxfordshire, and contains the highest concentration of multi-million-pound science research facilities in Europe. It has two enterprise zones – Science Vale (Harwell and Milton Park) and Didcot Growth Accelerator, which are the catalyst for employment growth and help to attract significant government spending. It also means the district councils can retain business rates, all of which will lead to £120 million of funding towards infrastructure around Didcot.

The town was awarded Garden Town status in 2015 and there are plans for the accelerated delivery of up to 15,000 new homes and 18,000 new jobs by 2031.

The station is the gateway to Science Vale and 3½ million journeys were made at the station during 2014/15, representing average growth of 5.8% per annum over the past ten years. Assuming growth of 4% per annum, reflecting the 20-year national average, the number of journeys could easily reach 7 million a year by 2031.

An £8 million redevelopment of the station forecourt to create a multi-modal transport interchange, with better facilities for bus, cyclists and pedestrians was completed in 2014. A new 800-space multi-storey car park, funded jointly by the Local Growth Fund and the direct award franchise is due to open in summer 2017. A new accessible footbridge will link the car park with the station building.

The development of Didcot station is of strategic importance to Oxfordshire and the wider area and our long term vision is to transform the station into a strategic transport hub. To do so it will need further expansion to accommodate expected rail growth and to reflect its role as "a key gateway" as outlined in the Strategic Economic Plan.

We have identified improvements that seek to integrate the station with developments in the town and ensure a sense of arrival at the heart of Science Vale with clear links to the town centre, Milton Park and Harwell Oxford. They are:

- A **new station building** with a larger footprint comprising three floors and a modern glass façade. We envisage the ground floor having retail space for a convenience store, café and cycle hub, toilets and staff accommodation. The subway to Didcot Railway Centre would be retained. The second floor could have a large waiting area with café/shop, ticket office and toilet facilities along with staff accommodation; it will provide level access onto platform 1. The third floor will lead to a new footbridge that will connect the building to all the platforms and the proposed new northern station entrance. There could be staffed ticket barriers and circulating space, staff and management accommodation. Lifts and stairs would connect all floors and make the station fully-accessible.

- A **northern station entrance** to improve pedestrian and cycle access from the residential areas of Ladygrove and North East Didcot. We envisage this having an entrance hall with ticket rchasing machines and staffed ticket barriers with lift and stairs to either an extension of the existing subway or a new pedestrian bridge to the station building. The limited headroom and narrow width of the subway may be a constraint to future growth. There would be new footways and cycle paths as well as facilities for drop-off accessed from Cow Lane.
- An **integrated rail and bus network** based on the station interchange offering seamless connections available between bus and rail services as part of the Science Transit initiative, including smart ticketing and a commercially viable bus network.

There remains a need for improved connectivity with other areas of the country and to international markets to support population growth, global economic activity and business growth. In particular:

- **Increase mainline services** with additional peak time services to/from London, and a standard off-peak service of four trains per hour; Bristol via Bath Spa, Bristol via Bristol Parkway, Cardiff and Gloucester/Cheltenham;
- **Introduction of East West Rail services**, with half-hourly services linking three growth areas in the Oxfordshire Knowledge Spine, and with Milton Keynes and Bedford. From 2024 it may be possible for these services to be extended to Heathrow Airport by using the new Western Rail Link, giving international visitors to the high-tech science facilities a fast, direct journey; and
- **Reintroduction of Cross Country services** will provide direct links with the West Midlands and Birmingham Airport and to the core cities making up the Northern Powerhouse - Manchester, Liverpool, Leeds, Sheffield and Newcastle.

The county council will work with South Oxfordshire District Council, Network Rail and Great Western Railway to develop a masterplan for the station with the intention of making a strong case for investment during Control Periods 5 and 6, (CP5, 2019-2024 and CP6, 2024-2029).

We will continue to work closely with Network Rail on their long-term planning of the rail network to ensure that future enhancements are safeguarded and not frustrated. We will respond to rail industry consultations on future franchise requirements and will stress the importance of better connectivity with other areas of the UK.

Cowley Line

The county council commissioned an initial study to assess the capacity and capability for introducing a half-hourly passenger service to support job creation, business development and new housing. Two new stations are envisaged in the locality of the Oxford Science Park and Oxford Business Park. Using the standard rail industry method for calculating demand, we considered a number of different train service options, with those to Banbury and London shown to have the greatest potential to generate new rail trips. A through service to London had the best business case as the higher fares generated the most revenue. However, both service options failed to cover the cost of operating the service.

The study concluded that it would be challenging to create an operationally robust timetable due to the number of trains using the main line south of Oxford station and the layout at Kennington where northbound trains would have to cross all tracks.

Chiltern Railways, who had been consulted during our initial study, undertook their own assessment in 2015 looking at the possibility of extending one of their London Marylebone to Oxford services to provide an hourly weekday service with extra trains at peak times. However, an hourly service is not likely to attract many potential passengers when there are other, more frequent, travel options.

It was estimated up to 2,500 journeys each weekday could be generated, but off-peak and weekend demand was minimal. This reflects the primary focus on commuting with the stations being mainly employment destinations rather than places of origin. They concluded there is no business case for operating weekend services, even on an hourly basis unless their operating costs were offset against the more lucrative weekday service.

Both studies identified the intensity of use and lack of capacity on the tracks south of Oxford as being a major constraint to developing the branch line. This could be resolved by provision of extra track on the east side of the railway so trains to Cowley can operate independently without affecting the main line. This new infrastructure should form part of the Oxford Corridor Capacity Improvement scheme.

The County Council will support the rail industry as it develops proposals to add more capacity in the Oxford corridor, and will work with the Local Enterprise Partnership to consider funding opportunities.

North Cotswold Line Upgrade

Significant improvements have been made on the North Cotswolds Line in recent years and the completion of 20 miles of track redoubling in 2011 enabled the introduction of additional services. Passenger growth has been significant and journeys from the seven stations in Oxfordshire have increased by 67% since 2002 to 741,350. Exceptional growth has been seen at Hanborough (up 239%) and at the busiest station on the line at Charlbury (up 30%).

There is significant demand and further passenger growth is being supressed, by train capacity and by relatively poor access to rural stations. There is potential for further growth with the introduction of an hourly service in December 2018. New trains will bring increased capacity with additional seating and will also achieve faster journey times, with some services from Hanborough reaching London Paddington in 63 minutes.

We have a strategic aspiration to develop Hanborough station as a transport hub, and it can help to reduce congestion on the A40 as part of a package of public transport measures contained in our A40 Strategy. To fulfil its potential, the station will require a larger car park, footbridge and new platform so any trains extended from Oxford can terminate and turnaround. In supporting any proposal, we will carefully consider the routeing of station traffic to mitigate its impact on the local road network and surrounding villages.

Appropriate levels of car parking should be provided at other stations to meet the demand created by service improvements and encourage people to use their nearest station. We would also welcome improved cycling facilities, and bus links where there is demand for them to be provided on a commercial basis.

To fully realise the potential of the railway, further redoubling will be required at the eastern and western ends of the line, between Wolvercot Junction and Hanborough, and from west of Evesham towards Pershore. This would

allow up to three trains per hour to Hanborough and/or Chalrbury and two trains per hour between London and Worcester, with a journey time under two hours.

There are many level crossings on the route used and these will need to be assessed to ensure a safe, efficient and reliable railway, especially with any increase in train frequency and potentially also an increase in speed to achieve a faster journey time. A review of the smallest stations will need to consider how they may be served in future given the competing demands to improve end-to-end journey times and meet suppressed demand at the busiest stations.
In the longer term, once there is additional capacity on the line, it may be possible to reopen the old railway between Honeybourne and Stratford-upon-Avon. This would boost tourism in the Oxfordshire Cotswolds and give a direct rail link between the popular tourist destinations of Oxford, the Cotswolds and Stratford-upon-Avon. An initial feasibility study identified some engineering challenges and further development work will be required to find affordable solutions.

The county council supports in principle the development of Hanborough station, subject to an assessment of highway capacity and traffic impact, and will work with Great Western Railway and West Oxfordshire District Council to develop an acceptable proposal for expanding the station;

As highway authority, we will participate in a level crossing review, with the intent of reducing the number of level crossings to improve safety and reduce journey times.

We will support a review of the stations with an annual footfall of less than 100,000 journeys to look at their current and future role and the options for serving them in the future.

Access to Heathrow Airport

Heathrow is the UK's busiest airport and handles the most international passengers of any airport in the world. The airport has excellent connections to central London but there are limited options for rail passengers travelling to Heathrow Airport from other areas.

It will involve building a new 5.5km railway that will leave the Great Western Main Line between Langley and Iver before entering a tunnel to pass under the M4 and M25 motorways to join the existing rail lines at Terminal 5. Heathrow Airport Holdings (then BAA) had the foresight to build the rail station underneath Terminal 5 with spare platforms and the ability for train services to continue through them, making western access easier to achieve.

Figure 12: Western Rail Access to Heathrow (*Network Rail*)

A new rail link with the Great Western Main Line will provide a direct rail service for airport staff and for travellers travelling to and from Reading, Oxford, South Wales and Bristol (and until High Speed 2 is completed, also from the Midlands and beyond).

Oxfordshire is strategically located at the heart of the UK road and rail network, within an hour of Heathrow Airport - the UK's and Europe's premier global hub airport. Its proximity to Heathrow makes it a great place to locate and grow business.

The Civil Aviation Authority[9] has identified that annually 2.3 million passengers travel to or from Oxfordshire using London's five major airports, including 1.33 million passengers at Heathrow Airport.

The Strategic Economic Plan strives to create the conditions that make Oxfordshire the location of choice for the world's leading science and technology businesses. Crucial to achieving that will be investor confidence in efficient international connectivity.

A direct connection to Heathrow Airport is a business priority and a significant opportunity to grow the economy of Oxfordshire. Fast, reliable rail access is a determinant of investment decisions for businesses which operate in the global market and is critical to Oxfordshire's economic success – both now and in the future.

The benefits of a western access to Heathrow are:

- Improve business access to Heathrow Airport from Reading and Oxford - it is forecast that the rail market share from Oxford will increase from 4% to nearly 20% as a result of the faster journey - equating to 250,000 new trips by rail each year;
- Improve workforce mobility within the Thames Valley;

[9] Passenger Survey Report 2013, Civil Aviation Authority

- Reduce traffic congestion on the M4, M40 and M25 motorways and the A4; and
- Up to 6,000 jobs created and £30 million GVA

London Heathrow - average AM peak journey time		
Travel mode	Oxford	Didcot
Driving (via A34/M4)	80 minutes	60 minutes
Coach (Airline LHR)	90 minutes	No service
Fast train to Paddington then Heathrow Express	105 minutes	92 minutes
Fast train to Reading then RailAir coach	94 minutes	76 minutes
Western Rail Access to Heathrow (WRAtH)	55 minutes	45 minutes
Time saving - public transport	*-35 minutes*	*-31 minutes*

Figure 13: Comparison of journey time to Heathrow Airport (by mode)

The greatest benefit for the economy of Oxfordshire would be gained by new direct airport services from Oxford and Didcot. This can be achieved if some of the four trains per hour expected to be operated between London Paddington and Reading via Heathrow are extended to provide through services from Oxfordshire. There would also appear to be significant benefits in East West Rail services from Bedford and Milton Keynes also serving the airport when they are extended from Reading to London Paddington.

The Network Rail Draft CP5 Enhancements Delivery Plan anticipates an application for a Development Consent Order being made by the end of 2017, with construction of the rail link due to start in 2019, subject to consent being approved. The new rail link is expected to open in 2024.

The county council will work with the Local Enterprise Partnership to lobby for the extension of two trains per hour beyond Reading to serve Didcot and Oxford, as they can support our international reputation in science and technology.

We will ensure that in discussions with the rail industry about capacity improvements, the solutions do not frustrate future aspirations to extend East West Rail services to Heathrow Airport.

Chapter 5

Committed Projects

Introduction

There are a number of committed projects that are either being developed or already under construction that will have either a direct or indirect impact on Oxfordshire once completed. This chapter explains what they are.

Crossrail

Crossrail is Europe's biggest engineering project and will transform services east of Reading and across central London when the Elizabeth Line, as it will be known, opens in 2018. The line will serve 40 stations from Reading and Heathrow Airport in the west through the West End, the City of London and Canary Wharf to Abbey Wood and Shenfield in the east.

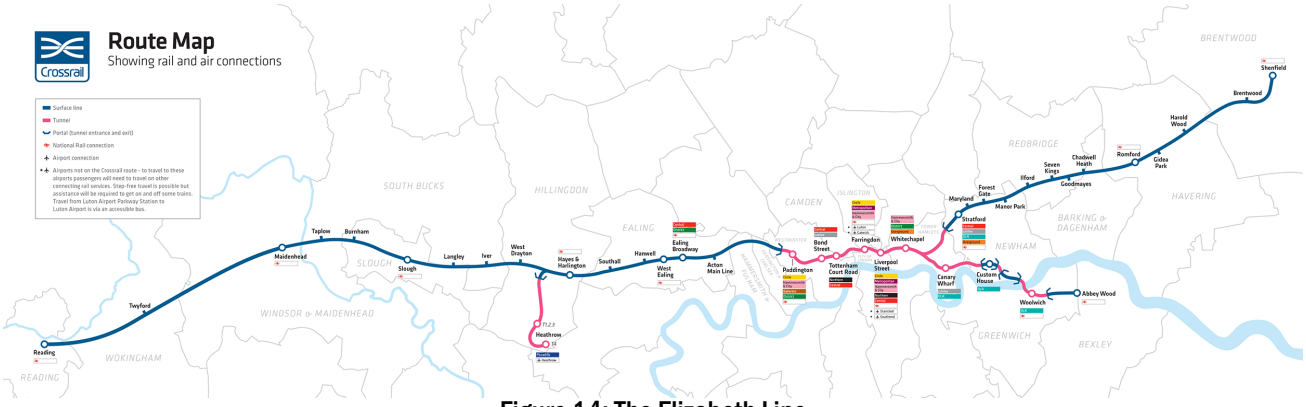


Figure 14: The Elizabeth Line

Crossrail is costing almost £15 billion but will increase central London rail capacity by 10%, and will bring an extra 1.5 million people to within 45 minutes of central London. Estimates suggest it will add £42 billion to the UK economy.

Up to 200 million passengers are expected to use the Elizabeth Line each year. Each train will be around the length of two full-sized football pitches and have nine carriages with accommodation for 1,500 passengers.

The peak-time timetable from the Thames Valley will consist of:

- 2 trains per hour in each direction from Reading
- 2 trains per hour in each direction from Maidenhead
- 2 trains per hour in each direction from West Drayton
- 4 trains per hour in each direction from Heathrow Airport

14 trains per hour will start or finish at Paddington. All trains will serve the West End, the City and Docklands, with half the trains continuing to Abbey Wood and half continuing to Shenfield.
To provide the capacity needed to cope with passenger demand between Reading and London Paddington, the existing peak-time direct services to and from Henley-on-Thames will be withdrawn by 2017 and replaced by a shuttle service to Tywford every 30 minutes throughout the day.

A comparison of journey times after the opening of the Elizabeth Line shows journeys from Twyford to London Paddington taking slightly longer than they do now (44 minutes compared to 34 minutes), but journeys to the City and Docklands will be on average 10 minutes quicker in future, and with no change of train required.

The county council welcomes and supports the Elizabeth Line, but expects timely connections to be provided at Twyford between the GWR Henley-on-Thames branch line services and TfL's Elizabeth Line so the end-to-end journey time to the City of London is no longer than it is in 2016.

Great Western Electrification

The Great Western Main Line is the longest non-electrified intercity route in Britain, and the strategic case for electrification is based on three main benefits – reliability, capacity and performance.

The existing fleet of High Speed Trains were introduced in 1976 and, whilst they have been updated many times over the past 40 years, they are now coming to the end of their working lives. From a passenger perspective, electric trains will provide a better experience with facilities such as accessible toilets and at-seat catering, and an improved level of comfort through reductions in noise and vibration.

The lines into London Paddington are some of the busiest in the UK, and the past decade has seen sustained growth in rail travel. With this demand set to continue increasing for the foreseeable future, especially into London, Reading and Bristol, electric trains can provide more seats compared to a diesel train of similar-length.

Electric trains have greater reliability and require less maintenance. They can accelerate and decelerate faster which will reduce journey times by up to six minutes from Oxford to London.

Electrification presents huge opportunities -

- It is **better for the environment** as electric trains are more reliable and emit 20% less carbon per passenger mile than a diesel train, even allowing for generation of the electricity used. They are quieter and virtually silent when waiting at stations;
- The new fleet of trains will have **more seats** and **journey time savings** can be made as they will accelerate faster;
- Electric trains are generally **cheaper to buy** than diesel trains, and lease costs are typically around 20% lower. This advantage is set to increase as diesel engines are likely to become heavier, larger and more expensive to meet stricter EU emissions standards; and
- **Cutting costs** as electric trains are around 35% **cheaper to operate**, are lighter causing less wear and tear, and they require less maintenance.

The electrification of the Great Western Main Line from Maidenhead to Swansea, including the lines to Oxford and Newbury, was first announced in 2009, and was given the go-ahead by the coalition government after the 2010 general election.

Figure 15: Electrification infrastructure near Didcot Parkway

A new fleet of Super Express Trains will replace the aging HSTs as part of the InterCity Express Programme (See Chapter 6). The Thames Turbo diesel trains will be cascaded to services around Bristol, and will be replaced with a mix of 37 four-carriage Class 387 trains and 21 four-carriage Class 365 trains from spring 2016. These new trains can run with up to 12 coaches to provide the extra capacity needed to cater for future growth.

The Hendy Review into Network Rail's 2014-2019 capital investment programme identified that costs had tripled from the original estimate of £874 million to £2.8 billion, but confirmed the main programme will still go ahead, albeit with some route sections re-prioritisation . The revised dates for the completion of electrification work were published in early 2016, with electrification to Cardiff via Bristol Parkway and the route from Reading to Newbury planned by December 2018; the line from Didcot to Oxford by June 2019 (three years later than originally planned); and the line to Bristol Temple Meads from Wootton Bassett by April 2020. The Cardiff to Swansea section will be delayed to sometime between 2019 and 2024.

The Henley-on-Thames branch line will also be electrified by December 2018, enabling the introduction of 4-car trains to replace the existing 2 or 3-car trains on an enhanced half-hourly shuttle service calling at all stations to Twyford.

The county council will work with Network Rail to facilitate the efficient delivery of highway works associated with electrification.

We will reiterate the importance of Network Rail completing the work to the revised programme and that wider 'opportunity' benefits, such as road widening or improved footpaths/cycle routes, are included where it is cost-effective to do so.

The Electric Spine

In 2012, the government announced[10] plans for a high-capacity freight and passenger route using existing tracks from the south coast to Oxford, where one route will run via Banbury to Leamington Spa, Coventry and the West Midlands and another will use East West Rail to Bletchley, Bedford and the East Midlands.

The electric spine would facilitate journey time and environmental benefits through use of electric passenger trains and bring efficiency savings to attract more freight from road hauliers and encourage investment by the private sector t in new electric freight locomotives. These would haul longer and heavier intermodal trains from Southampton Docks to the freight terminals in the north of England. To date, no orders have been placed for new electric locomotives and the freight industry remains sceptical about the benefits of the project.

The routes identified to form part of the electric spine include Southampton to Reading via Basingstoke, Oxford to Nuneaton via Banbury, Leamington Spa and Coventry, and Oxford to Bletchley and Bedford. The tracks between Basingstoke and Reading, Oxford and Bedford, the Midland Mainline and Leamington Spa to Coventry were prioritised and were due to be completed by 2019, with the other routes being completed in subsequent railway Control Periods.

The government paused development work on the planned electrification of the Midland Main Line between Bedford, Nottingham/Derby and Sheffield for three months. Following the Hendy review into Network Rail's investment programme, only the Bedford to Kettering/Corby section is expected to be delivered before 2019, with development and delivery of the electric spine being deferred into Control Period 6 (CP6, 2019-2024).

The county council will expect Network Rail to consider the development and future delivery of the 'electric spine' when delivering its committed projects in Oxfordshire.

We will encourage Network Rail to bring forward the delivery of electrification between Oxford and Bletchley.

Intercity Express Programme

The Intercity Express Programme is intended to replace the 40-year old InterCity 125 fleet on the Great Western Main Line. In 2009, the government announced that their preferred bidder to deliver this new fleet of electric trains was Agility Trains, led by Hitachi. An order was confirmed in July 2012.

The new fleet of 57 Super Express Trains will be introduced onto services between London Paddington, Oxford, Bristol and South Wales. Valued at £2.4 billion, the fleet will comprise 369 carriages consisting of 21 nine-car all electric (Class 801) and 36 five-car electric/diesel 'bi-mode' trains (Class 800).

The trains will be 15% more fuel efficient and weigh 86 tonnes less than existing HSTs which will allow faster journey times. They will be the first long-distance bi-mode trains operating anywhere in the world, and their 26 metre carriages will be a first in Britain.

[10] High Level Output Specification, Department for Transport, July 2012

The bi-mode variant will be used on services that travel over non-electrified routes, such as the Cotswolds & Malverns Line. At the busiest times, they can be joined together to form 10-carriage trains and they will be able to switch between overhead electric power and their on-board diesel engines whilst stationary or when on the move.

The first pre-production trains arrived from Japan in 2015 and are undergoing initial testing before the first production trains are delivered. The trains are expected to enter passenger service from May 2017, with all trains in service ready for timetable improvements that are expected in December 2018.

The county council supports the introduction of Super Express Trains which will transform rail services through Oxfordshire and provide extra capacity to cope with future demand, whilst also reducing journey times and improving air quality by reducing carbon emissions.

High Speed 2

Building a new high speed rail network in Britain is a government commitment, and a preferred route for the first stage of a new railway between London and the West Midlands was announced in March 2010. This has been subject to a number of minor modifications following public consultation.

The track passes through 3.4 miles of Oxfordshire, entering the county north of Godington on a low viaduct for a short distance and then re-entering east of Newton Purcell in a cutting that follows the old Great Central Railway alignment. The A4421 will be diverted over the new high-speed tracks and they will enter a deep cutting to pass below the A421. The tracks will deviate from the old railway alignment, passing to the north east of Mixbury in a series of cuttings and viaducts before they cross the River Great Ouse to exit the county.

In January 2012, the Government announced that HS2 will be built in two phases, with the line from London to the West Midlands expected to open in 2026, with an extension to Manchester and Leeds by 2033.

The government deposited a hybrid Bill, known as the '*High Speed Rail (London - West Midlands) Bill*, with Parliament in November 2013 to secure the powers needed to construct and maintain the new railway between London and Birmingham. The Bill will grant the powers to acquire land, divert or close rights of way, roads and waterways, modify any infrastructure belonging to utility companies and carry out demolition or protective work on buildings in order to build the railway.

A series of amendments to the original Bill, known as 'Additional Provision' were submitted to Parliament and examined by a Select Committee. The hybrid Bill completed its third reading stage in the House of Commons in March 2016 and has been introduced into the House of Lords. It is expected to achieve Royal Assent by the end of 2016.

The county council will identify highway improvements that it will expect HS2 Limited to consider funding where the new railway interfaces with our highway network. Working with HS2 Limited we will seek to mitigate the impact of building the new railway on residents and businesses, particularly by planning and monitoring the routeing of construction traffic and activities.

We will expect HS2 Limited to bring added value to East West Rail if there is an opportunity to do so where the two lines will run alongside and where they intersect at Claydon.

Chapter 6

Potential future projects

Introduction

There are a number of strategic projects which are unlikely to be achieved during the period of this strategy but remain longer term ambitions. Further development work will be required at an appropriate time to define the output required and determine if a business case exists that would justify future investment.

East West Rail - Central Section

The former railway between Bedford, Sandy and Cambridge was closed in the 1960s and some of the land has been sold and developed for other uses. Within the overall East West Rail project this is therefore the most difficult and costly part of the route to reinstate.

The East West Rail Consortium commissioned a study to determine the business case of a new rail line from Bedford to Cambridge to identify where economic activity and potential growth could be supported by a new railway. This concluded that improved rail connections and services could deliver sufficient economic benefit to justify investment. This will enable train services to operate between Oxford and Cambridge, and potentially onto Norfolk and Suffolk.

Network Rail has evaluated a long list of potential corridors, considering population and employment, operating costs, passenger and journey demand, the infrastructure and train service opportunities. In April 2016, they announced the single preferred geographical corridor from Bedford to Cambridge was via Sandy, with the evidence indicating it offers the best return on investment.

Further analysis and consultation will take place to determine the precise route of the new line on a map within that corridor. This will demonstrate a solid evidence-base that can be put forward for consideration for investment, most likely in Control Period 7 (CP7, 2024-2029).

> The county council supports the ongoing development work and will continue to work with Network Rail and the East West Rail Consortium to bring forward a proposal for delivering this vital section of missing railway, that ultimately will lead to direct rail services between Oxford and Cambridge.

Culham Station

Once the capacity constraints have been removed from the Oxford to Didcot corridor, there is a significant opportunity to redevelop Culham station as a transport hub, recognising its importance and potential as a gateway to support growth and development at the adjacent Science Centre.

Culham Science Centre is an internationally renowned centre for fusion energy research, development and technology and forms part of the globally significant science, technology and innovation cluster known as Science Vale Oxford. It hosts over 40 organisations from small start-up companies at the Culham Innovation Centre to global leaders in bio-science. It is the northern hub of Science Vale Oxford.

There is potential to radically improve the transport offer with better rail, bus and road links that could unlock land surrounding the station for commercial and residential development. This would need to be considered through the Local Plan process but a location with good sustainable credentials may offer a solution to accommodating some of the unmet housing need from Oxford City.

Our rail ambition includes the following elements:

- Dynamic passing loops with platforms to allow 'fast' services to overtake trains stationary at the station without reducing capacity of the network – this could be delivered as part of the Oxford Corridor Capacity Improvement Phase 2 scheme from 2019;
- An enlarged station, with accessible footbridge, passenger facilities and car parking;
- An improved bus interchange, and direct connections with the highway network, including proposed new link road;
- Direct pedestrian/cycle access with Culham Science Centre and Site One;
- A minimum of two trains per hour in each direction throughout the day.

The county council will work with South Oxfordshire District Council and the rail industry to identify future opportunities for a new station, and to assess its financial and operating viability and potential to support economic growth, job creation and new housing.

Oxford – Didcot - Swindon

The 24 miles of railway between Didcot and Swindon consists mainly of two-tracks with a passing loop at Steventon and another between Challow and Wantage. With a mix of 125mph passenger trains and 75mph freight trains the limited opportunities for slower trains to pass faster passenger trains is a major constraint. The 11 miles between Challow and the outskirts of Swindon is a constraint as passenger trains only take 6½ minutes to travel this section whilst a freight train can take three times as long. Other constraints include the road bridge and the two level crossings at Steventon. Although timetable solutions are possible they will lead to longer journey times and a reduction in the number of trains so are undesirable, and extra infrastructure will be necessary to accommodate train services beyond 2023.

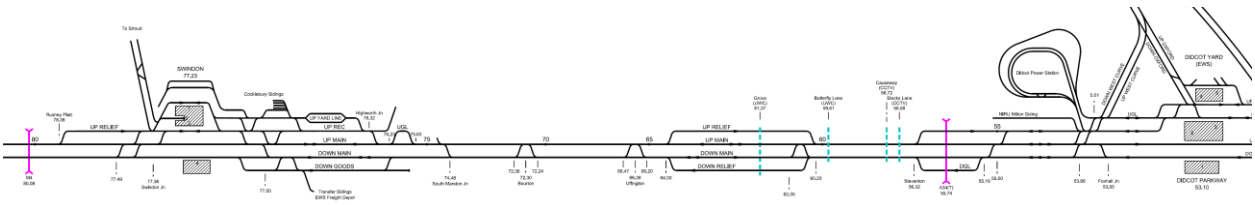


Figure 16: Electrification infrastructure near Didcot Parkway

There are currently five passenger trains per hour in each direction throughout the day and one freight train per hour in the off-peak, generally between 10:00 and 16:00. Table 14 shows how services will gradually increase over the coming years.

Table 14: Train service growth: Didcot to Swindon

Service Group	Trains per hour (peak/off-peak)			
	2019	2023	2033	2043
London Paddington – Bristol via Bath Spa	2tph	2tph	3tph	2tph
London Paddington – Bristol via Bristol Parkway	2tph	2tph	2tph	2tph
London Paddington - Cardiff	2tph	2tph	2tph	4tph
London Paddington – Cheltenham Spa London Paddington – Worcester via Cheltenham Spa	1tph -	1tph -	1tph -	- 1tph
London Paddington – Didcot - Swindon	2tph/-	2tph/-	2tph/-	
(East West Rail) Oxford – Bristol via Bath Spa			1tph	1tph
London Paddington - Gloucester				1tph
Freight	-/1tph	-/2tph	-/3tph	-/3tph
Maximum Infrastructure Capability	8tph	9tph	12tph	14tph

There are several options for adding capacity including extending the existing four mile passing loop towards Bourton in the west to create a new 12-mile loop that would be adequate to handle the level of service at 2033 but would require further extension towards Swindon and Steventon to create a predominately four-track railway by 2043. This final configuration would have the capability to handle up to 11 passenger trains and six freight trains every hour in each direction. Network Rail is currently evaluating the options and will present its initial advice to the Department for Transport in September 2016.

A more immediate enhancement is required to remove the conflict that exists between freight trains from Oxford that are heading towards Swindon and main line services, as the former currently have to cross all the main line tracks at Didcot West. This will help improve train reliability and allow two additional services to be introduced from 2023. In the future it would make operational sense to pair the tracks to Swindon by speed, as they are to the east of Didcot, which would put the slower speed tracks used by freight and stopping services on the north side of the existing railway.

The rail industry has already identified a need for a new passenger service to connect the south west of England with England's Economic Heartland, and potentially the East Midlands or East Anglia, without the need to travel across central London. It is intrinsically linked to our ambition for a new station to support growth in Grove and Wantage. This will be possible following the completion of East West Rail Phase 2 in 2019, but is subject to further business case development and a future franchise specification. To understand its full potential it will be necessary to work with neighbouring local authorities who might also gain benefit from a new train service, especially where they have plans for other new stations, such as Royal Wootton Basset and Corsham.

The county council will work with Network Rail to ensure that investment in new infrastructure deliver s the best outcome for local residents and businesses, with minimal environmental impact ,and will also work with the rail industry and neighbouring authorities to evaluate potential for a new train service between Oxford and Bristol.

Grove Station

The county council has a long-held ambition to reopen a station to serve Grove and Wantage. It had developed an outline proposal for a station on land adjacent to the A338 on the northern outskirts of Grove, but withdrawal of the Oxford-Bristol train service in 2003 was a major setback and the proposal was not developed beyond the outline planning consent, which lapsed in 2011.

Reconstruction of the A338 bridge, involving a realignment of the road and the building of an electricity feeder station for the Great Western Mainline electrification now means the land we had previously identified for a new station is no longer available.

We now need to look at alternative sites for a station, and consider the demand for a rail station, in the context of both recent and planned housing and employment development. We will also review the type of station and whether it should be a 'local' station or attract people from further afield; which would strengthen the economic case for investment. In doing so we will consider how it should be accessed. We will endeavour seek to get the site safeguarded so that it can be progressed in the future.

It will be necessary to understand the financial and operating viability of the proposal at an early stage, and to produce a robust business case that can be used to justify any investment. A significant factor that could affect the prospects for a station might be further development in the Grove area beyond that currently proposed. This is a matter for the district council but it is looking unlikely, at least in the current Local Plan period to 2031. It means a new station, even if proven to be financially viable, is unlikely to be considered until Control Period 8 (CP8, 2029-2034) at the earliest.

Our expectation is that a new station could be served by the hourly passenger service to be introduced between the south west of England, Oxford and the East Midlands by 2033, and peak-hour services to and from Didcot, Reading and London Paddington.

The county council will seek to identify a site for a new station and evaluate the potential demand based on various growth and train service scenarios. Working with Vale of White Horse District Council we will seek to safeguard land within the Local Plan to protect the long-term ambition of a railway station.

Oxford – Witney Rail Link

The county council commissioned URS in 2014 to carry out a feasibility study looking at a range of options, either singly or in combination, which could provide a long-term solution for improving transport along the A40 between Witney and Oxford. Their work included a review of the previous rail study carried out in 2001 and considered technical feasibility rather than specific infrastructure and operational issues.

Their study concluded that reusing some of the old railway alignment was feasible but there were significant issues, including deviation from the old alignment at Eynsham, South Leigh and south of Witney requiring land acquisition, difficulty in constructing new road bridges in some locations, a need for extensive work to drainage and earthworks, and being unable to cross the A40. Witney could only be served by a parkway-type station at Ducklington, and this would affect the amenity at Duckington Lake and require changes to the A40 slip roads

and possible demolition of the Four Pillars Hotel. The location of the station will generate extra local traffic but may not attract car users from residential areas in the town. A railway is unlikely to alleviate traffic congestion on the A40 on its own, and the estimated cost for a basic single-track railway at £289 million would in any case only facilitate an hourly train service. That level of service raises questions about its attractiveness to users, and particularly for short distance journeys to Oxford, and does not meet our strategic aim to reduce congestion and improve air quality.

An alternative new railway alignment north of the A40 was also considered, along with options such as 'tram' or tram-train. The study confirmed that trams could only be justified if there were also an extensive tram network with on-street running in the centre of Oxford and the surrounding area. The benefits of tram-train was thought to be limited as there is only a short section of shared infrastructure, between Oxford and Yarnton.

There was considerable public support for reinstating a rail link during the public consultation held in autumn 2015 to inform our long-term A40 Strategy, and it was the most favoured public transport option. A single track railway places a constraint on the level of service that could be provided, as does the capacity issues on the rail line through Oxford station. The low frequency of trains raises concerns about the commercial viability of a train service. A much greater population would be needed to compensate for the low frequency service but that is not part of the current Local Plan being taken forward by West Oxfordshire District Council. Rail industry resources and finances are focused on resolving the capacity constraints on the existing rail network, and it is unlikely we can progress this scheme in the foreseeable future.

Our A40 Strategy was agreed in May 2016 and proposes a combination of dual-carriageway and bus lanes. In the short-term, £35 million has been secured from the Local Growth Fund for the first stage of an A40 corridor upgrade, including a Park & Ride near Eynsham and associated measures such as eastbound bus priority and junction improvements. The may be an opportunity to link the Park & Ride with Hanborough station with a bus service, but only if this can be operated commercially without subsidy.

The strategy recommends a length of dual-carriageway between Witney and the Park & Ride, with further bus priority along the A40 between the Park & Ride and west of Wolvercote roundabout. Whilst the aspiration of reinstating a rail line remains, the Council is not taking it forward at this time.

The county council will retain the option of a rail line to Witney as a longer term aspiration in its A40 Strategy, and will pursue opportunities to realise the aspiration with Network Rail and train operators in the future.

Banbury Station Redevelopment

Banbury station functions satisfactory for rail passengers, but the area surrounding the station does not provide an attractive or welcoming gateway to the town, or recognise its proximity to the main shopping area and local bus services. The existing forecourt layout does not provide a practical transport interchange.

There are known problems with traffic congestion at the Station Approach/Bridge Street junction which hampers access to the station at peak times. Pedestrian access between the station and town centre and buses is hampered by the road layout and crossing facilities. A recent improvement has been a new multi-storey car park to the east of the station, located off Merton Street, with a connecting footbridge to the station.

A proposal has existed for several years to provide a bus-only link between Bridge Street and Tramway Road but has not secured funding. To meet an increasing demand for travel, broader proposals are now being developed to provide an integrated rail and bus interchange on the forecourt, with an improved public realm giving a sense of arrival and more space for pedestrians, better cycle facilities and a taxi rank, as well as providing for through bus services.

The county council will continue to work with Cherwell District Council and Chiltern Railways to develop proposals for redeveloping the station forecourt that improve access by sustainable modes to the national rail network in support of growth around the town.

Proposed Heyford Park station

Heyford Park is located 6 miles northwest of Bicester. It has established itself as one of Oxfordshire's leading business parks, with over 100 businesses employing over 1,200 people.

When the airbase was sold by the Ministry of Defence it was promoted as having the potential for up to 10,000 new homes. The first of 1,000 homes have already been completed, and the developer has recently sought permission to increase this to 5,000 new homes. There is strong demand for housing in Oxfordshire and Cherwell District Council is considering the site as a potential 'new town' to meet their housing supply targets in the Strategic Housing Market Assessment and provide a five-year land supply.

It is possible the developers will want to further develop the 1,200-acre site by providing up to 10,000 new homes and increasing the range of commercial property available to attract new businesses; this will realise the full potential of the expansive site.

The Chiltern Mainline runs in a shallow cutting less than 300 metres to the east of the site and a station existed at Ardley until 1963. Unlike the line through Lower Heyford, it s not constrained by capacity. A new station will make this a highly-sustainable and attractive development location.

A new station at either Upper Heyford or North-West Bicester could be served by the regular Chiltern Railways service between London Marylebone and Banbury/Birmingham, providing local connectivity and direct or onward connections with London and the West Midlands. Further work will be necessary to look at the demand for a station and potential site(s) to see whether it 'stacks up' in terms of benefits and costs.

The county council will work with Cherwell District Council, developers and the rail industry to identify future opportunities to progress one new station between Bicester and Aynho, and to assess its viability and potential to support economic growth, job creation and new housing.

Proposed Bicester Eco station

North West Bicester (Bicester Eco) is a proposed 6,000-home development to create a zero carbon development on the edge of Bicester. It was one of four eco-towns given the green light by government in 2009 to be a showcase for environmentally sustainable communities through measures such as renewable energy,

high energy efficiency and sustainable travel options. The development will also include complementary commercial development.

The site is located on both sides of the Chiltern Mainline, which passes through the centre of the development on an embankment. The first phase of the development to provide 393 new homes, a new primary school, local shops and offices, and an eco-business centre has already started. A masterplan will guide development for the remainder of the site as it takes place over the next 20 years.

The masterplan currently assumes there will be two high-frequency bus services between the development - one to the east and one to the west of the railway line - the town centre and Bicester Village station. These may be extended to serve other areas of the town or connect with longer distance bus services.

We recognise the masterplan seeks to limit the need to travel by provision of employment and a range of local facilities in close proximity to homes, but it has limited influence over people's choice about where they live, shop or work. There is an ambitious target for at least 35% of trips to be within the development and 60% to be within Bicester as a whole.

Where travel is necessary the masterplan aims to encourage high quality public transport to reduce the overall environmental impact, especially for longer journeys. Providing a station close to the development would help significantly increase the attractiveness of rail as an alternative to using the A34/M40 for north-south journeys.

A new station at either Upper Heyford or North-West Bicester could be served by the regular Chiltern Railways service between London Marylebone and Banbury/Birmingham, providing links to both local urban centres and direct or onward connections with London and the West Midlands, subject to further work to identify a positive business and operating case.

> The county council will work with Cherwell District Council, developers and the rail industry to identify future opportunities to progress one new station between Bicester and Aynho, and to assess its viability and potential to support economic growth, job creation and new housing.

Chapter 7

Supporting Rail Growth

Introduction

This chapter sets out how growth on the rail network relies on many factors, such as the adequacy of the road network, car parking at or near a station, ease of access, competitive pricing and availability of fares and the ability to expand stations to meet future demand.

First journey impressions are critical in determining whether someone will chose to travel by train again, and it should be a commercial imperative for the Train Operating Company. We need to consider how people receive the information that helps them plan their journey, such as train times and fares, and why it should be easy for them to get to and from the station seamlessly and without any hassle.

There needs to be a new emphasis on the 'whole journey experience' as travelling by train is often only part of a longer journey. Passengers also need to get to and from the station so their overall experience begins a long time before they step foot in the station.

Evidence from Transport Focus emphasises the importance of the "end to end" journey experience of using the railway, including:

- Getting to and from the station;
- Buying a ticket, either in advance or at the station;
- Using the station (waiting facilities, accessibility, toilets etc.); and
- The train service (frequency, reliability, seat availability and journey time).

Getting to and from the Station

When considering the 'whole journey experience', the quality and ease of access to and from the station has a major influence on the choice of rail as the main journey mode.

Active and healthy travel can enable people build exercise into journeys that may already form part of their daily routine, rather than try to find time in busy lives to add exercise as an extra task. Walking or cycling can often be used to replace car trips to the rail station for instance. Our Active & Healthy Travel Strategy sets out a vision for healthy sustainable travel, including walking, cycling and door-to-door multi modal travel.

Walking

Nationally, walking is the most frequent mode used for very short distance trips: 76% of all trips under one mile are walks which makes it hugely significant option for people to get to and from their station in most towns and villages. Walking is the healthiest option because it is good for our physical and mental health and often leads to social cohesion when people meet one another whilst walking on a regular basis.

The county council in collaboration with the Active Travel Steering Group will seek funding to improve walking routes to rail stations where there is evidence of existing or potential demand. Improvements may consist of step-free dropped kerbs, facilities for crossing roads, clear signage with timings and/or distance, and conflict free segregated routes so pedestrians do not mix with other traffic.

In town centres, there should be clear wayfinding to and from the railway station, using simple yet distinctive signage that is consistent and easy to follow. The use of colour is a good visual prompt whilst public art can create a sense of place and act as reassuring milestones.

The County Council will work in collaboration with the Active Travel Steering Group to seek funding to improve walking routes to stations where there is evidence of existing or potential demand, and will expect the station operator to continue pedestrian improvements within the station.

Cycling

We want to make cycling a safe, simple and accessible option for people of all ages, and their first choice for short distance local journeys, such as those to and from their nearest rail station. When funding permits, the county council in collaboration with the Active Travel Steering Group will identify routes connecting areas of employment growth with rail stations and areas of housing growth that can be improved to create direct and safe cycle routes. We will ensure that rail stations are sign-posted from national and local cycle networks.

Since 2005, we have provided secure cycle parking at all stations in Oxfordshire and cycle usage has increased at many stations as a result. Examples include Didcot Parkway and Oxford Parkway, where high quality two-tier facilities have been introduced, and Henley-on-Thames, where new secure covered cycle parking had the effect of unlocking suppressed demand. The use of cycle parking should be reviewed annually and spaces increased if there is demand. We welcome the introduction of initiatives such as folding bike hire at stations, as Brompton folding bikes can be taken on buses and trains without time restrictions, making them ideal for commuters.

Bike-rail can provide a seamless journey to almost anywhere, but encouraging and enabling more people to cycle is not simply about providing cycle routes, although that is important. People need to feel confident about travelling by bike. We have identified four measures that train operators should consider introducing to help build that confidence:

1) The compulsory reservation required for cycles on GWR inter-city services should be developed into a real-time smartphone app so potential users can check availability and reserve a space immediately before travel;
2) Sections of a journey where the carriage of cycles is restricted at peak times should be clearly shown by shading in the timetable;
3) Improved security, with all station cycle parking monitored by CCTV and located in a busy thoroughfare where activity may discourage vandalism or theft; and
4) The location of the bike storage area on trains should be clearly indicated on the outside of the train and on the platform to reduce delays in boarding and storing the cycle.

The county council will work in collaboration with the Active Travel Steering Group to improve cycle routes to and from rail stations, including clear directional signage, when funding becomes available.

We will support initiatives by the train operating companies to improve bike-rail integration with clear policies and commitments, platform and train signage and development of cycle hubs offering repair and maintenance facilities at the busiest stations.

Buses

Railways can move high volumes of people quickly and efficiently. However, completing the journey will often involve using a bus to get between the railway station and employment sites, town centre, hospital or housing development. It is important that bus services operate at the times when they are needed to get commuters to and from a station. This may mean they have to start earlier and finish later than they would normally, and may be something the rail industry might want to consider funding in future to improve access to the rail network.

It is important that bus stops are conveniently located outside the station to enable facilitate easy and seamless transfer between modes. They should be well-signposted and have accurate and up-to-date travel information.

Bus operators recognise the importance of making their services more attractive, and whilst co-ordinating bus and rail timetables to reduce waiting times is very desirable, it can be difficult to achieve. Simply retiming a bus journey to connect with a train can have an impact elsewhere on the route, make the bus service less attractive, or increase costs if an additional bus or driver is required. We will continue to work with bus operators through our Quality Bus Partnership to improve co-ordination and integration.

We have financially supported the award-winning Cotswold Line Railbus since 1994, but funding pressures mean we can no longer afford to subsidise rail-feeder bus services. We will seek to have this type of service funded by the rail industry in future rail franchise requirements.

The county council will work with bus operators to improve co-ordination and integration between travel modes, including bus-rail.

Car Parking

Oxfordshire is one of the most rural counties in the South East. The private car is an important mode of access to rail stations, particularly in rural areas where the dispersed settlements and low level of demand makes the provision of commercial bus services unsustainable and publicly subsidised services are no longer affordable.

In many situations, a station may be too far away or the roads are not suitable for walking and cycling. The car becomes the only realistic option to reach the station.

The provision of suitable car park capacity enhances the attractiveness of the rail service for the longest portion of the journey. It is important that an appropriate level of car parking is provided, and that it is reviewed on an annual basis, so it meets the demand for travel at a particular station. A report for Transport Focus *Getting to the Station* concluded that insufficient parking at stations meant that passengers who had difficulty parking

were instead dropped off and picked up at the station by family or friends; doubling the number of car journeys or, worse still, they chose to travel all the way by car rather than use the train.

The number of parking spaces at each station is regulated by DfT and ORR and this makes it difficult to reduce parking in favour of more sustainable modes, even when they are the best option, for example in Oxford where high frequency bus services and the cycle network offer real alternatives from most areas of the city. It should be possible to reduce, or increase, car parking where it can be shown not to reduce the number of passengers using the station.

As the highway authority, the county council will need to consider the capacity of the road network to handle an increase in traffic generated by any car park expansion, and early engagement by the Train Operating Company will be necessary.

The county council will support car park expansion at rail stations where this can be accommodated without a detrimental impact on the environment and where the road network has capacity to handle the extra traffic.

We will also support the provision of charging points for electric vehicles as part of any car park expansion, and incentives to encourage multiple occupancy of private cars for users of the Oxfordshire LiftShare scheme.

Station Travel Plans

A Station Travel Plan brings together all the stakeholders with an interest in, and responsibility for, rail stations; to develop an action plan with clear common objectives and a coordinated approach to delivering and funding projects that will mitigate the transport impact of the station, such as reducing peak time traffic congestion or encouraging use of sustainable modes.

The county council would like the train operating company managing each station to establish travel plans at the six busiest stations: Banbury, Bicester North, Bicester Village, Didcot Parkway, Oxford and Oxford Parkway.

Journey Planning

The availability of travel information before the journey is important to enable people to plan their journey, and it should be easy to obtain at local stations, online or over the telephone. The information should be impartial and allow people to understand their journey options prior to buying tickets, for instance the most appropriate route and fare for their needs.

The Train Operating Companies produce detailed timetables but do not have the resources to produce bespoke information for every local community on their network. The county council had produced bespoke local guides and leaflets to encourage rail use, particularly on the 'branded' lines[11], but funding pressures mean our whole approach to information provision needs to change, with the emphasis shifting to the train operators to fund and provide what is required in conjunction with the local community.

[11] The 'branded' lines are The **Regatta Line** between Twyford and Henley-on-Thames; the **Oxford Canal Line** between Oxford and Banbury and the **Cotswolds & Malverns Line**.

It is particularly important that accurate and reliable real-time information is also provided to keep passengers informed when train services are disrupted or when an alternative means of travel is required.

Fares and Ticketing

Fares

Tickets are the first major interface between passengers and the rail network, but the complexity of fares and the multiplicity of tickets available can deter some people from travelling by train. Simple, easy to understand fares are vital to ensure people thinking about using the trains get the best ticket for their journey.

Rail fare rises are one of the most emotive transport issues for passengers who rightly want to feel they get value for money. For many years, the policy of successive Governments has been to focus on shifting the funding of the railways so that passengers pay a bigger portion of the cost and taxpayers a smaller share.

Between 2004 and 2013, successive governments allowed regulated fares, which account for nearly half of all rail journeys and include season tickets and off-peak return tickets on long distance trips, to rise by on average 1% above Retail Price Inflation (RPI). A decision by the coalition government froze commuter fares in real terms by allowing regulated fares to increase only by RPI in 2014 and 2015, and the Conservative government elected in May 2015 has committed to continue with an annual increase in line with RPI until 2020.

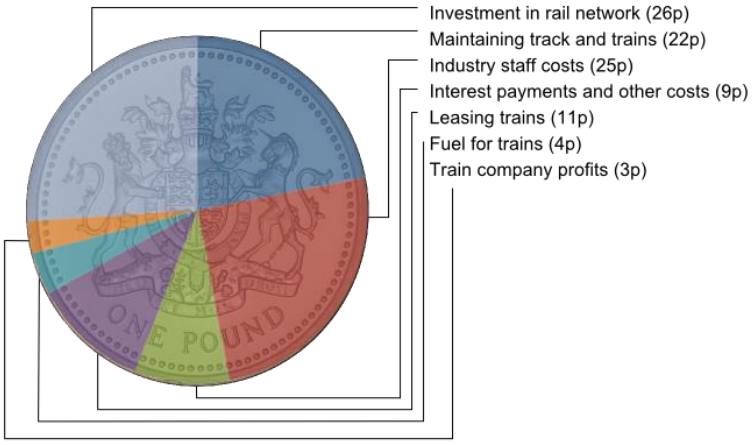


Figure 17: The Passenger's Pound [12]

In 2013-14 the annual cost of running the network was £12.7bn[13]. Income from passenger fares accounted for £8.2bn, and £3.8bn came from the taxpayer, representing 29% of the industry's total income. Government funding has decreased by 16.4% since 2010.

[12] Source: Network Rail and Association of Train Operating Companies, 2014
[13] Source: Rail Industry Financial Information 2013-14 (Office of Rail and Road, 2015)

To improve the value for money, initiatives such as reduced price contra-peak fares and promotions for flexible business travel may help to fill empty seats at times when there is spare capacity. Flexible working patterns often mean irregular travel and this can be met by using stored-value 'smart' ticketing.

The county council supports the policy of restricting annual fare increases to the retail price inflation, but also expects the rail industry to drive down the cost of running the railway through efficiency and innovation.

Ticket Purchasing

We recognise that people are changing the way that they buy tickets, and more and more people have chosen to buy their ticket online or through self-service ticket machines rather than from a staffed ticket office.

Modern technology means it is possible to print some train tickets at home, or have them displayed on a mobile phone, whilst contactless payments or smartcards, such as the key and keyGo smartcards on Southern Railway can also allow seamless travel on bus and train services.

Paper tickets could become a thing of the past as there are ambitious proposals to modernise train tickets over the next three years with a new flexible barcoded m-Ticket, which passengers download to their smartphones or other mobile devices. The rail industry is also working with the card payments industry to explore how people could use new 'ticket in the cloud' technology to use contactless credit or debit cards as a 'token to travel', replacing paper tickets.

Although some passengers still value the face-to-face transaction available at a traditional ticket office, the railway needs to adapt and embrace new technology to reduce its costs and improve efficiency. Many station ticket offices no longer open all day, and in London, all of those on the Underground have been closed. Whilst the way in which people buy tickets may be changing, there is still a need for staff to provide assistance to the infrequent traveller or to people who may struggle to use a self-service machine.

Self-service ticket machines often suffer from vandalism and crime. As a result most no longer accept cash and tickets can only be purchased using a credit or debit card. This becomes a barrier to travel for elderly people or those less than eighteen years of age, or the poorest in society who may not qualify for these cards.

The county council will support the rail industry in embracing new technology, but in doing so it will expect train operating companies to ensure that:

- there will be public consultation on any proposal to reduce ticket office opening hours;
- staff will still be available to assist passengers in using the new technology;
- all self-service ticket machines will offer the full range of payment options;
- preferential pricing should be used to encourage the uptake of paper-free ticketing ; and
- help points are improved so people can easily obtain travel information.

Smarter Payment

Smarter fare collection is a key feature of *Oxford Science Transit* - a high-level 20-year vision to create a better-integrated, high quality transport network that serves the Oxfordshire Knowledge Spine and connects it with the rest of the Oxfordshire. Through our delivery of Science Transit we intend to evolve fare collection and aim for

countywide cashless and ticketless travel, with integration between rail, local bus, coach, and park and ride payment systems.

To make this a reality the focus of our work will be on technical and data interoperability between the transport operators, including a mechanism to apportion revenue. We will seek to introduce new family of fare products with simplified pricing to make Science Transit easy to use and value-for-money. We will develop online and interactive services via the web and smartphone apps that include on-the-fly payment for travel (while in motion) and explore the potential for location-aware software to facilitate automated payments.

The county council will work with train operating companies to develop new, innovative solutions for fares and ticketing, including:

- the introduction of new fare products based on multi-mode/operator ticketing;
- simplified pricing for journeys within the Oxfordshire Knowledge Spine;
- cashless payment systems and ticketless travel; and
- online services and interactive smartphone apps.

Plusbus

Plusbus is a national scheme that enables passengers to buy an "add-on" to their train ticket allowing unlimited use of bus services within a participating area at either the start or end of their train journey. Plusbus tickets are currently available in Oxford, Didcot and Banbury.

The county council will encourage local bus companies to work with Journey Solutions, the organisation behind Plusbus, to introduce Plusbus ticketing in Bicester and to review the scope of the existing schemes annually.

Service Quality

Getting to the destination on-time is a crucial aspect of travelling by train and is one that passengers rightly expect. Whilst reliability is generally good, punctuality can be affected by delays caused by trespass, suicide, infrastructure failure or weather and by congestion at bottlenecks like Oxford Station and Didcot.

Overall performance is measured using a Public Performance Measure (or PPM); this is the percentage of trains that arrive within five minutes (for local services) or ten minutes (for longer distance services) of their published time at their destination, and the number of trains completing their scheduled journey without being cancelled or omitting to call at stations on their journey. Performance targets are written into each franchise agreement.

The county council expects train operating companies to achieve high levels of reliability and punctuality and should meet, and sustain, the performance targets specified in their franchise agreement.

Safety and Personal Security

High levels of safety and personal security are vital for all users, but especially for people who may be less confident and feel more vulnerable, particularly after dark or at quieter stations. Good lighting and clear sight lines should help create an environment that is welcoming and achieves a sense of personal security. Help Points should be easy to find on all platforms, be maintained in good working order and available at all times.

Calls for assistance should be answered promptly. CCTV should be provided at every station and monitor all entrances, car parks and waiting areas.

The county council would like to see an increased staff presence at stations and on trains to deter anti-social behaviour, particularly in the evenings. We will support specific funding being identified in franchise agreements to pay for extra staff and/or British Transport Police officers.

Accessible for Everyone

The rail network should be accessible to everyone. Train operators have a duty not to discriminate between groups of people who share a protected characteristic and those who do not. Under the Equality Act 2010, the protected characteristics are: age, disability, gender reassignment, marriage and civil partnership (in respect of eliminating unlawful discrimination), pregnancy and maternity, race, religion or belief.

Older people and people with a disability should be able to use train services as this can help to improve social inclusion and allow them to lead independent lives by giving them opportunities to travel that reduce isolation, such as going shopping or visiting friends. It is important that rail vehicles and infrastructure are fully inclusive and that people with disabilities receive excellent service and feel safe and secure when travelling.

The *Technical Specification for Interoperability: Persons of Reduced Mobility* (PRM:TSI) sets out the accessibility standards that all new heavy rail vehicles across Europe must meet. It dictates that rail vehicles built after 2010 must comply fully from the outset, and all rail vehicles, regardless of their age, should be compliant by January 2020, although DfT will still be able to grant exemptions where it is not technically possible to make changes.

The Equality Act 2010 places a legal obligation on station operators to take 'reasonable' steps to ensure they do not discriminate against disabled people. As this is essentially a civil right it also means that, until case law has been established, it is not possible to say what will or will not be deemed as 'reasonable'. However, the PRM TSI sets standards for new stations and for stations where major work takes place. These are included in the *Accessible Train Station Design for Disabled People: A Code of Practice* together with national standards for the built environment and other best practice guidance. Where passenger lifts are provided, they should have CCTV and a direct link to a 24 hour control room so they can be used even when the station is unstaffed.

The county council expects all rolling stock used on train services in Oxfordshire to be fully accessible by 2020. We will support Train Operating Companies who invest or seek funding to improve accessibility, and expect that by 2020 the busiest Category 'E' stations[14] and above will have level access to all platforms .

Community Rail

The county council has been successful in working with community groups for many years and has helped to establish several station adoption groups. These groups bring together local people with an interest in nurturing active community involvement. Station adoption is an excellent opportunity to take part in making their station

[14] Category E stations are defined as small staffed stations with less than 250,000 trips per annum.

an attractive community asset. Activities are varied, including gardening, tidying, artwork but all help to raise awareness of the railway and the train services, thereby increasing usage.

A route can also be designated as a "Community Railway" as either a 'line' (covering track and signals) or 'services' (covering the train service), or both. It could be supported by a Community Rail Partnership, working with the rail industry, local community, businesses and local authorities to help promote the line and improve stations, train services, bus links and accessibility; all of which help to increase passenger numbers and improve the viability of the railway.

There is potential to establish a Community Rail Partnership that covers the branch lines in the Thames Valley, but funding and resource pressures mean the county council is unable to take this forward for the time being. The train operating company may wish to develop the proposal in conjunction with the local community.

The county council will support the creation of a Thames Valley Community Rail Partnership that includes the Henley-on-Thames branch line, subject to a proposal being developed and submitted by the rail industry.

Safeguarding land

The planning and funding of transport infrastructure can take a long time to prepare and it is therefore important that longer-term plans are not compromised by inappropriate development occurring in the interim. Where there remain realistic and deliverable proposals to use former railway land to reintroduce rail services or to create new walking and cycling routes we will seek to safeguard the land.

The county council will encourage district councils to protect land in their Local Plan from any development that would be prejudicial to future transport use, in the following locations:

- The Kennington-Cowley railway, including land for two new stations;
- land for a new railway station near Grove;
- land north of the railway in Didcot;
- land adjacent to Charlbury, Culham and Hanborough stations;
- land between Yarnton and Ducklington, and between Witney and Carterton;

Chapter 8

Funding

Introduction

Delivering this strategy will require public and private sector investment, coming from central Government via a periodic review of rail industry funding and through a variety of private sector sources, especially those related to delivering job creation and housing growth.

The county council will need to work closely with the Oxfordshire LEP and Oxfordshire Growth Board to identify potential funding sources that may be necessary to bring forward public investment in rail infrastructure that unlocks local economic growth. This can ensure infrastructure is delivered when it is needed to support local growth rather than when national rail industry finances are available.

We will aim to optimise the use of the available funds by seeking joint funding whenever possible, especially where it can deliver multiple outcomes, or can be delivered in a more cost effective way or gives added value to other planned schemes.

This chapter therefore outlines the main sources of funding for investment in our rail network.

Rail Industry Funding Sources

High Level Output Specification (HLOS)

The Railways Act 2005 requires that, every five years, the Government sets out the rail services and projects it wants the rail industry to achieve over the next railway Control Period, and the public funds that are available to secure delivery (the Statement of Funds Available or SoFA). In doing so, it defines the railway the Government wishes to see at the end of each Control Period and priorities for investment.

HLOS is a high level strategic document and outlines the outputs, such as to increase capacity on a particular corridor, rather than the specific scheme inputs needed to make it happen which are the preserve of Network Rail. ORR will validate the Network Rail assumptions and costs, and set the access charges that Network Rail will receive to fund the schemes.

HLOS is the primary source of rail-industry funding for major enhancement schemes, and the culture in Network Rail is to focus their resources on delivering the regulated outputs it specifies.

In addition to the commitments to fund the delivery of specified enhancement schemes, there are ring-fenced funding allocations, including:

- **Development Fund** (£57 million, now reduced to £32 million) to develop an evidence base for an industry submission for infrastructure investment in Control Period 6 (CP6, 2019-2024); and to further develop schemes that are likely to be required and funded for delivery, primarily during CP6;

- **Network Rail Discretionary Fund** (£103 million, now reduced to £59 million) to fund small schemes that will result in an increase in the capacity or capability of the network, up to a maximum of £5 million per scheme;
- **Strategic Freight Network** (£253 million, now reduced to £235 million) to facilitate growth in the freight market by making best use of the existing network to reduce delays and reduce conflict between freight and passenger traffic;
- **Passenger Journey Improvement Fund** (£206 million, now reduced to £106m) to develop and deliver works that improve the passenger journey experience, with an emphasis on journey times along key corridors; and
- **Level crossing safety** (£96 million) to reduce the risk of accidents at level crossings.

These ring-fenced funds are targeted at the enhancement of the rail infrastructure. There are four other sources of potential funding for station-related enhancements that are not specifically detailed elsewhere in the HLOS.

Station Commercial Project Fund (SCPF)

A fund of £30m is included in Control Period 5 (CP5, 2019-2024) for station improvement projects delivering commercially focused investment at existing stations that can generate a financial return to the Government and reduce the cost of the railway to taxpayers.

It is available for capital projects, such as extra chargeable car parking, new retail units and revenue protection (e.g. ticket gates), that generate additional income and increase the value of a franchise when it is re-let.

Projects must provide a financial return with a benefit to cost ratio of 2:1 over the first 10 years, and should be delivered by March 2020. Franchised train operating companies, local authorities and other third parties are able to bid for funding, which is awarded on a competitive basis after being evaluated by the DfT and Network Rail. The fund is usually heavily over-subscribed, and the qualifying project criteria are strictly applied.

National Stations Improvement Programme (NSIP)

The objective of this programme is to achieve a noticeable and lasting improvement in the passenger perception of stations by focusing on high footfall, low passenger satisfaction stations. It aims to develop an efficient and coordinated approach to the planning and delivery of activities at station by all stakeholders. Previous projects have tended to focus on passenger facilities, such as waiting areas, retail facilities, wayfinding signage, toilets, lift and footbridge refurbishment.

Potential schemes are identified through a Local Delivery Group, comprised of Network Rail, the train operating companies and other stakeholders and proposed to the NSIP Board who then allocate the funding ensuring best use is made of the available funding.

A fund of £110m was ring-fenced in Control Period 5 (CP5, 2019-2024), although this has been reduced to £73m following the Hendy Review and the remainder of the original funding will be rolled forward into the next Control Period.

Access for All (AfA)

The objective of this programme is to increase accessibility at stations for older, disabled and other mobility-impaired passengers by providing an unobstructed and obstacle free route from the station entrance and all drop-off points, to each platform and between platforms served by passenger trains.

Accessibility proposals are identified by a Local Delivery Group, and submitted for funding approval to the AfA Programme Board (consisting of Network Rail, DfT and ORR). The Board also oversees delivery of the national programme, and allocates the funding ensuring best use is made of the available funding.

A fund of £135m was ring-fenced in Control Period 5 (CP5, 2019-2024), although this has been reduced to £87m following the Hendy Review and the remainder of the original funding will be rolled forward into the next Control Period.

Commercial Investment by Franchises

Train operating companies are also able to invest their own money in projects if there is a strong business case showing an adequate payback on their investment within the term of their franchise. The term of their franchise is a major consideration, and can discourage major investment. By law, a franchise may be awarded for up to 15 years, and can be extended by a further 7½ years to a total of 22½ years, but a more cautious approach to long franchises, involving short initial franchises with the potential for extension and intermediate break points is the Government's current favoured policy. Chiltern Railways are unique in being the only company awarded a 20-year franchise.

Chiltern Railways invested £130 million of the £320 million total cost of East West Rail (Phase 1) with Network Rail contributing the remainder. Their business case for investment was based on the financial return they will get from the revenue generated by the new services. Network Rail provided the capital for the upgrade and will recover this through a repayment (facility) charge over the next 30 years, paid by the existing Chiltern Railways franchise up to 2021 and by subsequent franchises; effectively the DfT is underwriting the financial risk.

A similar approach can be taken with new rolling stock, which can be procured by an incumbent train operator even though its active use will extend many years beyond the end of their franchise. The DfT will need to reach agreement with the train manufacturer or leasing company and guarantee a use (and payment) for the trains by a future franchise. FirstGroup arranged an order for 29 new Hitachi AT300 trains to replace HSTs on services between London and the South West, valued at £361 million, which was 'approved' by the DfT.

Wider Funding Sources

Local Growth Fund (LGF)

The county council no longer receives funding directly to spend on transport improvements. Instead the funding from three central government departments - Transport, Business Innovation & Skills, and Communities & Local Government have been merged into a single Local Growth Fund (LGF), and forms part of the Oxfordshire Growth Deal. LGF funding is awarded on a competitive basis nationally.

The Oxfordshire LEP has sole responsibility for deciding on local investment priorities and for selecting the bids that go forward for assessment. This means that for each transport scheme for which the Council wants to seek Government funding, it has to prepare a bid and demonstrate a strong business case that shows how a scheme contribute towards economic growth. We are then wholly dependent on the Oxfordshire LEP selecting it for submission, and on a successful evaluation in competition with transport and non-transport schemes from all 39 LEPs across the country.

This challenging route to funding means we no longer have any certainty on funding until LGF bids are invited and decided. The funding for successful schemes is generally added to the Growth Deal, with governance of scheme delivery given to the Oxfordshire Growth Board.

The **Oxfordshire Growth Board** is a statutory decision making body comprising the leaders and chief executives of the district and county councils, and non-voting partners that include Network Rail, Highways England, the Universities and government departments. The Board oversees the delivery of projects financed through the Oxfordshire Growth Deal and the previous City Deal and also monitors the delivery of priorities set out in the Oxfordshire Strategic Economic Plan on behalf of the Local Enterprise Partnership (OxLEP).

The Board also exists to seek agreement on local priorities and influence relevant local, regional and national bodies on economic development, strategic planning and growth.

From time to time, specific grant funding opportunities arise, but these are moving towards becoming funding streams within the LGF, for example the Local Sustainable Transport Fund (LSTF). With the pressure on council budgets increasing, government revenue grants are particularly valuable, allowing us, for example in the case of LSTF, to carry out promotional activities no longer affordable from council budgets. We will seek to bid for every available opportunity that is relevant, which means we need to have schemes and projects ready to put forward.

Oxfordshire Growth Deal

The Oxfordshire Growth Deal is part of the government's long term Growth Fund which will devolve at least £12 billion from central government to local economies across the UK from 2016/17 to 2020/21. The Oxfordshire LEP has agreed a Growth Deal with the Government, which will see up to £118.4 million invested in Oxfordshire for projects including:

- Headington Phase 1 & Eastern Arc Transport Improvements
- Science Vale Cycle Network improvements
- Didcot Station Car Park Expansion (*due to open in 2017*)
- Bicester London Road Level Crossing
- Oxford Science Transit Scheme
- Enabling the Northern Gateway Development, including A44/A40 Link Road
- Improvements to the A34, including the Lodge Hill Junction.

Successful LGF schemes will be added to this list, and the value of the Growth Deal will generally be adjusted accordingly to reflect the award of further funding.

Local Major Transport Schemes

A £475 million Local Majors Fund was announced in the 2016 Budget, and is also part of the government's long term Growth Fund, but is intended to fund very large, maybe transformative, transport schemes that are too big to be taken forward within regular Growth Deal allocations. The Department for Transport rather than the LEP will oversee these larger schemes.

The individual scheme threshold is based on population and for the Oxfordshire LEP it is £31 million. Potential schemes must have an estimated cost exceeding this figure to be considered for submission.

There is a presumption against the Fund being used for schemes on the national rail, as it is harder to make the case that they have no other way of being funded, for example by the industry's five-year investment programme. Schemes that do not have any rail service or rolling stock implications, for example station expansion schemes, could be considered if there is a robust business case and clear delivery plan.

Oxford and Oxfordshire City Deal

In 2014, the county and district councils and the Oxfordshire LEP signed a one-off City Deal which saw £55m being committed to invest in a network of new innovation and incubation centres, accelerated delivery of 7,500 homes across the county and three transport schemes to increase connectivity in the 'Oxford Knowledge Spine'. The transport schemes are:

- Improved access to the Science Vale Oxford Enterprise Zone at Milton Interchange, Chilton Interchange and Hagbourne Hill (Harwell Link Phase 2);
- Highway improvements at A40 Wolvercote and Cutteslowe roundabouts to relief congestion and enable Oxford Northern Gateway; and
- Oxford Science Transit (Phase 1): Improvements on A34 between Abingdon and Oxford, and on A423 Southern Bypass between Kennington and Hinksey Hill roundabouts.

The delivery of these schemes is expected to be completed in 2016.

Section 106 Contributions

The traditional method of securing developer contributions is Section 106 of the Town and Country Planning Act 1990. Planning obligations (or "Section 106 Agreements") are negotiated between local authorities (County and District) and the developer, usually as part of a planning application. Obligations must be:

- Relevant to planning;
- Necessary to make the proposed development acceptable in planning terms;
- Directly related to the proposed development;
- Fairly and reasonably related in scale and kind to the proposed development; and
- Reasonable in all other respects.

Planning obligations cannot be used solely to resolve existing deficiencies in infrastructure provision; or to secure contributions to fund wider planning objectives that are not necessary to allow consent to be given for a particular development.

Community Infrastructure Levy

Community Infrastructure Levy (CIL) is a discretionary levy that local planning authorities are choosing to charge on new developments in their area, in place of seeking contributions under Section 106 of the Town & Country Planning Act 1990. Unlike S.106, the money raised can be used to fund a wider range of off-site infrastructure, and excludes works related to accessing the development site which would be secured through S.106 or S.278 agreements or planning conditions.

The planning authority is required to publish the projects or types of infrastructure that CIL funding may be spent on in a document called the 'Regulation 123 List'. This can include open spaces, recreation, sports and leisure facilities, community and cultural facilities, strategic and local transport and schools. Most district councils have decided to show the type of infrastructure and only Oxford City Council has so far adopted a list of specific projects; although their list does include Oxford station redevelopment. CIL charges are set out in a document called the 'charging schedule', with the charging rate based on a pound per square metre for residential and retail warehouses or supermarkets.

Value Capture Mechanisms

Value capture is an innovative type of public financing that recovers some or all of the added value that publicly funded infrastructure can generate, either through increases in land value or an increase in a council's tax base. The main types of value capture include:

- Land Value Tax (LVT)
  LVT aims to recover the capital cost of public investment in transport infrastructure by capturing some or all of the resultant increase in adjacent land values that otherwise generates an unearned profit for the private landowners at no cost to them. This unearned value may be "captured" directly by converting it into a public revenue, and may be particularly relevant around new stations or along a new rail line.

- Tax Increment Financing (TIF)
  TIF is a means of investing public funds in infrastructure that is necessary to unlock regeneration which otherwise may be unaffordable to local authorities. It works on a 'buy now pay later' basis by allowing local authorities to borrow now on the basis that the infrastructure results in an overall increase in the council's tax base, which in turn increases the potential revenue generated from taxation i.e. the "tax increment". The borrowing can then be used to fund key infrastructure that in turn create those gains. TIF might be suitable funding for projects that enable economic development within enterprise zones by attracting investment in new property and business which contribute to additional business rates.

- Air rights
  Another form of value capture involves selling the development rights to build shops or offices above, or below, a railway station that will increase surrounding land value and generate a tax increment. Using 'air rights' to build over an existing railway station or rail tracks is something property developers have already become adept at in London's key business districts; the railway stations at Liverpool Street and Charing Cross both boast office complexes built over their platforms.

Locally Retained Business Rates

Since 2013, local authorities have been able to keep up to half of business rate receipts in their area instead of contributing all business rates into the central pool and receiving formula grant. Business rate revenue is split into the 'local share' and the 'central share' on a 50/50 basis. The central share goes into a single national pot and is redistributed to councils in the form of revenue support grant in the same way as the previous formula grant. The local share is retained by local government, but is also partly redistributed, with 80% going to the district council (responsible for the billing and collection of business rates) and 20% to the county council.

There is increased financial risk for local government, as receipts will rise or fall depending on the size of the business rates tax base in the area, but also a strong incentive to grow the business rate base by encouraging new or expanding businesses into the area.

In the 2015 Spending Review, the Chancellor abolished uniform business rates and announced that revenue support grant will be phased out completely by 2020. Instead, local government will be given powers to set their own business rate and retain 100% of business rate receipts in their area.

Within the Enterprise Zones, it is permissible to retain all business rate growth up to 2038, but whilst the district council will collect the income, the Local Enterprise Partnership will take the decisions on how it used according to its priorities.

Business Rate Supplement (BRS)

In order to raise revenue for local projects, county councils and unitary authorities are permitted to levy an additional Business Rate Supplement of up to two pence in the pound of rateable value on properties with a rateable value in excess of £50,000.

The revenue generated from BRS will be retained locally and can only be used on economic development that supports the productivity and prosperity of the locality. This may include transport infrastructure which can be shown to benefit the business community by improved productivity to facilitate trade and competition in goods and services. Under the prudential borrowing system, local authorities are able to raise finance and pay it back using BRS.

New Homes Bonus

The New Homes Bonus was introduced by the Coalition Government to tackle the shortfall in new housing. It aims to encourage local authorities to grant planning permissions for the building of new houses in return for additional revenue. Under the scheme, the Government matches the additional Council Tax raised on new homes and empty properties brought back into use, with a higher rate for affordable homes.

The payment of the New Homes Bonus lasts for a period of six years (although after the 2015 Spending Review it is being reviewed) and is split between district councils and the county council; the split being subject to local negotiation. The extra funding does not need to be spent on other housing development, and although it may not yield large sums of money, it may be a useful supplement as part of a wider funding package in development areas.

Chapter 10

Glossary of Terms

Term	Meaning
Aggregates	refers to the broad category of bulk materials used in construction, including sand, gravel, crushed stone (e.g. granite or limestone) and recycled ballast.
Bi directional	The provision of signalling that allows one or more tracks on a multiple track railway to be operated in either direction, whether for regular or emergency use.
Bi mode	A train that can be powered either from an overhead electricity supply or from an onboard diesel engine (on non electrified tracks).
Capacity	(1) the theoretical number of train paths that can be operated over a section of route, based on track layout (e.g. junctions) and signalling (i.e. distance between trains), as well as station platform (layout or the time a train is stationary in the platform); and also (2) the available passenger capacity (seating and standing) of rolling stock.
Capital Expenditure	The cost of investing in fixed assets, such as stations, track and signalling, interchanges, new trains etc
Carnet	A number of tickets, usually ten, which are valid for a fixed period of time and give a discount for non regular rail passengers.
CCTV	short for Closed Circuit Television
Chord	A stretch of (curved) track between two interconnecting railway lines allowing train movements between them.
Clockface timetable	A timetable where the trains leave at the same minutes past every hour making it easier for passengers to remember.
Connectivity	Describes the range of rail services from a particular station to another station.
Contra peak	Travel in the opposite direction to the main direction of commuters, i.e. away from London in the morning peak, and into London in the afternoon peak.
Control Period	The five year time periods which are used for rail industry planning and investment. We are currently in Control Period 4, also known as CP4 (2009-14). Future Control Periods will be from (CP5) 2014-19, (CP6) 2019-24, (CP7) 2024-2029, and (CP8) 2029-2034.
DMU	short for Diesel Multiple Unit. A two, three or four carriage train with on-board diesel engines, that can be coupled together to form a longer train of up to 12-carriages.
Deep sea container	A weatherproof box designed for the shipment of overseas freight. Each container can be lifted between ship, lorry or train. Historically, they were 8'6" high but the industry is now moving to larger 9'6" 'high-cube' containers.
Direct service	A train journey that does not require passengers to change train.
Down	Generally means the direction of travel heading away from London (i.e. Down Main Line or down train).
Electrification	The provision of 25Kv AC overhead power lines and lineside equipment to allow trains to pick up electricity using a pantograph.
EMU	short for Electric Multiple Unit. A four carriage train with electricity pick up equipment, that can be coupled together to form a longer train of up to 12-carriages.
Enterprise Zone	an area designated by the Government to boost the economy and job creation

	with super-fast broadband, lower taxes, and simplified planning controls.
Franchise	The right of a private company to provide passenger rail services for a number of years; with the Department for Transport managing the process.
Gauge	short for Loading Gauge. It defines the maximum height and width for trains and their loads to ensure safe passage through bridges, tunnels and other structures.
Heathrow Express	An open-access operator, owned by BAA Limited, operating non-stop services between London Paddington and Heathrow Airport.
High Level Output Statement, or 'HLOS'	the Government's statement of the outputs it requires from the National Rail network for the next five year control period.
HSTs	short for Intercity 125 High Speed Train. They have been the mainstay of long-distance services on the Great Western Main Line since 1976.
Hybrid Bill	a parliamentary bill which affects the private interests of a particular person or organisation. It is generally initiated by the Government to obtain authorisation for major projects deemed to be in the national interest, but which would affect a large number of private interests.
IEP	short for Intercity Express Programme (*see below*).
Infrastructure	Physical assets including railway tracks, stations, freight depots, tunnels, bridges, level crossings and communications equipment (such as signalling), and access to stations via the highway.
Intercity Express Programme	A Government programme to purchase new electric and bi-mode trains to replace the HSTs – supplier identified as Hitachi.
Interchange	term used to describe people transferring between transport modes, such as between bus and rail, or between two separate rail journeys.
ITSO	short for Integrated Transport Smartcard Organisation. A Government standard for 'smart' card ticketing that ensures compatibility between bus and rail companies across the country.
Journey time	The time taken by a train between its origin and destination stations.
LDF	short for Local Development Framework. A series of documents produced by each local planning authority setting out future spatial planning (housing and employment) in their area.
LENNON	short for Latest Earnings Networked Nationally Overnight. A national system that collects all ticket sales information and distributes the revenue to the train operators.
Local Enterprise Partnership, or 'LEP'	A locally-owned partnership between local authorities and businesses that will determine local economic priorities and undertake activities to drive economic growth and the creation of local jobs.
Loop	A section of track that allows slower, or stopping, trains to be overtaken by faster non-stop services. Often used to manage the mix between freight and passenger trains.
Main Line	In general, means any non-branch line. In the local context, the tracks with the highest line speed between Didcot and London Paddington.
National Stations Improvement Programme, or 'NSIP'	A DfT programme intended to achieve a noticeable improvement in the station environment for the benefit of passengers.
Off-peak	Generally means the time between 10:00 and 16:30 on weekdays, and at anytime at weekends and Bank Holidays
OHL	short for Overhead Line. Used to describe the masts and wiring necessary to provide a 25Kv AC electricity supply.

ORCATS	short for Operational Research Computerised Allocation of Tickets to Services. A computer system used for sharing revenue on inter-available tickets when a ticket or journey involves trains operated by more than one train operator.
Passing Loop	see *Loop*.
Path	the timing of a possible train movement along a given route. All the train paths on a given route constitute the timetable.
Peak time	Generally means the time between 0700-1000 and 1630-1900 on weekdays.
PPM	short for Public Performance Measure. A combination of figures for punctuality and reliability into a single percentage showing trains 'on time' compared to the total number of trains planned.
Punctuality	A train is defined as 'on time' if it arrives within five minutes of the planned destination arrival time for service from the Outer Thames Valley, or 10 minutes for long distance services.
RA	short for Route Availability. A system to determine the type of locomotive and rolling stock that may travel over a route, normally governed by the strength of bridges in relation to axle-loads and speed.
Rail industry	The collective term for a number of organisations (see Chapter 1) who have direct investment, regulatory and operational responsibility for the rail network.
Railbus	In Oxfordshire, used to describe dedicated rail-feeder bus services, such as the Cotswold Line Railbus, which are specifically time to connect with trains.
Redoubling	Reinstatement of track that was removed in the past to save money.
Regulated Fares	These fares are 'capped' to 3% above inflation each year and include saver returns, season tickets, standard singles and standard returns to any station in the London travelcard zones from a suburban area up to 50 miles from London.
Reliability	A train is regarded as being reliable if it completes all of its planned route and calls at all scheduled stations.
Relief Line	In the local context, the tracks with the lower line speed between Didcot and London Paddington, used by freight and 'local' stopping services.
Revenue Expenditure	The cost of investing in project feasibility and development, the marketing and promotion of rail services, and the cost of subsidising train services.
Route Utilisation Strategy, or 'RUS'	Network Rail study identifying current operations and forecast changes in demand to identify 'gaps', and a strategy with options for closing each 'gap'
Services	The running of trains, stations and freight terminals.
Statement of Funds Available, or ''SoFA'	the Government's statement of the public funds they are prepared to invest in the National Rail network for the next five year control period.
Station Commercial Projects Facility	A DfT/Network Rail funding facility that supports commercially focused station improvements, such as retail/car parks/revenue collection to reduce the cost of the railway to the taxpayer.
Skip stop	A calling pattern which minimises end-to-end journey times and increases capacity over a section of route by not having all trains call at all stations.
Station Travel Plan	A strategy for managing the travel generated by a station, with the aim of reducing its environmental impact.
Stored value	A top-up 'smart' card that deducts the cost of a train journey from the balance stored on the card. An example is London's Oyster Card.
tpd	short for Trains Per Day.
tph	short for Trains Per Hour.

Up	Generally means the direction of travel heading towards from London (i.e. Up Main Line or up train).
Transport Focus	nationwide independent consumer watchdog covering bus and rail
Value for money	Creating the maximum benefits from the resources available. A project or investment should generate more benefits than the cost of the project or investment.
'W10' Gauge	Height above rail 3.90m and width at station platform level 2.50m. This loading gauge is important as it allows the large fleet of existing Freightliner wagons to carry 9'6" deep sea maritime containers.
'W12' Gauge	Height above rail 3.90m and width at station platform level 2.60m. No route is currently cleared to this loading gauge. It would allow movement of all maritime containers and European gauge freight wagons through the Channel Tunnel.

Chapter 11

Delivery Plan

Introduction

It is vital for the success of our economy that we create the conditions to facilitate residential and employment growth and create a thriving, attractive county in which to live and work. That means we need an efficient and reliable transport network that will support planned growth and meet the needs of new developments.

It is vital that enhanced rail infrastructure is delivered in good time so it can meet the challenge of a growing population and strong economic growth. More jobs, more housing and more demand will drive the need for greater connectivity and new train services, including fast, reliable access to international gateways, such as Heathrow Airport. These are viewed as a critical factor in attracting inward investment and for growing the international science sector in Science Vale.

The county council is not responsible for planning and delivery of major rail investment schemes, and our role and that of our local partners is to make the case for rail investment that underpins our economic objectives. We will support the rail industry to facilitate and deliver a better rail network in a timely and efficient manner.

The schemes range from those that are already being developed by the rail industry to those that are emerging ideas and therefore will need further development to determine if they are viable. Improving the railway will include:

- Physical infrastructure to provide capacity and capability, i.e. the track, stations and structures;
- Improvements to equipment (such as signalling, in-cab radio and customer information systems);
- Service enhancements, including the provision of new rail vehicles and/or new services; and
- Supporting measures, such as how people get to the station, integrated ticketing and travel planning.

As a way of informing funders, we have considered how the rail network can support growth and generate added value to other government initiatives such as garden towns and enterprise zones. Our delivery plan sets out how locally we would expect to see rail investment prioritised over the next four five-year control periods. Of course, the timescales can be influenced by a number of different factors and may be subject to change.

The Delivery Plan is shown in Annex A.

Connecting Oxfordshire:
Local Transport Plan 2015-2031

Active & Healthy Travel Strategy

1. Policy Context

1.1 This updated Plan has brought active and healthy travel modes together as an Active & Healthy Travel Strategy. This builds on what was already in the original LTP4. It updates the LTP4 cycling strategy and adds new sections on walking and Door to Door integrated journeys, which covers longer journeys undertaken by cycling or walking in combination with bus or rail.

1.2 In 2015, the Government stated that it wanted to create "an environment where walking and cycling is the norm for short journeys or part of a longer journey". The Government issued a consultation draft Cycling & Walking Investment Strategy in March 2016, and aims to work with local government and others to ensure its effective delivery at local level. Oxfordshire County Council will seek to work with the Government to deliver a better cycling and walking environment.

1.3 In May 2016, Public Health England outlined five key messages when developing a healthy local transport strategy:

* Physical inactivity directly contributes to 1 in 6 deaths in the UK and costs £7.4 billion a year to businesses and wider society

* The growth in road transport has been a major factor in reducing levels of physical activity

* Building walking and cycling into daily routines are the most effective ways to increase physical activity

* Short car trips (under 5 miles) are a prime area for switching to active travel and to public transport

* Health-promoting transport systems are pro-business and support economic prosperity. They enable optimal travel to work with less congestion, collisions and pollution, and they support a healthier workforce.

(Source: Working Together to Promote Active Travel – A briefing for local authorities, Public Healthy England 2016)

1.4 Walking and cycling provide opportunities for people to take outdoor recreational exercise and Oxfordshire County Council is responsible for managing and maintaining an extensive network of public rights of way. This includes equestrians as well as walkers and cyclists. There is more information in the Council's Rights of Way Management Plan – link below:
https://www.oxfordshire.gov.uk/cms/content/oxfordshires-rights-way-management-plan

1.5 The Active & Healthy Travel Strategy aims to contribute to reducing pressure on the road network, contribute to economic growth and the reduction of emissions, quality of life and health, and link active travel with bus and rail options by enabling sustainable door to door journeys combining cycling or walking with public transport. It will link with and contribute to other strategies, as outlined in the diagram on page 4.

2. Why there is a need for an Active & Healthy Travel Strategy

Health and inactivity

2.1 A Joint Strategic Needs Assessment (JSNA) looks at the current and future health and care needs of local populations to inform and guide the planning and commissioning (buying) of health, well-being and social care services within a local authority area. The 2016 JSNA provides information about Oxfordshire's population and the factors affecting health, wellbeing, and social care needs. The JSNA found that in 2014, 21.9% of people aged 16 years and over in Oxfordshire were physically inactive. 63.1% of those aged 16 years and over in Oxfordshire achieved at least 150 minutes of physical activity per week. This was similar to the level for the previous year (62%). The proportion was similar to the South East (59%) and higher than in England overall (57%). Across the county, proportions varied - from 59.7% in West Oxfordshire to 65.9% in Oxford. However, these differences from the county average were not statistically significant.

2.2 In November 2013, Public Health England published Obesity and the Environment: increasing physical activity and active travel. The document stated that physical activity that can be incorporated into everyday life such as brisk walking and cycling has been found to be as effective for weight loss as supervised exercise.

"Creating an environment where people actively choose to walking and cycle as part of everyday life can have a significant impact on public health and may reduce inequalities in health" (Source: *Obesity and the Environment: increasing physical activity and active travel , Public Health England, 2013).*

2.3 The Department of Health document Start Active, Stay Active (2011) states that regular physical activity can reduce the risk of many chronic conditions including type 2 diabetes, as well as coronary heart disease, stroke, cancer, obesity, mental health problems and musculoskeletal conditions.

What does active travel have to do with transport?

2.4 Active and healthy travel can enable people build exercise into journeys that may already form part of their daily routine, rather than try to find time in busy lives to add exercise as an extra task. Walking and/or cycling can replace car trips to work, to the shops, or to catch trains or buses. Walking is the most frequent mode used for very short trips – 76% of all trips under one mile are walks *(*Source: *National Travel Survey, England 2014).*

2.5 However, there is evidence that people from disadvantaged areas are less able to benefit from active travel options. Disadvantaged areas tend to have a higher density of main roads, leading to poorer air quality, higher noise levels and higher collision rates in the UK. The obesogenic environment impact most on disadvantaged groups which discourages walking and cycling and exacerbates health inequalities (Source: Working Together to Promote Active Travel, Public Health England 2016).

2.6 Through this Strategy, the County Council will proactively seek ways for active travel and transport to play a role in contributing to the health agenda. For example, NHS England recently announced their 'Healthy New Town' programme. Developments or environments which encourage active and healthy travel can contribute to tackling key health challenges that this programme seeks to address, including obesity, dementia and social isolation. Two sites in Oxfordshire have been chosen to be part of this initiative – one in Bicester and another in Barton Park in Oxford.

Active travel can reduce congestion and improve punctuality

2.7 Congestion is bad news for the economy. In 2014, a report from the Centre for Economic & Business Research and Inrix estimated that the annual cost of congestion to the UK is currently £40 billion and set to rise to £3 trillion in 2030, if current trends continue. Figures released in May 2016 by the Department for Transport found that a total of £316.7bn miles were travelled by vehicles on the UK road network during 2015, a year-on-year rise of 1.6% and the highest level ever recorded. Long term trends show that since 1995, road traffic has grown by 18.6%. ((*Source:* Road Traffic Estimates: Great Britain 2015 Summary *Department for Transport 2016*).

2.8 More commuting by cycle (or for shorter distances by walking) and Door to Door travel using bus and/or rail in combination with cycling or walking has the potential to contribute to reducing vehicle congestion, increasing punctuality, reducing stress levels and providing businesses with a fitter, healthier workforce. It could also be quicker – for example, even the fastest car journey times into Oxford during weekday peak time (on the Woodstock Road) is just 13mph and the slowest average journey times (on Beaumont Street/Hythe Bridge Street) had an average speed of only 5.4mph. *(*Source: *Oxfordshire & Oxford City Congestion Monitoring 2014/15).*

2.9 There is evidence that cycling and/or walking boosts the economy. Research commissioned by Cycling UK in 2015 found that if cycle use increased from less than 2% of all journeys (current levels) to 10% by 2025 and 25% by 2050 (as recommended by the Parliamentary Cycling Group's *Get Britain Cycling* report), the cumulative benefits for England would be worth £248bn between 2015 and 2050. These economic benefits are generated chiefly through a physically fitter population, but also in terms of reduced congestion and absenteeism, improved air quality and consumer spending.

2.10 The overall costs to society from road transport is substantial, and there is evidence of its impact on the economy. It has been estimated that half of the UK's £10bn cost per annum in relation to air pollution comes from road transport (Source*: Health & Environmental Costs (European Environment Agency, 2014*). Further evidence suggests that switching active travel for short motor vehicle trips could save £17bn in NHS costs, with benefits being accrued within 2 years for some conditions (Source: Effects of increasing active travel in urban England and Wales on costs to the National Health Service (*Source: Jarrett, Woodcock, Griffiths el al 2012, published in The Lancet*).

2.11 Traffic can also endanger health through noise. People surrounded by daytime traffic noise louder than 60 decibels (db) were found to be 4% more likely to die prematurely than those who only experience noise levels of 55db. The World Health Organisation calculated that 40% of people in EU nations are exposed to traffic noise that exceeds 55db.

2.12 The Government recently consulted on a new draft Cycling & Walking Investment Strategy, and Oxfordshire County Council provided a comprehensive response. The Government is also promoting best practice through the Cycle Proofing Working Group, an advisory body to the Government on cycle proofing, a process which over time ensures that the built environment generally, and roads specifically, are seen to be safe, convenient and pleasant for cycle use by people of all ages and abilities.

2.13 The remainder of this document sets out the Strategy vision for healthy sustainable travel in three sections – cycling, walking and Door-to-Door active multi modal travel. In order to achieve the vision, we are creating an Oxfordshire Active Travel Steering Group that will oversee the development of the Strategy to promote healthy and sustainable travel. More details of the Steering Group and what it aims to do can be found in the Implementation Plan at the end of this Strategy (paragraphs 6.1 and 6.2). Recreational walking, cycling and horse-riding are mostly managed through the Rights of Way Management Plan (see paragraph 1.3) and there are clear connections between this and the Active and Healthy Travel Strategy.

3. Cycling Strategy

Cycling: why it is important and what needs to be done

3.1 The 2011 census data on travel to work in Oxfordshire found that 54% of people usually drive to work while just 7% of people cycle to work. As mentioned earlier, the number of people who usually drive short journeys to work in Oxfordshire is increasing and our roads are becoming more congested.

3.2 Cycling is one of the key elements of active and healthy travel. Overseen by the new Active Travel Steering Group Oxfordshire County Council and partners will work with Government, businesses, developers and cycle groups in order to create the foundation for cycling to become a major mode of travel in Oxfordshire. Cycling is a sustainable and non-polluting way of getting around, and comes with the added benefit of improving our health and well-being. It is also a low cost form of transport which can enable people on low incomes to travel.

3.3 Cycling alone cannot replace the car for long journeys, but a combination of cycling and public transport can create more door-to-door sustainable trips. Bike-rail or bike-bus can provide a seamless journey to almost anywhere. More details can be found in the Door to Door: active multi modal travel for longer trips section.

3.4 There are a wide range of cycles available, and this makes cycling a potential option for people who are mobility impaired or lack confidence. Electric bicycles (e-bikes) can help people who want to travel actively but may need assistance getting up hills. All e-bikes retain the ability to be pedaled by the rider and are therefore not electric motorcycles. They can offer an active and healthy travel option for a section of the population who do not currently cycle regularly or at all. Germany and Holland are the leaders in terms of e-bikes within Europe, with 42% and 20% respectively of total sales in the EU in 2014 (Source: *e-bikes sold in EU 2014 – statista.com*). The Oxonbike cycle hire scheme will shortly be offering e-bikes as well as conventional cycles (see paragraph 3.31)

3.5 Our vision is to make cycling a safe, simple and accessible option for people of all ages. In order to do this, we will consider adopting the six Good Design Outcome factors in the London Cycling Design Guide. These factors will also be proposed for walking – see paragraph 4.3. The six factors are as follows: Safety, Directness, Comfort, Coherence, Attractiveness and Adaptability.

3.6 Through the new Active Travel Steering Group, we will work with the Oxfordshire Cycling Network, Local Enterprise Partnership and other stakeholders to develop projects to meet our health and transport challenges. Oxfordshire County Council is updating its Design Guide, and this will include incorporating improved cycling design standards, drawing on good practice from Transport for London and Wales. In the longer term, and subject to funding, our ambition is for cycling to become commonplace, a mode that more people to choose as their first choice of journeys and where people start from as early an age as possible. Our aim is to ensure that more people will want to cycle to work as more cycling has the potential to reduce traffic congestion and improve air quality, especially in areas where there is a limited bus network. We also want to see demonstrable increases in levels of cycling for journeys to school, and access to services like health and shopping.

3.7 Where funding permits, the County Council will improve cycling infrastructure in order to provide an alternative sustainable and healthy way to travel. The Council and the Active Travel Steering Group will work with the five District Councils within the county to ensure that new cycling infrastructure and other cycling-related initiatives are coordinated. In collaboration with users, we will identify a series of strategic routes, which we will develop into Cycle Premium Routes and Cycle Super Routes, using updated best practice Design Guidance. Paragraph 3.14 provides more details. The greatest investment potential lies in connecting the areas of employment growth to transport hubs and areas of housing growth. Many of these routes may already have good levels of cycling or have the potential for more cycling if made safer.

3.8 Over time and where funding is available, local cycle networks will also be upgraded to enable safe, signed cycle journeys throughout the county, as well as providing links with Cycle Premium Routes and Cycle Super Routes. We have already developed cycle strategies and networks for Oxford, Bicester and Science Vale and propose to adopt this approach, including updated Design Standards, for other main towns in Oxfordshire, working with the OCN and other partners to improve the choice of safe, attractive, high-quality cycling routes in the county. We will promote these to residents and visitors, and ensure cycle parking is provided at key destinations

3.9 Encouraging and enabling more people to choose cycling is not simply about providing cycle routes, although that is important. We are aware of the need to enable people to become confident about travelling by bike. We will seek resources to provide a toolkit of cycling support, including training. Where possible, we will promote cycling using social media, workplace travel plans and personalised travel planning. The Journey Planning Tools will play a key role in the promotion of cycling.

3.10 Patterns of travel behaviour tend to be established very quickly. In order for cycling to be part of people's daily routine, new and expanding developments must be planned and built with making cycling (and walking) the most attractive forms of transport, within, to and from the development, using best practice design standards (more details in paragraphs 3.29 and 3.30).

3.11 Cycling will be considered and incorporated into the design of new roads at the earliest stage, and users and/or potential users consulted as part of this process. Our forthcoming updated Design Standards for cycling, which draws from best practice, will be used. It will also include Quality Audits to appraise place-making, which will include the opportunity for cycle audits with users, to be funded by developers as part of development planning, so that local people can have a direct input into what cycling infrastructure would benefit users.

3.12 One of the main aims of this Strategy is to contribute towards a reduction in air pollution. Replacing vehicle journeys with active and healthy travel options such as cycling, walking and door to door travel can make a contribution to the reduction of air pollution.Transport - particularly single occupancy vehicle trips - is widely recognised to be a significant and increasing source of air pollution in the UK and elsewhere. This is a serious risk to health for everyone. Although increased cycling cannot make a difference on its own, we will actively work towards achieving more cycling throughout the county as a contribution to reducing air pollution.

Our plans for increasing and enabling cycling

3.13 We have varying quality cycle routes in Oxfordshire, like the rest of the UK. To support our growth, transport and health objectives, we are committed to transforming the cycle network in Oxfordshire in the longer term and will identify funding from all available sources to ensure that the network continues to grow and that supporting infrastructure, such as cycle parking is included:

Cycling Strategy Table 1: cycle route categories

Cycle route category	Common features
Cycle Super Route	Safe, direct, well-signposted routes in and around Oxford's areas of major current and potential cycling demand
Cycle Premium Route	Safe, direct, well-signposted routes in areas across the county where there is substantial potential growth in cycling
Connector/Local Routes	Safe, well-signposted routes attractive for both leisure and commuter journeys, providing links around the county

3.14 For routes and areas where our analysis indicates the biggest potential growth in cycling and where funding is in place, we will create safer and connected routes for cyclists, which will comprise safer, direct routes. Our aim is that the routes will be of a quality to convince more people to consider cycling, using our updated Design Standards. Where possible and funding permitting, we will enhance the routes with branded signage, displaying details of destinations and the estimated time to reach these. Where possible, users will be involved in auditing the potential routes to

develop coherent user-friendly plans. We will aim to ensure all designers of schemes fully understand and take into account the needs of cyclists as well as using updated cycle design standards

3.15 We will also work to increase the number of residents and visitors to Oxfordshire choosing to cycle for recreation (see paragraphs 3.30-3.32 for more details).

Providing a safer environment for cyclists

3.16 Sharing narrow carriageway space with fast-moving vehicles – particularly HGVs – is intimidating for even the most confident, experienced cyclists. All available evidence shows that this is why most people will not cycle on the carriageway. Where funding is available, we will provide more segregated cycle lanes and other measures like advance stop lines at junctions. We will consider lowering speed limits and introducing other traffic calming measures in locations where cyclists share space with other vehicles, where these can be justified. In the longer term, our ambition is that there will be more fully-segregated cycle lanes on existing routes. Where space is not available, we will seek to sign cyclists along safer route options, to minimise the need for cyclists to ride on roads that have no cycle facilities. We will also consider reallocating space to cyclists where feasible and where funding permits, considering the needs of pedestrians where space is shared.

3.17 A safe cycle network is also a well maintained cycle network. Given limited resources available, we will identify a list of priorities for maintenance on key cycle routes.

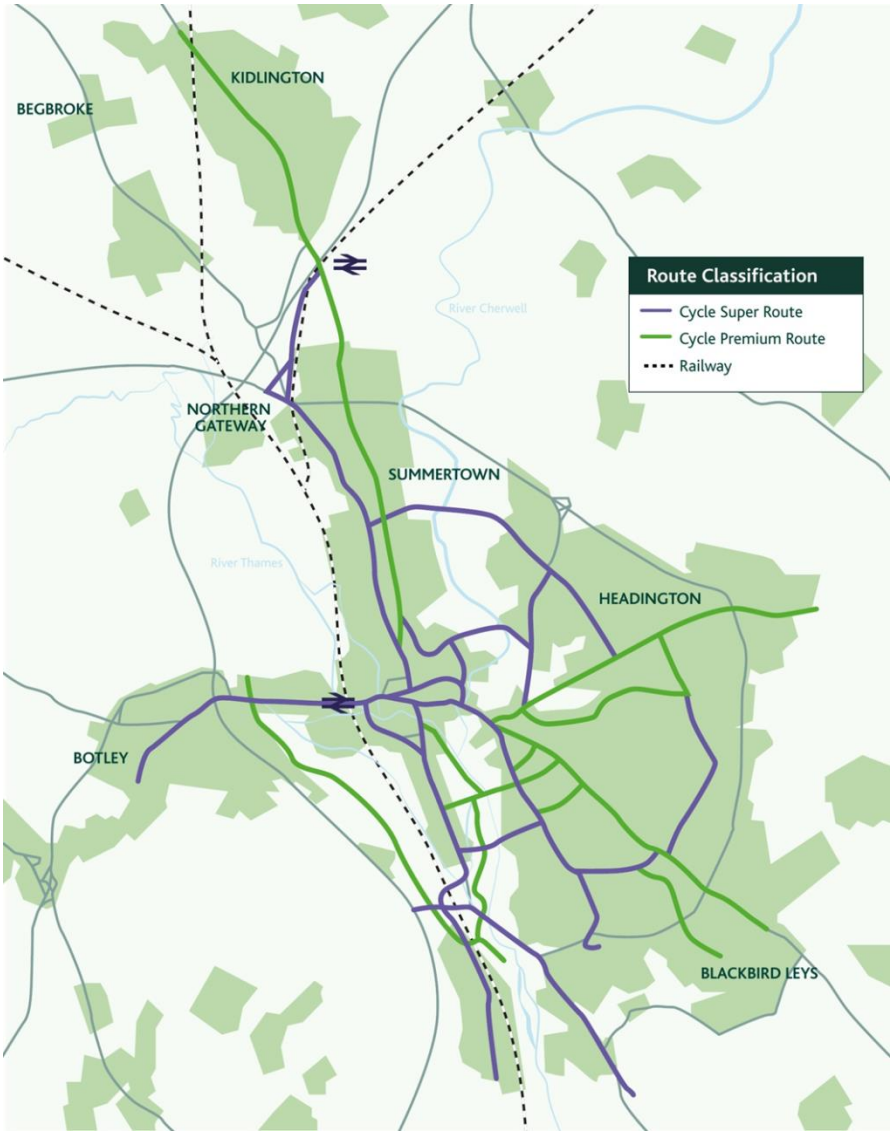
3.18 Oxfordshire County Council offers Cycle Training, to National Standard Levels 1 & 2 (combined), to all Oxfordshire primary schools, to help children aged 9 and above learn how to be safer on the roads - which, in turn, would encourage more cycling.

3.19 Currently, most of our cycling work is taking place in three areas of growth – Oxford, Science Vale and Bicester. A summary of our vision, ambition and the progress we are making on each area follows:

Oxford

3.20 Oxford already has an enviable cycling record with an estimated 75,000 cycle journeys made each day and monitoring of trips has shown a consistently high proportion of journeys made by bicycle into the city centre. But, there is an ambition to go further. Our aim is for Oxford to become a world class cycle city where cycling is accessible to everybody, regardless of age, background or cycling experience.

3.21 Long term, the ambition is for a fully joined-up and coherent and safe network of higher quality routes throughout the city that are continuous and direct, enabling cyclists to travel more quickly across the city. It will also mean overcoming major road and river barriers and providing cycle hubs at key public transport interchanges and major employment destinations. In the city centre, it also means more innovative cycle parking solutions to deal with future demand and a range of cycle types. The proposed network is based on a hierarchy of Cycle Super Routes and Cycle Premium Routes (shown in the figure below) and Connector Routes linking major origins and destinations.



Oxford cycle route categories (also outlined in paragraph 3.13)

Cycle route category	Common features
Cycle Super Route	Safe, direct, well-signposted routes in and around Oxford's areas of major current and potential cycling demand
Cycle Premium Route	Safe, direct, well-signposted routes in areas across the county where there is substantial potential growth in cycling
Connector/Local Routes	Safe, well-signposted routes attractive for both leisure and commuter journeys, providing links around the county

3.22 The Oxfordshire Transport Strategy therefore commits to providing high quality cycle infrastructure on all of Oxford's main roads and expanding and improving its network of quiet roads. This will include the following funded schemes:

Cycling Strategy Table 2 – Funded schemes in Oxford:

Our Cycle City Ambition project to install a pedestrian and cycle bridge at Oxpens to connect to future city centre redevelopment and the train station, along with improvements along the Thames towpath including certain sections being widened and resurfaced together with the installation of lighting as well as widening of the foot and cycle bridge over Bulstake Stream.
An increase in secure and conveniently located cycle parking in the city centre linked to the redevelopment of the Westgate Centre.

As part of the Access to Headington project, the first implementation of cycle super route facilities are planned for 2016/17 and 2017/18).
Botley Road (CSR), Banbury (CPR) and Woodstock (CSR) Road corridor studies are due to be completed by July 2016 and these will be used to bid for funding in future.

Science Vale

3.23 The Science Vale cycling network will focus investment on a series of strategic corridors across Science Vale where we will establish the Cycle Premium Routes that will become the focus of our future investment. A study will review existing routes and previous studies, and recommend a series of schemes required to provide a continuous Cycle Premium Route along each corridor. Potential schemes are listed below:

1	Wantage to Harwell Campus
2	Wantage to Milton Park
3	Abingdon to Milton Park
4	Abingdon to Harwell Campus
5	Didcot to Harwell Campus
6	Didcot to Milton Park
7	Abingdon to Culham Science Centre
8	Didcot to Culham Science Centre
9	Grove to Wantage
10	Didcot to Wallingford

3.24 Connector routes are an important part of the network but vary significantly in terms of value for money and contributing to increasing cycling. Here are some identified possible options:

1	Steventon to Milton Park
2	Chilton to West Illsey A34 junction
3	Backhill Lane Tunnel
4	Culham Village to Abingdon
5	A417 cycle path
6	Didcot Station to Power Station Roundabout area
7	Cow Lane underpass Didcot
8	Wantage Town Network
9	Didcot – a mini Holland
10	Other potential schemes within the towns and villages

Bicester

3.25 Investment in the Bicester's walking and cycling network aims to have an essential role in accommodating growth, encouraging sustainable travel choices, and raising the quality of the environment. The county council's Bicester area strategy reflects the benefits of and need for cycle infrastructure improvements and changing travel behaviour through Smarter Choices

3.26 As with cycling, we will review walking networks and improve routes with the greatest potential for increasing the numbers of people walking, particularly where improving the pedestrian environment would support economic growth and reduce

car use. We will also prioritise important walking routes for maintenance. This will include the following:

Central corridor cycle improvements will provide a strategic route for cyclists through the town between north and south, whilst public realm improvements in Bicester Market Square and The Causeway will enhance the quality of the pedestrian environment by creating a sense of 'place'.
The redevelopment of Bicester Village Railway Station is an opportunity to create a state of the art multi modal interchange offering high quality facilities for pedestrians, bus users and cyclists, including a cycle hub offering hire and repairs. We will also improve walking and cycling links to the station
Good wayfinding can greatly enhance the visitors' experience, can facilitate an increased number of visitors to key destinations within the town centre and can support local businesses which are of increasing importance to Bicester's economy and regeneration. As a result, Bicester requires an expansion of, and where necessary, signage for pedestrians and cyclists, which will be progressing through a wayfinding project.

New Developments

3.27 It is essential that new developments are planned with cycling in mind and with facilities to make cycling both convenient and safe. Designing new developments so that cycling is the most convenient transport method for the majority of trips will naturally increase the proportion of journeys made in this way.

3.28 For large new or expanded housing and employment development sites, we propose establishing the following principles. Developers must use and follow the new OCC Design Guidance (currently being developed).

- Developers must demonstrate through master planning how their site has been planned to make cycling convenient and safe, for cyclists travelling to and from major residential, employment, education, shopping and leisure sites within 5-10 miles, and also within and through the site.

- Site road network and junctions must be constructed with cycling in mind, including providing space for cycling on main/spine roads through the provision of, as a minimum, advisory cycle lanes of acceptable width.

- OCC may ask developers to fund Quality Audits, to include cyclability audits, so that the local user view is incorporated into new cycle facilities. The Active Travel Steering Group will consider the most effective Quality Audit process to adopt.

Oxonbike Cycle Hire Scheme

3.29 Using Government funding, Oxfordshire County Council launched a pilot cycle hire scheme called OXONBIKE to link Thornhill Park and Ride with Headington in 2013. The scheme has been very successful and recently expanded to other parts of the city. It was shortlisted for a National Travel Award in 2015. Management of Oxonbike has now been taken over by a Partnership, headed by Oxford University**.** There are plans for the scheme to expand to other parts of the city and surrounding areas, including other Park and Ride sites. Oxonbike was recently successful in a grant submission that has resulted in a fleet of electric cycles being added to the project**.**

Recreational Cycling

3.30 Cycling is the third most popular recreational activity in the UK - it is estimated over 3 million people cycle each month. Recreational and leisure cycling is often about taking the less direct route, using quiet roads, dedicated cycle tracks and public rights of way in addition to the road network. There is evidence that time spent cycling (and walking or horse riding) in green space can boost mental as well as physical health. Recent research looked at feedback from 1,250 people in ten studies and concluded that being in green space enables radical improvements in peoples' mental health and self-esteem (Source: *Longitudinal effects of green space on mental health,* published in Environmental Science & Technology Journal 48 (2014).

3.31 Less experienced cyclists may be put off by traffic volumes, driver behaviour, and/or road condition. The public rights of way network is mainly unsurfaced and subject to seasonal variations as well as other problems such as vegetation growth so its quality and availability can be variable. All these factors mean that choices can be limited, and can result in people choosing to drive to a location that can offer a safer cycling experience. As well as generating additional vehicle journeys this may reduce the number of new cyclists using the public network and mean they are less likely to choose to cycle for transport as well as recreation.

3.32 We will work to increase levels of cycling for recreation in Oxfordshire by

- Improving the available cycle network where feasible and where funding permits.
- In collaboration with our Countryside colleagues, improving the quality and resilience of the public rights of way network where possible and particularly where there is potential for increasing usage.
- Working with partners to improve the choice of other safe, attractive, high-quality recreational cycling and walking routes in the county, promote these to residents and visitors and provide cycle parking, where appropriate, at destinations along the routes. Promoting the use of green infrastructure as one of the tools to help create safer and cycling (and walking) and increasing peoples' exposure to nature and areas of high quality landscape
- Where the network has breaks in continuity that affect levels of use, we will work with colleagues, local communities and other stakeholders to find solutions.
- We will also look to reduce traffic speeds and influence driver behaviour where space is shared with vehicles.

"Soft" measures – Awareness, Motivation and Opportunities for cycling (and walking)

3.33 A new One TRANSPORT project aims to create a 'oneM2M' (machine to machine)-based Open Ecosystem for Nationwide Transport Integration. The project is looking to make transport more user friendly and accessible across Local Authorities, bringing all transport related data to one platform. Four local authorities (Oxfordshire, Buckinghamshire, Northamptonshire and Hertfordshire County Councils) are partners for the project. The data will be more accessible to app developers, and as such, we hope that it will encourage the production of new and innovative apps to support travellers and boost uptake of alternative modes of transport to driving.

3.34 We are also developing Journey Planning Tools, including free downloadable apps which will be a key element of encouraging and enabling cycling and other elements of active and healthy travel. The aim is that these will be mobile friendly, pull together journey planning information to one location and deliver a product that goes beyond other journey planners.

Funding for cycling

3.35 Councils no longer receive funding directly to spend on transport improvements, which means that for each transport scheme for which the Council wants to seek funding (from Government or elsewhere), it has to prepare a bid. Where there is a clear justification and outcome, we will commit to applying for grant and other funding opportunities announced for cycling and related schemes. Where possible, we will make improvements at low cost by including cycling and walking improvements in highway maintenance schemes.

3.36 The other main source of funding is from development. We will work with developers to ensure that funding is used to provide high quality cycle infrastructure as outlined in our updated Design Guidance, designed-in to their own development plans and secure Section 106 money to improve cycle facilities in and around the site, to encourage people to cycle as soon as they move in to the development. Where appropriate, Community Infrastructure Levy (CIL) funding will be used to provide cycle schemes or sections of the county cycling network, informed where possible by cyclability audits.

Cycle scheme assessment and prioritisation

3.37 As schemes and funding opportunities come forward, we will need to ensure there is a robust means of assessing projects against the outcomes of this strategy and any bid criteria, to maximise our chances of success in securing funds and developing cycling throughout the county. This will be a task for the Oxfordshire Active Travel Steering Group. For more significant and costly schemes, especially those which require Local Growth Fund funding from the Oxfordshire Local Economic Partnership, schemes will be prioritised against their contribution to meeting the LEP objectives of Innovative Place, Innovative People, Innovative Enterprise, and Innovative Connectivity. Where schemes require Major Scheme funding (generally those costing over £5 million) then they will also need to be justified through a Business Case based upon the government's five-case model – economic, strategic, financial, management and commercial - before funding becomes available

Best Practice

3.38 As stated, we are currently in the process of updating our Design Guidance for cycling. It will consider lessons from other successful cycling cities and regions from the UK and beyond, while making the document relevant to the specific transport demands of our county, to our ability to influence developers and taking into account the likely budget we shall have available for schemes over the coming years.

4. Encouraging and Enabling Walking

Walking – why it is important and what needs to be done

"Nationally, walking is the most frequent mode used for very short distance trips: 76% of all trips under one mile are walks. For all other distance bands, the car is the most frequent mode of travel. …Walking accounts for 22% of trips, but is mainly predominant for very short distances". (Source: NTS England 2014).

4.1 Walking emits less carbon than any other form of transport. From a strategic transport perspective, its advantage is that it uses less space than other forms of transport and does not require any parking facilities. However, walking is also much more than a form of transport - it is good for our physical and mental health, improving walking facilities can also create stronger communities and higher levels of walking can benefit personal security and help reduce crime –. .

4.2 Our approach to walking has been developed to reflect four key aims:

- To set out Oxfordshire County Council's overall aspiration to enable and encourage walking over the lifetime of the Active & Healthy Travel Strategy.
- To provide a means to prioritise funding available to the County Council for the best value for money investments for walking and to adopt good practice standards from elsewhere
- To support Oxfordshire County Council in enabling additional funding opportunities for walking measures
- To raise awareness of the physical and mental health benefits of walking. There is evidence that walking (or cycling) in green space provides significant mental as well as physical health benefits (see paragraph 3.32).

Outlining aspirations, tools and targets to support walking

4.3 Our overall aspiration is for walking to be the travel mode of choice for short trips and the most popular and accessible form of recreational activity. Our long term ambition is for our streets and public spaces to be accessible to all users, particularly more disadvantaged groups such as people from disadvantaged areas, older adults and people with disabilities. Consultation with people with disabilities has highlighted the importance of adequate road crossings, pavements, toilets and public seating as well as organisational and attitudinal factors to encourage walking (Source: *Living Streets: Overcoming barriers and identifying opportunities for disabled people (2016 – in press).* A more comprehensive list of categories for consideration can be viewed in paragraph 4.6.

4.4 Walking can be more challenging in rural areas than in urban ones. For example, a lack of pavements can discourage walking, even for short distances. The Department for Transport commends adopting a Safe Systems approach, emphasising the need to protect vulnerable road users, including pedestrians, cyclists and equestrians (Source: *Working together to build a safer road system – British road safety statement*, Department for Transport 2015).

4.5 Subject to approval, we will adopt the six Good Design Outcome factors –adopted by Transport for London (TfL) in the London Cycling Design Guide for walking as well as cycling (see paragraph 3.2. Although this refers to cycling and green space, it is equally applicable to walking). The six factors are as follows: *Safety, Directness, Comfort, Coherence, Attractiveness and Adaptability*

4.6 There are other tools that could be adopted to improve walking facilities. The Welsh Assembly document, Creating an Active Wales, outlines the following factors that encourage people to be more active:

Proximity of local services to people
Streets designed to encourage physical activity
Attractive environments that are perceived to be safe
Traffic reduction and calming measures
Well-designed user-friendly walking (and cycling) routes, which also consider the needs of disabled people
Access to well-designed and maintained green spaces such as parks
Access to a variety of environments for play

4.7 Walking, particularly in urban areas, is generally a short distance activity for users. Living Streets outlined eight key categories for consideration when evaluating the street environment to ensure that it provides comfort and safety for people on foot.

Footway surfaces & obstructions; issues such as footway condition, alignment and condition of street furniture, shop front displays and road works.
Facilities & signage: toilets, benches, litter bins, lighting and signage
Maintenance & Enforcement: litter, flyposting and graffiti, parking enforcement
Personal security: lighting levels, sightlines, surveillance, anti-social behaviour and escape routes
Crossing points & desire lines: formal (zebras, pelicans, puffins) and informal (no specific provision), including consideration of desire lines (where people most want to cross).
Road layout & space allocation: the share of space allocated to different users and the relationship of different elements of the street to each other
Aesthetics: beauty & interest, public art, fountains, statues, green space/noise, ugliness
Traffic: traffic speed and volume, air pollution, noise and smell

Prioritising funding opportunities

4.8 In collaboration with Active Travel Steering Group, the Council will look for external funding opportunities to improve facilities for walking and review other funding opportunities, including developer funding, consult with stakeholders and ensure that good practice is followed and the best value for money investments are made.

5. Door to Door: multi modal travel for longer trips

Door to Door multi modal travel: why it is important and what needs to be done

> "Traditionally, different modes of transport have been considered separately – with separate policy teams, separate funding and separate providers. While this reflects, arguably, how industry operates, it does not reflect the way people think about their journeys. When planning the commute to work or a long-distance trip, people think about the cost, convenience and complexity of the entire door-to-door journey – not simply one element of it. To encourage and enable more people to choose sustainable transport for the whole journey, we need to focus on improving the entire door-to-door journey. That way, we can not only help to meet carbon reduction targets, but also increase use of public transport – so reducing congestion – and encourage health travel choices" *Door to Door – A Strategy for improving sustainable transport integration (Department for Transport 2013).*

5.1 Our ambition is to create an environment where more Oxfordshire residents will consider Door to Door sustainable integrated journeys within and beyond the county, rather than using a private vehicle for longer trips.

Cycling/walking and rail

5.2 Improving facilities for Door to Door journeys via cycle/rail has huge potential for reducing congestion and making a contribution to improving air quality. Over 1.6 billion people travelled by rail in 2014-2015, an increase of 4.2% from the previous year and 69.5% since 2002-3.

5.3 Many of these journeys involved an element of vehicle travel, adding significantly to congestion, pollution and lack of parking spaces. An example is Hanborough Station, which has seen passenger numbers rise from 75,000 in 2004 to over 200,000 today. Its new 200 space car park is now reaching capacity on most weekdays.

5.4 Cycle parking has increased at many Oxfordshire rail stations with positive outcomes. Examples are Oxford Parkway and Didcot, where high quality facilities have led to increased usage by cyclists. We will continue to upgrade cycle parking facilities where there is most use/ potential use for cycling journeys. We will also seek funding to improve walking routes to rail stations where there is evidence of existing or potential walking numbers, including signage with timings, better facilities for crossing roads and segregated routes for pedestrians to safely access the stations.

Cycling/walking and bus

5.5 Given the reduction in funding for supported transport for Oxfordshire, development and expansion of the core commercial bus network and proposals for new transport hubs such as Park and Ride sites, there is an opportunity for more walking and cycling to bus/rapid transit corridors, and interchanges. One way of visualising this is to think of a "catchment area" of a bus stop – typically 400m for walking to an urban stop (e.g. about 5 minute walk). Cyclists can travel longer distances to bus stops, but secure cycle parking is an essential component of cycle/bus travel.

5.6 Door to door travel integrated cycle and bus travel is different to cycle/rail in many ways. Given the number of bus stops and wide variation in the numbers of users, there is a clear case for prioritising access to popular routes such as Oxfordshire's Premium Bus Routes and coaches to London. There are already examples of good practice on the main Oxfordshire bus routes, such as the X13 service between Oxford and Abingdon with good parking facilities for cyclists.

What we will do

5.7 The Park & Ride network is popular and well used. We will work to improve cycle facilities and cycle and pedestrian routes, and explore the potential for expansion of the Oxonbike cycle hire scheme to existing and planned Park & Ride sites. We will also work with bus (and rail) operators to improve facilities for Door to Door travel.

5.8 In order to facilitate cycle/bus travel where there is most potential in terms of user numbers, we will aim to work with operators and other stakeholders to provide:

Accurate accessible and reliable information about the different transport options for journeys via the Journey Planner
Convenient and affordable tickets for an entire journey
Facilities , including secure cycle parking at stations and main bus stops , at all stages of the journey between different modes of transport
Safe, comfortable transport facilities

5.9 For rail stations, other transport interchanges and bus stops where analysis indicates the biggest potential use and where funding is in place, we will seek funding to create safer and direct routes for cyclists and pedestrians, which will comprise safer, direct routes and secure cycle parking. The Active Travel Steering Group will lead on the development of this initiative, including the identification of priorities.

6. Implementation Plan

Oxfordshire Active Travel Steering Group

6.1 In order to oversee the Strategy, an Oxfordshire Active Travel Steering Group is currently being set up, which will include membership from cycle groups and other partners. The purpose of this new group is set out below, as well as an Implementation Plan for 2016/17. This Strategy will be regularly refreshed, and Implementation Plans for future years will be included.

6.2 **Purpose of Oxfordshire Active Travel Steering Group:**

1.	**Oversee the development & implementation of the Oxfordshire Cycling strategy and associated proposals as part of a wider Active & Healthy Travel Strategy**
2.	**Provide a structure and mechanisms for positive discussion and agreement between Councils, cycle groups, developers and other organisations**
3.	**Prioritise, commission and review "task and finish" groups**
4.	**Work with the Oxfordshire LEP and Department for Transport to target support and funding opportunities**
5.	**Prioritise and agree proposals for investment and feed into Growth Board proposals, funding bids and schemes**
6.	**Engage with partnership bodies, including the LEP, Universities, OCC Public Health, OCC Countryside and District Councils**
7.	**Develop, prioritise and agree proposals to promote Active Travel within Oxfordshire, including links with other projects and developments.**
8.	**Have early sight of planned projects, bids and developments, so that opportunities to enhance active travel can be built in at an early stage**
9.	**Promote active travel and propose how it feeds into other projects and programmes**
10.	**Monitor and review completed schemes and interventions, identify lessons learned and establish examples of good practice**

6.3 **Active Travel Implementation Plan 2016-17**

AT1	**Set up the new Active Travel Steering Group (ATSG) to oversee the development and implementation of this Strategy and monitor all elements of the Active & Healthy Travel Strategy – e.g. cycling, walking and Door to Door travel. The new Group will undertake a range of tasks, including identifying funding opportunities, monitoring and reviewing completed schemes and interventions, identifying lessons learned, prioritising and agreeing proposals for investment and quantifying the benefits of active travel.**
AT2	**Identification of funded projects to add to the Cycle Premium Routes and Cycle Super Routes (CPR) network.**
AT3	**Identification of maintenance priorities for cyclists and walkers in the county. This will be an on-going annual task. Given that only a limited budget is available, it is essential to ensure that resources are directed to where they are most needed.**
AT4	**Completion and implementation of updated best practice Design Guidance to ensure high standards of implementation for cycling and walking (as distinct and separate elements) and to ensure high standards in terms of developer funded infrastructure**
AT5	**Working closely with Public Health and Countryside colleagues to raise awareness of the health benefits of walking, cycling and Door to Door travel and seeking funding opportunities for healthy and active travel initiatives, including recreational cycling and walking.**
AT6	**The ATSG will undertake an analysis of the priorities for improving Door to Door journeys involving rail stations and premium bus hubs and will ensure that limited funding is directed to where there is most use and/or potential increase in numbers of users.**
AT7	**The ATSG will commission, oversee and review research and statistical reports in relation to cycling, walking and Door to Door travel.**
AT8	**The ATSG will provide a further Implementation Plan for 2017/18**

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Connecting Oxfordshire:
Local Transport Plan 2015-2031

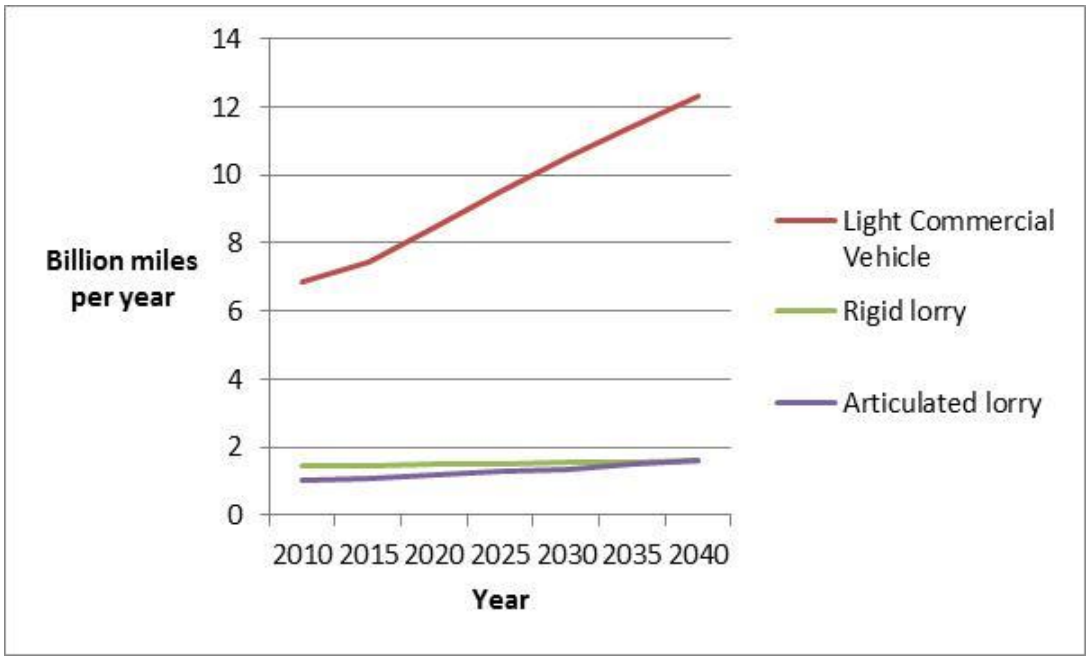
Oxfordshire Freight Strategy

Oxfordshire Freight Strategy

Introduction

1. We rely on an efficient and reliable freight network for our daily lives, to bring food to our supermarkets, parcels to our doors and link our manufacturers with their suppliers. We need to enable reliable freight transport between businesses, their supply chains and their customers and so make Oxfordshire an attractive location for business and employment.

2. The nature and volume of freight traffic is likely to change substantially over the period of this strategy. All of the Department for Transport's forecast scenarios for south-east England involve a substantial road traffic increase for light commercial vehicles and articulated lorries in proportion to present (see Figure 1). Freight traffic growth from our Strategic Economic Plan, with its aim to promote high tech industry, is likely to reflect and even exceed this pattern of growth in light commercial vehicles.



Freight Strategy Figure 1: Forecast growth in freight on all types of roads in south-east England excluding London, billion miles per year (source: Department for Transport Road Traffic Forecast 2015 – extrapolated trend)

3. To provide for this we need to make more efficient use of transport networks and systems across all modes of transport, including use of the rail network. However, the majority of freight movements in our predominantly rural county will continue to be by road. It is essential that we make use of our road network as efficient as possible, with larger goods vehicles using the strategic road network in preference to minor roads, encouraged by measures to reduce journey times and increase journey time reliability on these important major routes.

4. Freight vehicles can have negative effects on congestion, road safety, air quality and the wider environment. These depend very much on time and particularly place, with lorries negotiating narrow streets through villages and market towns generating numerous complaints from local residents. This can also impact on other modes of transport that LTP4

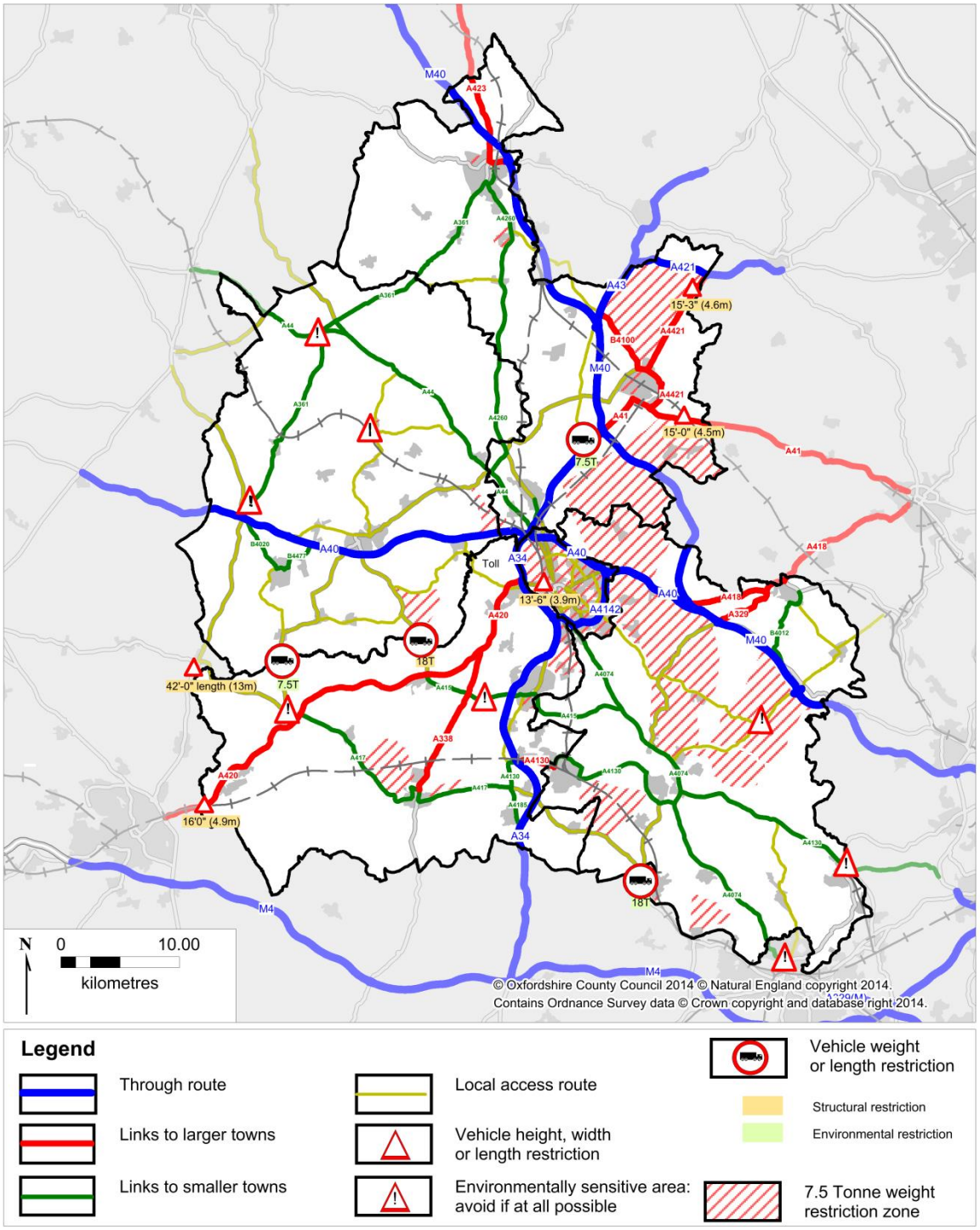
is seeking to encourage, for example delays to buses particularly from on-street loading and the risks to cyclists and pedestrians from large lorries which can deter use of these active modes of transport.

5. However, it is not a simple trade-off between economic benefits and environmental costs. A safe and attractive environment where people and goods can move around freely is a vital component of the county's economic offer as a place to live, work and visit. This is what our freight strategy aims to deliver for Oxfordshire.

6. The Department for Transport has published the estimated external cost per lorry mile of using different categories of road.[1] These vary from 82 pence for A class roads to 235 pence for other (lower classification) roads. This reflects various environmental costs but the critical factor is infrastructure, where the costs are 7 pence for motorways, 24 pence for A roads and 171 pence for other roads. This illustrates the economic and environmental benefits of keeping lorries on the strategic road network as far as possible.

7. Oxfordshire County Council is currently reviewing cycling and HGVs in order to understand how cyclist casualties can be reduced. The group currently includes members of the Oxfordshire Cycling Network, Cyclox and an HGV representative.

[1] *Freight mode shift benefit values technical report: an update,* DfT, 2014



Freight Strategy Figure 2: Oxfordshire lorry route map

Key Principles

8. We will base our freight strategy on the following six principles:

    a. **Understand** patterns of freight movements including time, origin and destination, as well as any problems encountered by operators and their customers and those experienced by local communities and other road users. Surveys may be required to improve our evidence base in an area where data is currently limited and will be undertaken when resources allow.

    b. **Inform** freight operators of the best routes to use and routes and locations which should be avoided where possible. We will take advantage of new technology and best practice to help manage freight movements, notably through our recent adoption of Freight Gateway. This system uses local authority data to provide the National freight Journey Planner and also feeds into lorry specific satnav and commercial logistics software, to get our preferred lorry routes and environmentally sensitive locations to a wider audience in the road haulage industry.

    c. **Encourage** use of the strategic road network by traffic management measures, working with Highways England on the A34. This could include better provision of high quality rest facilities, coupled with the removal of sub-standard laybys where these can adversely affect road safety and congestion. This also means using the opportunity presented by investment in rail in Oxfordshire to shift freight from road to rail in support of our Route Based Strategies in the county.

    d. **Deter** use of inappropriate minor roads and movements through towns and villages and other environmentally sensitive areas, except where this is essential for local access. This also helps to minimise damage by lorries to road surfaces and bridges. We will set out our policy on the introduction of further environmental weight limits in Oxfordshire and on their enforcement.

    e. **Manage** freight and logistics in partnership with public sector organisations and businesses to achieve maximum efficiency and reduce waste by eliminating unnecessary trips. This might involve consolidation of items from diverse origins, combining them for onward delivery to the same destination, possibly including the use of smaller or low emission vehicles in sensitive environments such as urban centres with poor air quality.

    f. **Plan** the location of new employment sites and any related transport infrastructure so that these can function well, with efficient freight access to and from the strategic transport network without adverse impacts on local communities, road users and the environment.

These principles are developed further below.

Understand patterns of freight movements

9. We will improve our understanding of freight transport, the needs of freight operators and their customers as well as the impacts on local communities. This may involve surveys

where resources permit but also knowledge gained from the national freight journey planner, the development of Construction Logistics Plans and Delivery and Servicing Plans.

Inform freight operators of the best routes to use and those to avoid

10. There has been growing public and political concern in recent years about the number of lorries passing through towns and villages in Oxfordshire. In 2012 the Oxfordshire lorry routes map was updated to show both recommended routes and restricted locations. However, few drivers and freight operators use individual local authority maps such as these so the impact on route choice is limited.

11. Oxfordshire County Council has therefore signed up to the National Freight Journey Planner offered by the specialist mapping data consultancy PIE. This is an opportunity get our lorry route data to a wider audience. Drivers and companies are more likely to use the national Freight Gateway journey planner product than individual local authority maps such as Oxfordshire's.

12. Freight Gateway allows an operator to enter details of a particular vehicle (size, weight, etc.) and routes it accordingly. Freight Gateway shows the user the location of restrictions so that it is clear why a particular route is being recommended. It will incorporate all the details of our restrictions and recommended routes. Features include a lorry watch link to allow local people to report breaches of weight restrictions and detailed local mapping.

13. This data is also made available to other portals and to logistics companies with their own software to inform how they plan their activities. It also feeds in to certain lorry-specific satnav products.

Encourage use of the strategic road network and of rail freight

14. The rationale for our Route Based Strategies for the A34, A40 and A420 is to encourage lorries and through traffic to stay on the strategic route network as much as possible. There are various traffic management measures that can help to achieve this objective. For example, removing laybys from main roads can help because large vehicles pulling out slowly onto a road with fast traffic can be a safety hazard as well as a significant cause of congestion. It is important to note that, while major development is concentrated in areas well served by the strategic route network, this can lead to increased congestion on the routes we want lorries to use.

15. Rest areas for lorry drivers are an important element in an efficient freight network. Proper facilities with security, refreshments, washing and toilets also cater better for drivers in terms of health and safety. They also help to avoid inappropriate use of laybys and parking on-road, which can cause obstruction and serious environmental problems to local residents. Unfortunately, in recent years the smaller service stations have withdrawn from catering for

HGVs, leaving only motorway service areas and a few lorry parks. Motorways and trunk roads are better served including Oxford services at M40 junction 8, Cherwell Valley services at M40/A43 junction 10 and Chieveley services (outside Oxfordshire) at M4/A34 junction 13. However, the Road Haulage Association (RHA) and Freight Transport Association (FTA) have identified a need for additional capacity at a site or sites close to the Oxford ring road.

16. Significant volumes of rail freight pass through Oxfordshire, particularly between the port of Southampton and the Midlands and North of England. A recent project to increase the loading gauge, enabling larger containers, has removed thousands of HGVs from the A34. Other rail freight includes aggregates, waste, MOD supplies and finished cars. It is heavy and bulky items like these for which rail is most competitive, and we will support the provision of appropriately sited rail freight facilities, subject to funding being available and having regard to the impacts on local communities and on the road and passenger rail networks.

Deter use of inappropriate minor roads through towns and villages

17. The county council will consider environmental weight restrictions across the County, particularly areas which are subject to significant levels of HGV traffic, prioritising the towns of Burford, Chipping Norton and Henley-on-Thames. However, the county council is very unlikely to have any funding available for this in the coming years so any schemes would need to be funded through development and/or by local communities, businesses and town/parish councils.

18. Our policy on new environmental weight limits is that it would first be necessary to establish that a particular location has a problem in terms of environmental and economic impacts as reflected in congestion, air quality, road danger and public concern. It would then be necessary to identify the share of HGV traffic that does not constitute local access based on origin and destination surveys and other data, as well as analysis of alternative routes. Consideration of weight limits would also need to have reference to the road hierarchy set out earlier in this Local Transport Plan.

19. In the case of Chipping Norton, a scheme to change the status of the A44 would be required before a new environmental weight limit could be considered. In line with policies 4 and 29 of the Local Transport Plan, taking note of Table 2 of the LTP, we will seek to remove the primary route status on the A44 between Oxford and Moreton-in Marsh. This would open opportunities to reduce HGV movements through Chipping Norton and address the air quality problems. However, as with weight limits, this would need to be funded through development and/or the local community, businesses and the town council.

20. In Oxford we will review signing on the ring road to ensure that lorries are directed to their destinations within the city by the most appropriate routes. It is sensible to co-ordinate this with work to develop the cycle network to try to reduce the danger that lorries pose to cyclists.

21. Neighbourhood Weight Watch is an existing scheme using volunteers, often in partnership with parish and town councils, to report lorries contravening weight and other restrictions. We will integrate this scheme with the LorryWatch on line reporting facility that is part of

Freight Gateway. It can supplement the limited resources available for enforcement (Thames Valley Police and OCC Trading Standards). Trading Standards have a separate policy for prioritising the enforcement of the various weight limits in Oxfordshire in the most appropriate and effective way.

Manage freight and logistics to achieve maximum efficiency

We will engage with freight and logistics operators and other stakeholders, reflecting our resource levels and prioritising practical solutions to problems raised.

22. The County and City Councils have discussed with local stakeholders the possibility of freight consolidation and trans-shipment to reduce the negative impacts of goods vehicles in the city. These include congestion, poor air quality resulting from (diesel) emissions, and accidents, particularly involving cyclists and pedestrians.

23. Freight consolidation means combining loads from various sources to one or a number of closely located destinations. It is a technique already practised by large retailers with sophisticated logistics operations and it reduces the number of separate goods vehicle journeys and total goods vehicle mileage. Trans-shipment means switching to smaller, sometimes electric delivery vehicles for the "final mile". In Oxford there are two areas that could benefit from freight consolidation - the city centre and the Headington area including the hospitals and University sites.

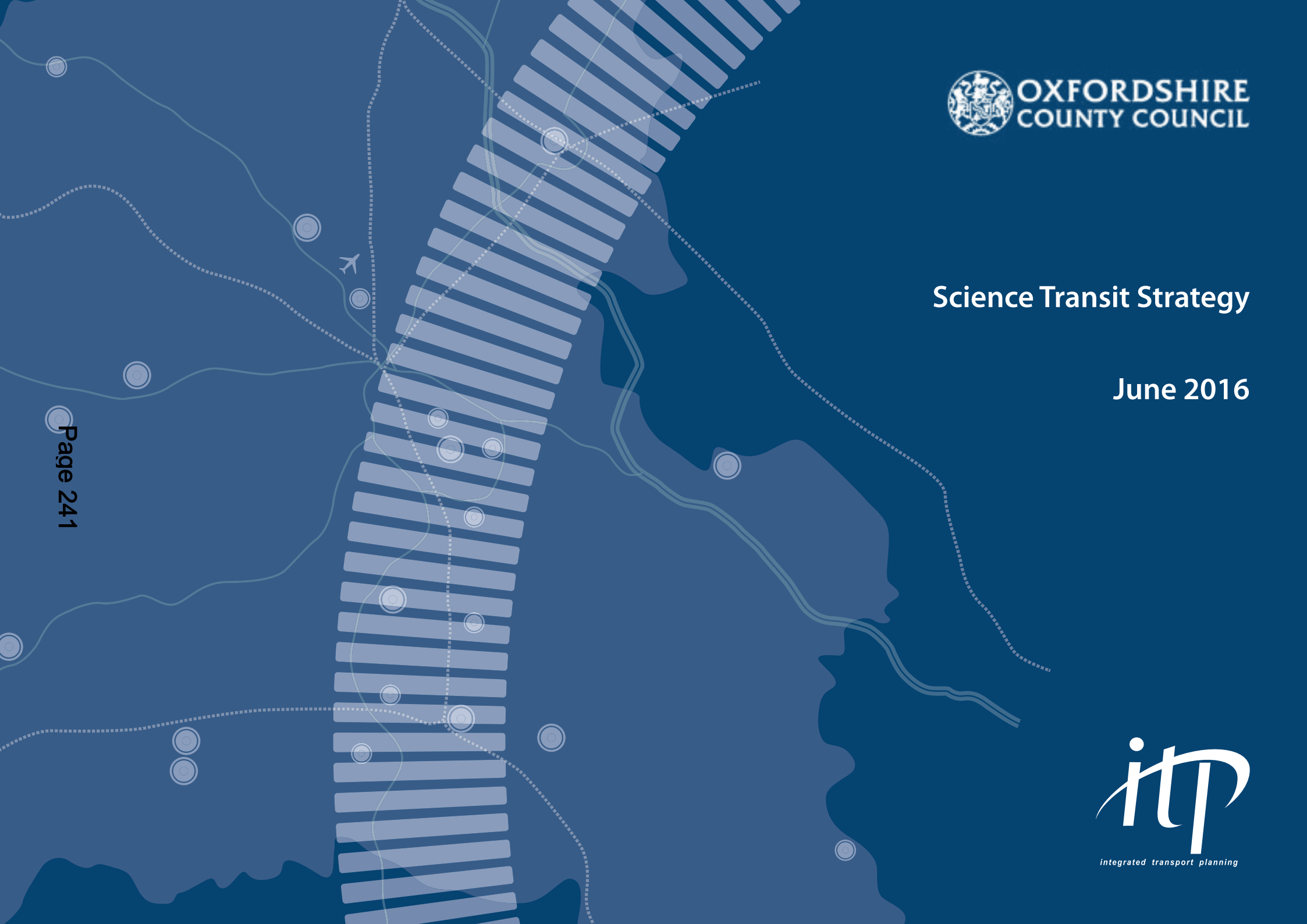
24. Other options include Construction Logistics Plans (for major developments while under construction) and Delivery & Servicing Plans (for existing and newly completed developments). These are like travel plans and help businesses to organise their deliveries and collections to reduce lorry trips but also to bring efficiency savings. They can be linked to the use of approved operators under a Freight Operator Recognition Scheme (FORS) with standards for safe and environmentally friendly operation.

Plan the location of new employment sites and any related transport infrastructure

25. We will influence the location and design of new development, particularly employment sites and any related transport infrastructure so that these can function well, with efficient freight access to and from the strategic transport network without adverse impacts on local communities, other road users and the environment. We will work closely with local planning authorities within the National Planning Policy Framework.

26. We will ask developers of major sites to prepare Construction Logistics Plans to minimise the impact of the large scale residential and business development planned for Oxfordshire, as well as Delivery and Servicing Plans to ensure that businesses make ongoing arrangements for sustainable freight and logistics.

27. We will take careful account of the need for an efficient and sustainable freight network as we look to refine Infrastructure Development Plans as part of emerging Local Plans. We will seek developer contributions to mitigate the impact of freight traffic on the environment and on the local and strategic road network.



OXFORDSHIRE COUNTY COUNCIL

Science Transit Strategy

June 2016

itp
integrated transport planning

CONTENTS

Glossary of Terms

ATOC RJIS	Association of Train Operating Companies' Rail Journey Information Service. The IT system used to provide the timetables, fares, route planning, ticketing and transaction services needed to buy rail tickets and complete travel enquiry requests in the UK.
Autonomous vehicles (driverless vehicles)	Vehicles able to sense the road environment around them and navigate themselves to destinations by negotiating other traffic and road hazards. Vehicles are being manufactured with increasing degrees of autonomy and are anticipated to become fully driverless within the next 10-15 years.
Bleeding edge	Technologies considered so new that they could have a high risk of being unreliable and require considerable investment in order to make use of them. A proportion of bleeding-edge technology will find its way into the mainstream (e.g. email).
Crowd sourcing	A distributed problem-solving and production process that involves outsourcing tasks to an undefined public ('crowd') rather than a specific entity.
Data mining	The computational process of discovering patterns in large data sets involving methods that combine artificial intelligence, machine learning, statistics, and database systems.
Digital exhaust	Virtual 'trails' of data that are generated by individuals and things through their electronic interactions and transactions with both private and public sector organisations.
Disruptive innovation	Innovations which help to create new markets or value chains, and eventually disrupt existing markets and value chains (over a period of years or decades), to the extent they displace earlier technologies. E.g: the DVD player was a disruptive innovation for VHS players.
GNSS	Global Navigation Satellite System (GNSS) receivers commonly-used for surveying and navigation.
GPS	A space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more global positioning satellites.
Hackathon	A hackathon (also known as a hack day, hackfest or codefest) is an event, typically lasting between a day and a week, in which computer programmers and others involved in software development come together to create usable software. Transport hackthons can focus on building exciting transport-related apps, visualisations, or conduct insightful data analysis.
Innovate UK	The organisation formerly known as the Technology Strategy Board, which is responsible for disbursing innovation funding, mentoring and networking in order to accelerate the uptake of innovative technologies and practices across UK industrial sectors.
INRIX	One of the major global providers of live traffic and road network incident data, which is also increasingly being made available for analysis and transport modelling.
Intelligent Mobility	More responsive and predictive transport systems that: Better meet the needs of an inclusive society by efficiently and sustainably connecting goods, services, events and people; Optimise the use of available infrastructure capacity to maximise the time, energy and resource efficiency of travel and transportation. Are more readily connectable and flexible - promoting seamless intermodal journeys that can flex according to disruptions, changes in schedule or priority, and competing demands for seemingly unrelated services Generate smaller environmental and social impacts than current transport systems
Internet of things (IoT)	The proliferation of devices and ICT applications connected to the internet (such as smart meters, smart grids, and smart transport services) based on sensor networks and machine-to-machine communication. The number of networked sensors and information generators is growing at over 30% per annum, creating a rapidly expanding 'Internet of Things' (IoT) that is projected to contain as many as 50 billion devices by 2020.
Interoperability	The ability of different networks or discrete, closed systems (e.g. bus, rail, coach) to integrate and work together in order to allow for the seamless transfer of information, people and things. Interoperable transport systems are expected to form the basis for future intelligent mobility systems.
Knowledge Spine	A linear corridor running North – South along the alignment of the A34 dual carriageway between the M40 and M4 motorways. It runs from Harwell and Culham in the south, to the life science Bio Escalator in Oxford, on to the advanced engineering hub at Begbroke, and through to Bicester in the north.
Living Lab	An experimental real-world environment being set-up in Oxfordshire that is intended to support the accelerated design, prototyping, and testing of new technologies and mobility systems.
Mobility as a Service	The concept through which the movement of people and things (e.g. goods and services) can be bought and sold on a pay-as-you-go basis, or through subscription models. These approaches have become increasingly common in the world of software and technology, and are anticipated to underpin the development of intelligent mobility services. ITS Europe defines Mobility as a Service (MaaS) as a mobility distribution model in which a customer's major transportation needs are met over one interface and are offered by a service provider.
Open data	Open data is information that is available for anyone to use, for any purpose, at no cost.
OXybeles	The development of a local "catapult" to provide a central point through which local authorities can develop partnerships with Universities and business to develop innovative transport led approaches and technology that enhance services, manage infrastructure more efficiently and provide a basis for local business to address problems thus reducing burden on public sector finances.
Sentiment data	Subjective information collected through social media and other sources that can be mined using natural language processing, text analysis and computational linguistics techniques.
Transport Systems Catapult	The organisation set up by InnovateUK to accelerate the UK's development of intelligent mobility systems and their export to other locations in the world.
UTMC	Urban Traffic Management Control systems are used to manage traffic lights, bus and light rail priority, and car parks in UK cities.

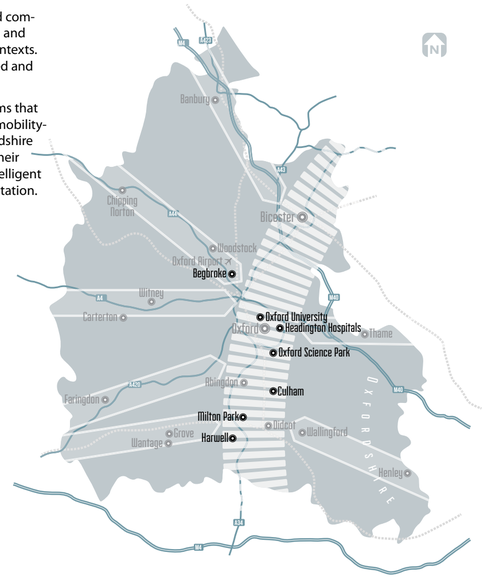
1 SCIENCE TRANSIT – FUTURE MOBILITY IN OXFORDSHIRE

1.1 A fresh approach to planning and delivering local transport is needed if we are to successfully, and sustainably, connect the places in Oxfordshire where the majority of people will live and work over the coming 20 years. This is particularly true for the Oxfordshire Knowledge Spine (Bicester - Oxford - Science Vale UK), which the Oxfordshire Local Enterprise Partnership's (LEP) Strategic Economic Plan (SEP) identifies as the key driver for local economic growth. Other parts of Oxfordshire will also be key contributors to the success of the county's growth strategy. Banbury in particular is a hub for employment in its own right. Banbury, Witney and Carterton each have individual area strategies which provide housing for significant numbers of people who work in the Knowledge Spine. **Science Transit relates to connectivity within, to and from the Knowledge Spine**.

1.2 A number of strategic challenges, which also present significant opportunity for purposefully directed growth and local improvement, emerge in relation to this area and its connectivity:

- The anticipated scale of housing and employment growth will place significant additional demands on the county's transport infrastructure:
  - With an integrated approach to transport and land use planning, major new developments can be located and designed to support new transport services, providing the catalyst for change and bringing benefits to existing communities
- Reducing carbon emissions to address climate change, requires a radical change in the way transport is provided and used:
  - Over the next 20 years, new, innovative products and systems will create a very different environment for mobility, with new ways of travelling and more efficient use of time, vehicles and space
- Travel from highly desirable and affluent areas, predominantly rural market towns and residential hinterlands, is contributing to rising traffic levels and road congestion. Predicted local economic and population growth is likely to increase demand for car travel in the absence of viable and equally attractive alternatives, placing greater strain on existing networks:
  - There are planned improvements to nationally important road, rail, and air connections that run through the County and serve local, regional and strategic national mobility needs. These will make it easier for people to travel through the county of Oxfordshire, as well as get to Heathrow and London. These improvements are likely to make the county an even more attractive location for businesses and people but may increase traffic volumes on local feeder roads.
- Continued rapid development of technology and communications will further accelerate the collection and transfer of data in both business and personal contexts. Much of the data in Oxfordshire is currently closed and not integrated:
  - More intelligent, data-driven transport systems that better integrate with personal and business mobility-needs are widely expected to emerge. Oxfordshire has an opportunity to be at the forefront of their emergence by acting as a live test bed for intelligent mobility system development and implementation.

The Oxfordshire Knowledge Spine



1.3 Science Transit is a direct response to these challenges. It defines a high-level vision, and outline roadmap, for the development of better-integrated, high quality mobility systems that both serve the Oxfordshire Knowledge Spine and connect it with the rest of the County. We envisage a future system made up of four main elements:

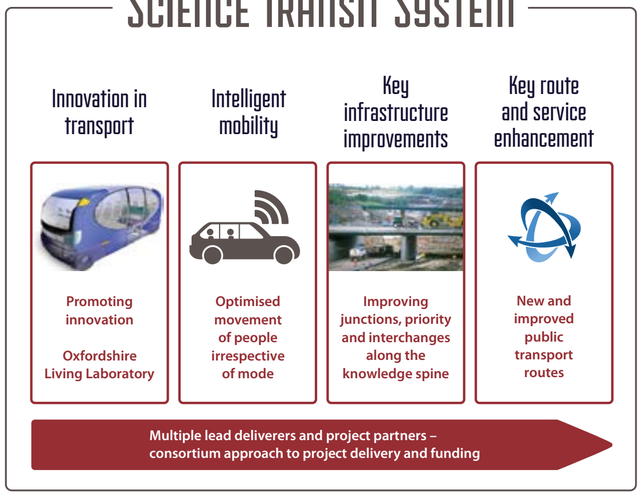
- Projects which **promote innovation** in mobility and integrated transport delivery.
- Projects which e**ncourage intelligent mobility** and opening Oxfordshire's data to promote research and enterprise.
- Key **infrastructure improvements** which will improve connections between key areas along the Knowledge Spine, for example, upgrading pinch-point junctions and constructing new rapid transit lanes. These infrastructure projects will sometimes be led by opportunities in funding streams.
- **Route enhancements** which will improve connections between key locations along the Knowledge Spine including new public transport routes and improved frequency of services on existing routes.

Science Transit is aligned with the County Council's practically-focused strategies for improving the county's transport networks: LTP4, accompanying area strategies, bus, rail and cycle strategies.

1.5 By implementing Science Transit alongside the strategies described above, we aim to:

- Embrace new technologies and data innovation to unlock intelligent mobility, presenting information to all users to allow them to make truly informed choices about the way they travel.
- Accelerate local growth through innovative R&D, providing opportunities for forward-looking business and research organisations and their highly skilled workforces to test and bring new products and technology to market.
- Improve connectivity between places where people live, work and spend their leisure time, ensuring all aspects of the door-to-door journey are fast, reliable, seamless and affordable.
- Integrate transport and land-use planning to improve non-car-based mobility, creating an environment where sustainable travel is the simplest and obvious choice.
- Deepen public and private sector partnership delivery for the mobility of people and goods, harnessing the respective skills of the different partners to fund, develop and implement new and improved transport systems.

The diagram below illustrates how the Science Transit System works together with interdependent elements.

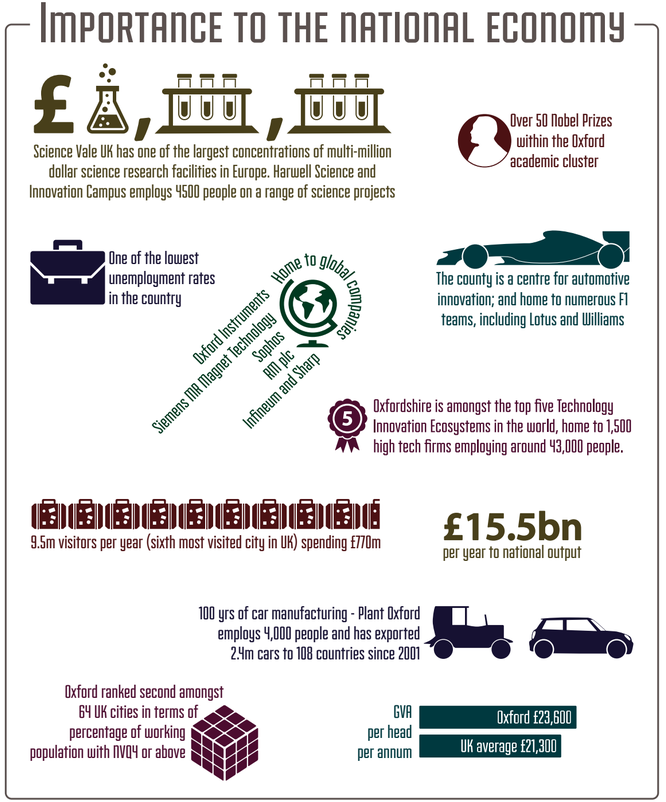


2 STRATEGIC CONTEXT

Oxfordshire – a global centre for innovation

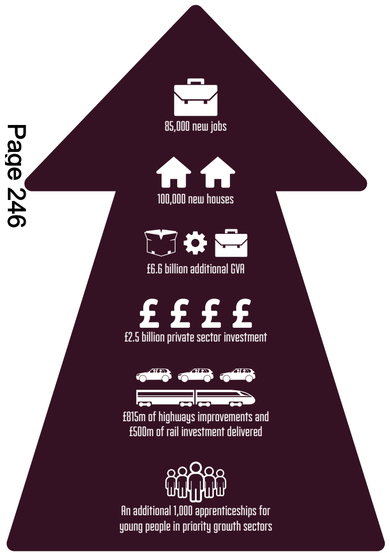
2.1 Oxfordshire is renowned across the globe for its academic excellence, innovative business culture and the quality of its built and natural environment. The county is home to Europe's largest concentration of multi-million pound science research facilities, underpinning our leading position in advanced engineering, manufacturing and life sciences, as well as sitting at the heart of the UK's growing international space cluster. We are therefore primed for investment with solid economic foundations and ambitious plans to support growth and the creation of sustainable jobs for local communities.

2.2 Oxfordshire makes a disproportionately large contribution to UK economic performance in relation to its geographic size and population:



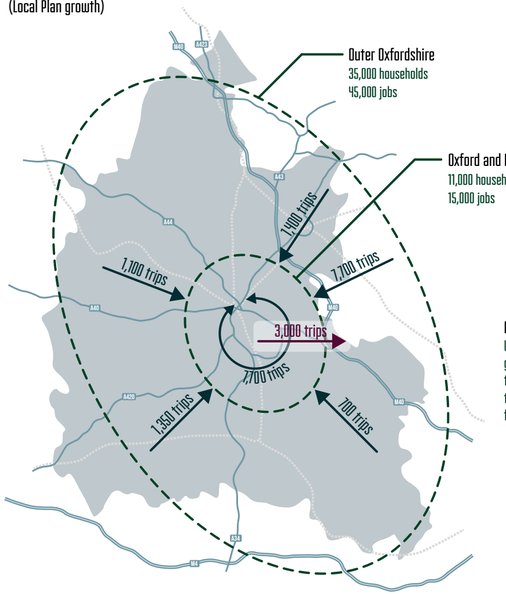
A prosperous and growing county

2.3 Oxfordshire is currently one of the fastest growing, and most dynamic, areas in the UK. The City Deal, and Oxfordshire Local Enterprise Partnership's (LEP) Strategic Economic Plan (SEP), both set out a vision for accelerating economic growth to meet the needs of the area's science and knowledge-rich economy. Per Oxfordshire County Council's overarching growth plan, the aim is to place the county at the forefront of the UK's global growth ambitions to 2031 and beyond, through the delivery of:



2.4 To date the various local planning authorities have progressed their Local Plans to different stages. The following diagrams summarise the main locations currently being envisaged as the focal points for future growth across Oxfordshire according to the Local Plans and the Strategic Housing Market Assessment (SHMA[1]):

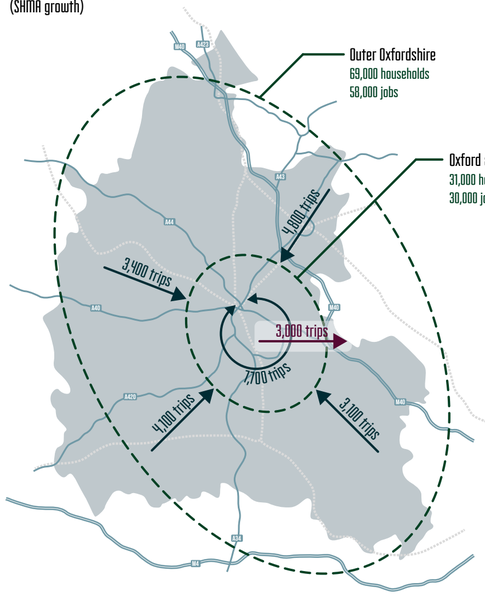
Scale of development and commuter trips to, from and within Oxfordshire 2031
(Local Plan growth)



Additional demand
Where existing patterns of commuting trip generation, distribution and mode share applied to the anticipated Local Plan housing growth throughout the county, the city will see the following additional level of commuting:

- 6,800 car trips
- 2,450 bus trips
- 2,300 cycle trips
- 5,500 rail trips
- 2,200 walking trips
- 950 other modes

Scale of development and commuter trips to, from and within Oxfordshire 2031
(SHMA growth)



Additional demand
Where existing patterns of commuting trip generation, distribution and mode share applied to the anticipated Local Plan housing growth throughout the county, the city will see the following additional level of commuting:

- 13,600 car trips
- 4,300 bus trips
- 2,900 cycle trips
- 900 rail trips
- 2,400 walking trips
- 2,000 other modes

2.5 Government funding secured through the City Deal and SEP will be controlled locally to boost innovation and business growth, and create jobs in the technology and knowledge sectors in which Oxfordshire is already strong. This funding will also be used to unlock private sector investment, focusing on the following thematic objectives:

Innovative Enterprise	Growth led by innovation, R&D and business collaboration
Innovative People	Specialised and flexibly skilled people across all sectors
Innovative Place	Quality of urban and rural environments and choice of homes
Innovative Connectivity	Freedom of movement and interconnectivity for people and things

[1] Household growth levels taken from the SHMA and jobs forecast from Cambridge Econometrics study for Oxfordshire LEP. The SHMA is a technical study intended to help the Oxfordshire local planning authorities understand how many homes will be needed in the period 2011 – 2031. The Oxfordshire SHMA was commissioned jointly by all the Oxfordshire district councils supported by Oxfordshire County Council in 2013.

The Knowledge Spine and Innovation Hubs

2.6 The creation of high value science-related jobs within the area defined as Oxfordshire's **Knowledge Spine** represents a cornerstone of the economic growth strategy enshrined in our City Deal and SEP. The Knowledge Spine cross-cuts the county; running from Harwell and Culham in the south, to the life science Bio Escalator in Oxford, on to the advanced engineering hub at Begbroke, and through to Bicester in the north.

2.7 Key innovation areas within the Knowledge Spine include those shown in the table.

2.8 Other parts of Oxfordshire will also be key contributors to the success of the county's growth strategy. Witney and Carterton are key commuter areas for the Knowledge Spine. Banbury, while a hub for employment in its own right, also provides housing for significant numbers of people who work in the Knowledge Spine. This emphasises the critical need for effective mobility links that connect locations situated within the Knowledge Spine to each other, as well as key residential and locations outside the Knowledge Spine into the area.

Science Vale Oxford	▪ World class free-standing research establishments – at Harwell Enterprise Zone, Milton Park and Culham Science Centre. ▪ Growing settlements of, Didcot and Wantage / Grove and Abingdon-on-Thames provide a very attractive "town and country" lifestyle. ▪ Great Western Main Line, East-West Rail, A34 and M4 motorway also provide excellent links to Thames Valley, London and West of England.
Oxford	▪ Thriving city of 150,000 people – combining a historic city centre, a wide range of cultural activities with world famous research-based universities. ▪ The area boasts major blue chip companies, business incubators and an existing industrial base around the Cowley motor manufacturing facility. ▪ The city is home to 40,000 students and attracts nine million visitors per year. ▪ Its dense urban bus / Park & Ride network and strong culture of cycling is the envy of many larger UK cities.
Bicester	▪ A growing market town that is rapidly becoming one of the best connected places in the UK – thanks to excellent bus / coach services, expanding rail links to London / the Midlands and motorway connections. ▪ The availability of land for further housing and employment development will see the town grow in importance – especially for low carbon, sustainable living.

Challenges of accommodating future growth

A key challenge moving forward is that our future growth plans are threatened by our current success. Existing patterns of development and high income levels have created an environment defined by high car ownership and high levels of car use – particularly outside of Oxford.

2.10 If our growth plans are to be achieved, we recognise the need to provide an effective mobility system that provides real alternatives to the private car and helps to reduce traffic congestion. This is a key aim of both this Science Transit vision, and Connecting Oxfordshire (LTP4). Importantly, the growth plans themselves provide an opportunity for changing travel patterns and making public transport more attractive and viable.

Increasing demand for mobility

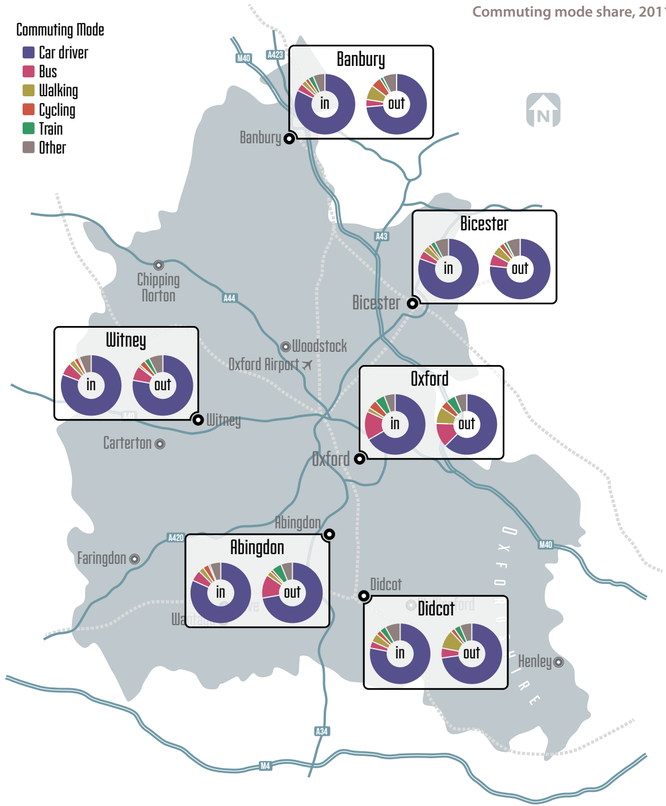
2.11 Unless public transport, walking and cycling can provide an equally or more attractive alternative, the predicted economic and housing growth will result in greater demand for private motor vehicle travel in the future – thereby increasing current levels of congestion and pollution.

2.12 Car ownership in areas outside of Oxford is high, with, for example, 88% of households in South Oxfordshire owning a car, compared to the national average of 74%. Forecasts based on projected growth and residential development across the county predict the total number of cars owned will increase by approximately 70,000 vehicles (+19%) between 2013 and 2031 in Oxfordshire. This is higher than the growth of the number of households in Oxfordshire (16% between 2013 and 2031).

2.13 This high car ownership translates into high levels of car usage, including for commuting trips. Census data from 2011 reveals that around 80% of commuter trips to work from Banbury, Bicester, Witney, Abingdon and Didcot are made by car. Travel into Oxford is also predominantly by car, but 15% of trips into the city are by bus and 10% by bike and train.

2.14 All of the major settlements in Oxfordshire, and in particular Didcot and Oxford, see a greater proportion of people leaving by train each day to travel to work than the proportion arriving from nearby towns and villages. The higher proportions of commuter bus trips into Oxford, and emanating from Abingdon, demonstrate that where good public transport is provided, it can offer an attractive travel choice.

Commuting mode share, 2011 Census



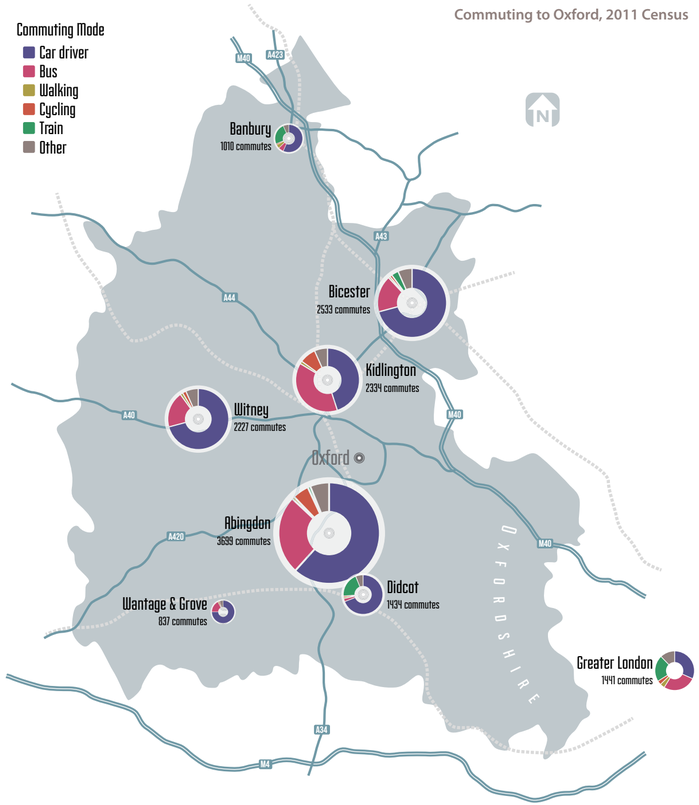
2.15 It is considered that high incomes and poor public transport accessibility are key reasons behind this trend, and improvements to public transport are essential if the growth in car use is to be reduced.

Complex travel patterns

2.16 Although Oxford city centre is the largest urban area in the county, Oxfordshire presents a challenge to serve dispersed "polycentric" employment sites and housing development that have traditionally resulted in high levels of private car use because of difficulties in providing commercially viable public transport.

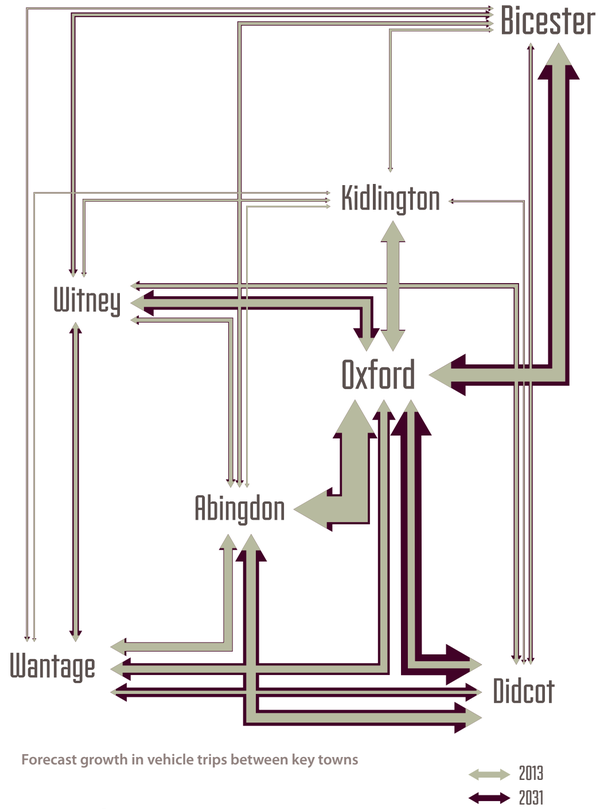
2.17 Reflecting its size, geographically central position in the county, and the range of employment opportunities available in the city, Oxford itself attracts workers from a wide geographic area. It is the main commuter trip attractor in the county, accounting for around 13,000 passenger car movements each weekday peak hour morning. As well as commuters, Oxford attracts tourists from all over the world. It was the seventh most visited town or city in Britain in 2013; attracting around nine million visitors per annum in total.

Commuting to Oxford, 2011 Census



2.18 The Oxfordshire Strategic Transport Model reveals that a large number of trips are currently made in the morning peak period on weekdays between key towns and Oxford. Although movements between these locations are greatest in the direction of Oxford; Bicester, Abingdon, Wantage, and Didcot are also significant trip attractors in their own right.

2.19 The projected future growth of local settlements is forecast to result in a strengthening of these movements during peak hours - particularly those emanating from Didcot, Abingdon, and Bicester.



Forecast growth in vehicle trips between key towns

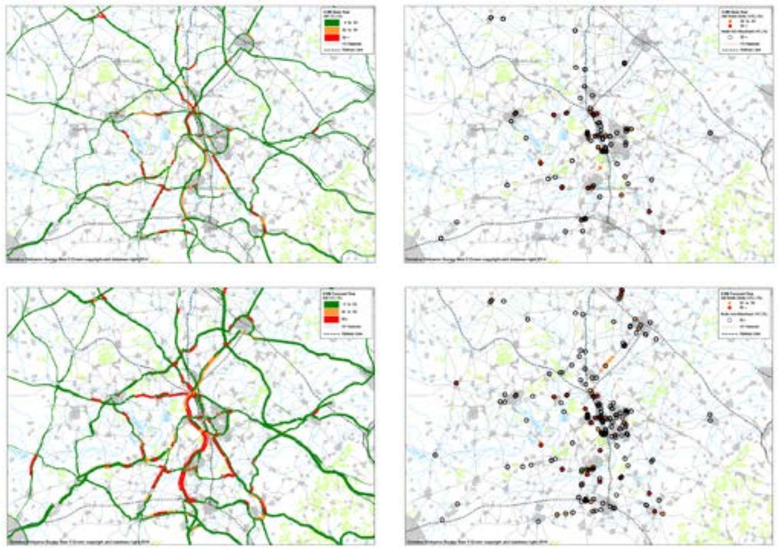
Traffic congestion and its impacts

2.20 Perhaps unsurprisingly, the key characteristics of Oxfordshire's dispersed population and employment centres, complex movement patterns, and high levels of car ownership and usage have resulted in a highly congested road network.

2.21 The A34 and A40 already experience high levels of traffic congestion and delay. Most notably, sections along the western boundary of Oxford and towards Didcot frequently operate over capacity during extended morning peak hours and near to capacity for much of the day. As a result the A34 and A40 are not resilient to minor incidents and disruptions, which often result in major congestion events. Elsewhere in the county key junctions serving strategic routes like the A34, A40, and A44 operate at or beyond capacity during the morning peak hours. Stretches of the A420, A4074, A417, and A415 that link key residential areas and employment locations all experience high volumes of vehicles in relation to available highway capacity.

2.22 Future growth in jobs, population and car ownership levels will have a significant impact on the highway network's ability to cope with rising traffic volumes. During the morning peak hours there are projected to be more areas of stress on the network, particularly on the A34 between Oxford and Bicester, on sections of the Bicester ring road; and between Abingdon, Kidlington, and Didcot.

2.23 These levels of congestion on strategic and supporting road networks also create challenging operating conditions for local bus services. Buses rely on the same roads to operate, and only tend to benefit from bus lane segregation and signal priority on approach to/within Oxford. As a result, journey times can be slow from key towns to Oxford - up to 50 minutes to travel nine miles.



2013 and 2031 Forecast congestion

Transport opportunities arising from projected growth

2.24 Although the challenges presented by Oxfordshire's projected growth over the next 20 years may seem overwhelming, many of the new residential and employment developments being envisaged will unlock funding and create opportunities to deliver improvements to the county's transport system.

Intelligent Mobility for Oxfordshire

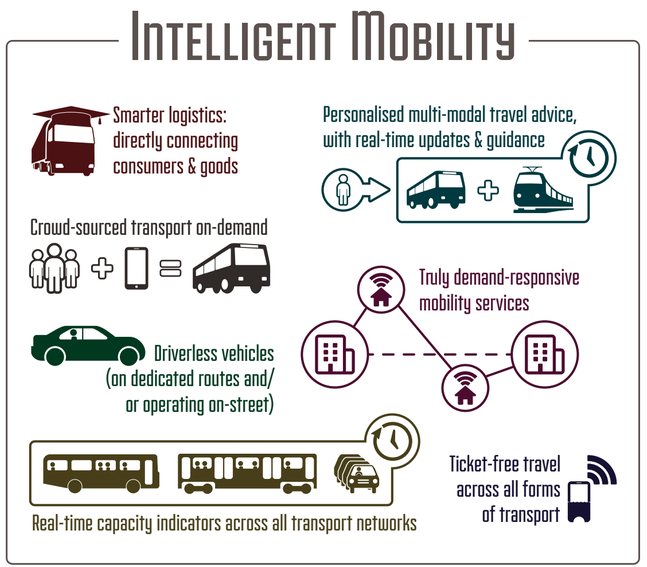
2.25 The emerging concept of Intelligent Mobility refers to significantly more responsive and predictive 'data-driven' transport systems that:

- More efficiently and sustainably connect goods, services, events, and people.
- Optimise available infrastructure capacity to maximise the time, energy and resource efficiency of travel and transportation.
- Are more readily connectable and flexible - promoting seamless journeys across all transport modes that can flex according to disruptions, changes in schedule or priority, and competing demands for other seemingly unrelated services.
- Generate lesser environmental and social impacts than current transport systems.

2.26 Intelligent Mobility services are not currently very well defined, since many are yet to come to market. Those already in development, or are technologically feasible, are shown in the diagram.

2.27 The international market for Intelligent Mobility services is estimated to be worth £900bn[2] by the Transport Systems Catapult[3]. As a global centre for research and development, the Innovation Hubs that make-up the Oxfordshire Knowledge Spine are perfectly positioned to capture a share of this market.

2.28 Science Transit seeks to develop the concept of Intelligent Mobility and apply it to real world transport systems within Oxfordshire – with particular emphasis on influencing and changing the way people think about mobility. We envisage the planned transport improvements to the Knowledge Spine area will act as a live test-bed and proving ground for Intelligent Mobility systems, techniques, and services. In doing so we will work in partnership with local research industries and commercial providers to develop and integrate this expertise.



[2] Transport Systems Catapult (2013) Five-Year Delivery Plan to March 2018. Available online here, last accessed on 28/04/14.

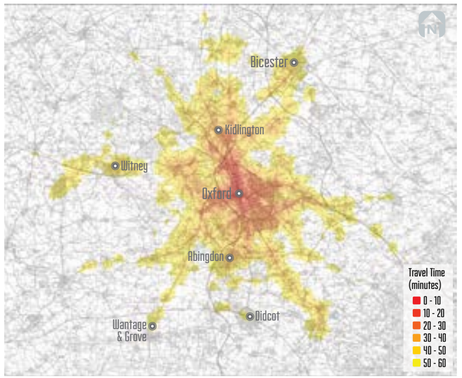
[3] The Transport Systems Catapult (TSC) is the UK's technology and innovation centre for Intelligent Mobility, harnessing emerging technologies to improve the movement of people and goods around the world. The TSC forms part of an elite network of seven technology and innovation centres established and overseen by the UK's innovation agency, Innovate UK. Together, they represent a £1bn public and private sector investment up to 2018.

Attractive public transport alternatives

2.29 The consolidation of people in the main existing settlements like Oxford, Banbury, Carterton, Bicester, Witney, Didcot[4] and Abingdon will help to strengthen the viability of enhanced public transport investment linking these towns to employment hubs. Anticipated investment to create new jobs across the county's Knowledge Spine, focused on the county's Innovation Hubs, will also help to define principal employment locations that can feasibly be connected to each other, and to local towns, by public transport.

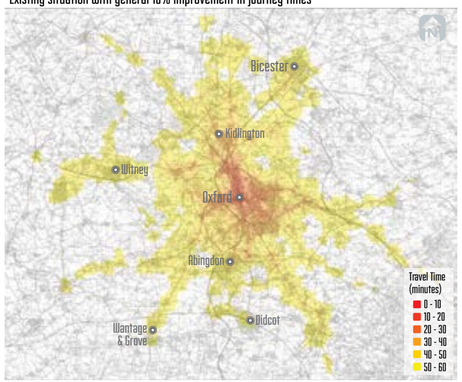
2.30 Projects highlighted in the Science Transit Strategy aim to achieve improved connectivity to new and existing development locations by public transport alongside service quality, passenger experience, and journey time/reliability improvements. For example, achieving a 10% reduction in door-to-door public transport journey times alone would increase by around 20% the proportion of Oxfordshire's current population that could access key employment areas in the Knowledge Spine within 20 minutes by public transport:

Existing situation



Journey times by public transport to Oxford City Centre

Existing situation with general 10% improvement in journey times



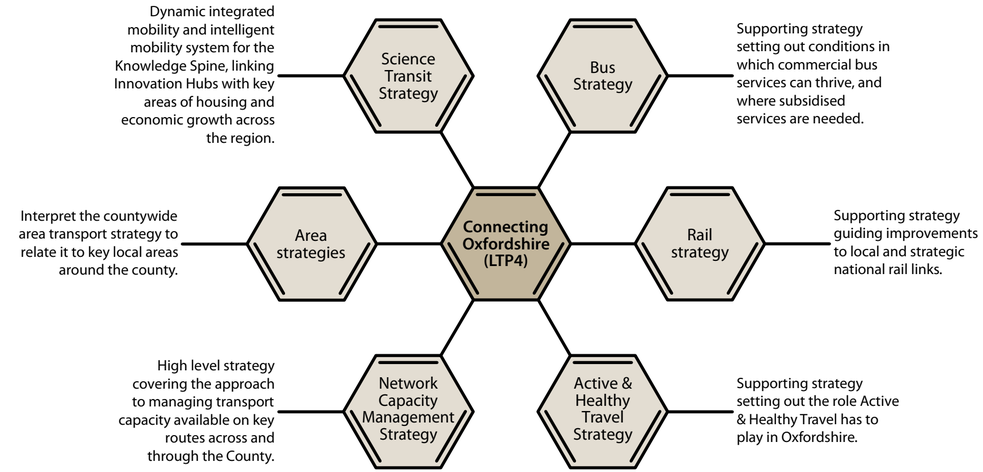
[4] Populations with > 20,000 inhabitants

Unlocking pinch-points on the highway network

2.31 Employment and residential growth will generate contributions from property developers and additional public revenues that can be invested in highway network improvements. Planned improvements to junctions on the A34 (at Hinskey, Kennington, Milton, Chilton, and around Harwell), on the A40 (Shores Green and Downs Road), within Oxford city centre; and new link roads at Grove, Wantage, and South West Bicester will help to improve traffic flows and public transport journey times alike.

Strategic fit with existing transport policies and strategies

2.32 Science Transit is part of a suite of local transport plans and strategies that will combine to address existing and future traffic congestion challenges in Oxfordshire:



3 SCIENCE TRANSIT VISION & OBJECTIVES

Our vision

3.1 **Science Transit** will realise a next-generation mobility and information system for the Oxfordshire Knowledge Spine across all modes of travel. It will link together our Innovation Hubs, and connect them to locations of identified housing and economic growth across the county. New developments will support Science Transit's delivery through strategic land-use planning to prioritise non car-based mobility, and create bi-directional demand for public transport services wherever possible. Science Transit will represent a credible and viable alternative to private car use by meeting people's basic mobility needs, as well as their expectations of speed, comfort, reliability, environmental sustainability, affordability, and journey experience.

3.2 This is about more than just improving bus services. The Science Transit vision is to ensure local transport links are deeply integrated with mainline rail and strategic highway connections to neighbouring towns, London, and Heathrow. New interchange locations will connect new and existing public transport services with walk, cycle, car-based, and air travel modes. Smart uses of real-time data generated through our effective coordination of mobility networks, and system users' movements, will increasingly enable people to seamlessly combine multiple travel modes to complete their door-to-door journeys.

3.3 To achieve this, Science Transit will actively seek to exploit:

- New and emerging technologies that improve the environmental efficiency and sustainability of conventional transport systems.
- Ticketless and cashless payment systems that are expected to enable seamless interchange across travel modes in the future.
- New and innovative uses of data that are being collected from local transport networks and vehicles in real-time.
- Entirely new modes of travel (e.g. autonomous vehicles) that are emerging from the intersection of technology, data, and transport system research & development.
- Partnerships with local transport operators, developers, and businesses to improve timetable coordination, service frequencies, and existing interchange and cycling infrastructure.

3.4 This ambition was outlined in Oxfordshire's feasibility bid to Innovate UK in 2014 to develop integrated transport solutions with Science Transit enabling the Knowledge Spine Area to be treated as a 'living laboratory' for the development and demonstration of 'Mobility as a Service'[5]. Its legacy will be a set of integrated mobility products that are end-user focused, seamlessly integrated with each other, and highly valued by time and money-conscious consumers.

Strategic objectives

3.5 Five interrelated and interdependent objectives will underpin the development of the Science Transit system. They are to:

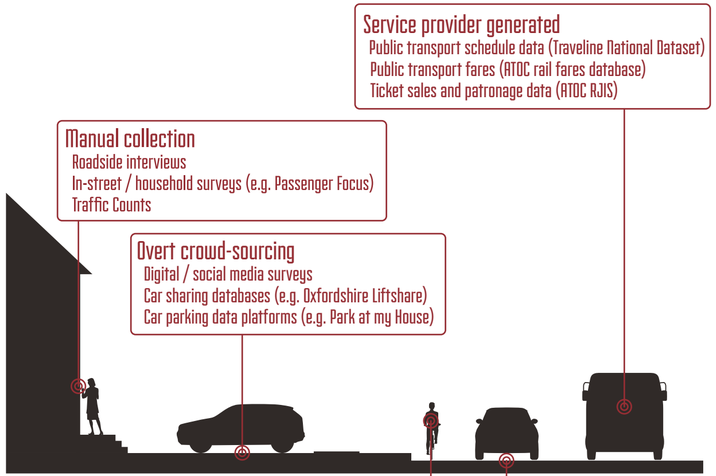
- **Embrace new technologies and data innovation to unlock intelligent mobility**
- **Accelerate local growth through innovative R&D**
- **Improve connectivity between places people live, work and spend their leisure time**
- **Integrate transport and land-use planning to improve non-car-based mobility**
- **Deepen public & private sector partnership**

3.6 The remainder of this section is structured around these objectives to explain each in more detail.

[5] ITS Europe defines Mobility as a Service (MaaS) as a mobility distribution model in which a customer's major transportation needs are met over one interface and are offered by a service provider

1) Embrace technology and data innovation to unlock intelligent mobility

3.7 Intelligent mobility services will be primarily, but not exclusively, driven by technological innovations and new analytical possibilities being created by accelerating flows of so-called 'digital exhaust' data. Such digital exhausts are a by-product of the online activities of Internet users and are created when people move around, purchase goods and services, or post updates to social networks. Such data is increasingly becoming available in real time:



Intelligent Mobility Data

3.8 Although it is impossible to be certain, given the emerging nature of many data processing and autonomous control systems at the time of preparing this strategy, we envisage the following possibilities will be unlocked by adopting a data-driven and proactive technology approach through Science Transit:

- **More timely, accurate, and insightful intelligence** for transport system managers in respect of what is happening across the county's transport and movement at any given time. This more proactive network management will draw on data from both public and private sector data owners, and Oxfordshire County Council's role will likely involve acting as an independent broker for this data.
- **Scope for autonomous mobility network** control and management systems that require less human intervention. These are likely to operate based on intelligent responses to data that are being collected and analysed in real-time, and simultaneously compared against historically collected and pattern-analysed datasets.
- **Deeper insight and intelligence for strategic transport planners**, enabling more efficient design and implementation of new mobility systems.
- **Personalised and context-specific multi-modal travel information** that can be delivered to individuals across multiple platforms. This will power digital tools that enable individuals to make more intelligent, data-driven, decisions about their personal mobility options in a range of scenarios – optimising their use of time, money, CO_2 and calories when moving around.

3.9 In line with Oxford's emerging Smart City Strategy, Science Transit will be both a key contributor to, and consumer of, data from Oxford's envisaged Open Data hub.

Successful delivery against this objective will involve embedding the latest mobility technologies and data analytics so that digital exhaust data collected from operational transit systems and the region's road networks bind the county's disparate transport network components into an integrated system.

2) Accelerate local growth through innovative R&D

3.10 Driving economic growth through innovation is a key future theme for the county, and our delivery of the Science Transit Strategy will create opportunities for precisely this. Its commitment to embracing emerging environmental sustainability and intelligent mobility technologies in transport and other areas deliberately seeks to create significant research and development opportunity for local industries. Our aim is for the following business segments to benefit from future investment in the local transport system through innovative Research & Development (R&D) in:

- Vehicle manufacturing
- Communications technologies
- Electronic sensors and controls
- Logistics and distribution
- Traveller information systems
- Predictive modelling
- Infrastructure management
- Real-time data exploitation

3.11 Each of these are fast-moving, independent business sectors that have historically operated with little formal connection to each other. As such, existing intelligent mobility initiatives often appear fragmented, with the concept's full potential yet to be realised.

3.12 Science Transit will help overcome this lack of integration by establishing R&D projects that enable all forms of transport to participate in continuous, intelligent vehicle-to-infrastructure and vehicle-to-vehicle interactions. These offer unexplored potential to tackle global problems of congestion, poor traveller experience, fuel consumption, environmental pollution, and road safety.

If successful, working in coalition with businesses and University partners, Oxfordshire's transport system will become a 'living-lab' for internationally significant, bleeding edge[6] mobility technologies that benefit our county whilst also being scalable for export to other regions around the world.

[6] Bleeding edge technologies are considered so new that they could have a high risk of being unreliable and require considerable investment in order to make use of them. A proportion of bleeding-edge technology will find its way into the mainstream (e.g. email).

3) Improve connectivity between places people live and work

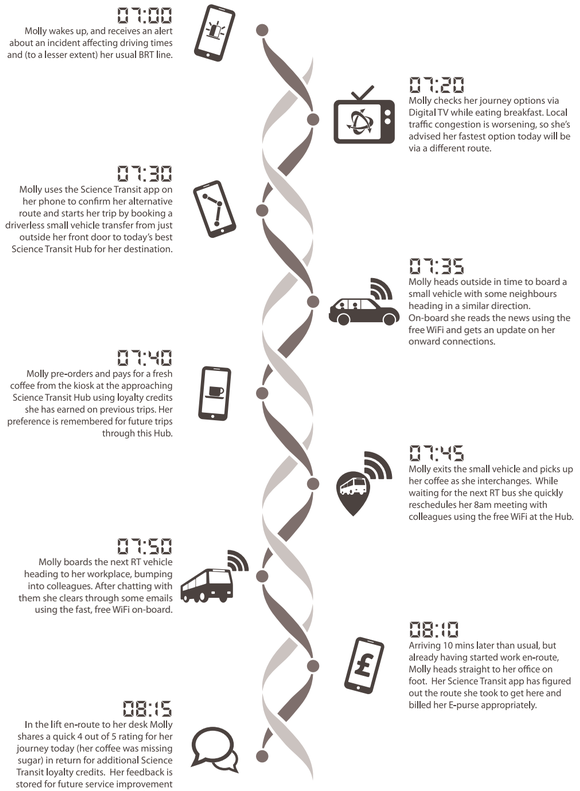
3.13 Science Transit's ultimate objective is to provide mobility as a consumer service that people in Oxfordshire can purchase easily, as and when they need it, for their trips to/from, and within the county. In this context the system will aim to be:

- **User-focused** – It will integrate with modern lifestyles, and align with evolving demands and expectations for personalised mobility options (both for people and goods). It will allow for informed decisions, be simple to use, and allow people to combine whatever modes of travel they want to use in order to get where they are going. Information and communication will be the key interface between the user and transport service.
- **Seamless** – Physical and virtual integration will ensure coordinated transfer between modes and create a 'zero wait state', whereby delay to users of the transport system is minimised before/during/after their journeys. Science Transit Hubs Interchanges and services will make space for people to work or relax whilst they are in-transit, and will be inclusive and accessible to all by design. Cashless payment and ticketless travel will aid seamless transfer between travel modes and ensure the system is easy to use.
- **Valued** – Trusted services, in which users perceive value for themselves, will be delivered. A transparent value proposition will be accompanied by simple and flexible payment systems. Science Transit will be recognised by its users as safe, reliable, comfortable, fast, environmentally sustainable, and good value. The clear use of Science Transit branding will create a common identity across integrated travel modes.

3.14 We foresee a combination of tangible improvements to existing public transport routes (as set out in the Bus and Area Strategies), the construction of new mass rapid transit capacity, and the creation of Science Transit Interchanges (described in more detail in section 4) for seamless interchange between modes of travel, as the basis for achieving this objective. The illustration provides an example of how Science Transit journeys between home and work are likely to take place in 2035, once the vision for the system has been fully realised.

The closer we are in 2031 to providing mobility services that are as seamless as the example above, the more successful we will consider our delivery of Science Transit to have been.

A future journey to work



4) Integrate transport and land-use planning

3.15 Another key objective for our successful delivery of Science Transit is for the strategy to become fully embedded within the future growth aspirations, development proposals, and urban design features of the areas it serves.

3.16 The National Planning Policy Framework (NPPF) provides the policy requirement to locate major developments where the need to travel can be minimised and the use of sustainable travel modes can be maximised. However, there is also scope through future Local Plans and Reviews to deepen the integration between development proposals and the Science Transit system. For example, encouraging developers and local planning authorities to focus growth in locations adjacent to high frequency transport corridors can help to further boost demand for services, and reduce forecast future growth of private car trips. New developments can be designed with 'nudge' factors to make people more likely to choose sustainable transport, for example by providing parking in secure garaging areas a short distance away from homes or offices rather than directly outside and in view. This reduces the likelihood that a traveller will consider a private car journey as the default option when they begin their trip.

3.17 Through Science Transit our aim is for transport and personal mobility planning considerations to become significant factors in local planning decisions for residential, commercial, and employment developments.

If successful we will create a virtuous cycle that enables growth and development to both support, and be supported by, commercially viable sustainable connectivity.

5) Deepen public and private sector partnerships

3.18 The aims of the Science Transit Strategy cannot be achieved through Oxfordshire County Council working in isolation. Instead the success of the strategy will critically depend on effective partnership working, and joined-up project delivery, with:

- Private sector mobility providers - bus and rail companies, bike hire providers.
- Secondary service providers - car parks, public WiFi, ticket sellers.
- Research and development partners - Universities, technology providers.
- The local business community and our Local Enterprise Partnership.
- Local Planning Authorities
- Central government departments.

3.19 To this end our aim is to use the Science Transit brand and funding allocated for Science Transit projects to unlock involvement, in-kind support, and investment from private sector and research delivery partners.

3.20 An example already in development, is the OXybeles concept[7] being established in partnership between Oxfordshire County Council and local Universities. It will act as a vector for intelligent mobility research and live-testing. Innovative SME business development, new Intellectual Property for both local businesses and the OXybeles partnership, and wider economic benefits through efficiency savings are anticipated outcomes. The partnership will build on existing work being led by Oxfordshire County Council around digital traffic monitoring, responsive journey planning tools, traffic management and smart transaction hackathons[8].

Successful achievement of this objective will involve the majority of Science Transit projects being delivered in collaboration with private sector and/or other research partners, and include shared investment, by 2035.

[7] Oxfordshire LEP (2014) Strategic Economic Plan: Driving Economic Growth Through Innovation, pg 68, Available online at: http://www.oxfordshirelep.org.uk/cms/sites/lep/files/folders/Strategic%20Economic%20Plan/Oxford_Strategic_Economic_Plan.pdf, last accessed 28/10/14.

[8] A hackathon (also known as a hack day, hackfest or codefest) is an event, typically lasting between a day and a week, in which computer programmers and others involved in software development come together to create usable software. Transport hackthons can focus on building exciting transport-related apps, visualisations, or conduct insightful data analysis.

4 OUR APPROACH TO DELIVERING SCIENCE TRANSIT

General approach

4.1 The ultimate vision for Science Transit is of establishing an integrated mobility system that is very different to existing ways of providing public transport. The approach we adopt to achieve this will need to recognise the strengths of the networks we have today and evolve each different component of the system appropriately.

4.2 The Science Transit Strategy will evolve over the next 20 years as funding, growth, development, investment, partnering, and intelligent mobility opportunities arise. Our long-term vision means the foundations on which Science Transit will be built are unlikely to fall into place overnight. Instead individual components of the Strategy are expected to materialise at different times, and in different locations, across the county.

4.3 For example, widely anticipated advances in technology and data-analytics are expected to dramatically change the landscape within which mobility services are delivered. Greater personalisation of services, and fluidity in response to changing patterns of travel demand, are expected to become common features of both urban and rural mobility systems. We don't know what some of these technologies will be but the Science Transit Strategy needs to be flexible enough to take them on board and exploit their benefits. As such our approach to delivering Science Transit will draw on four over-riding principles:

Flexibility	To respond to rapidly changing technologies and analytical possibilities that emerge through the maturation of the current 'digital revolution'
Quality	Throughout our approach to planning, designing, and delivering Science Transit services, supporting infrastructure, and policies.
User-centred	Ensuring the infrastructure and services we plan truly meet the mobility needs and aspirations of local commuters, business and leisure travellers alike.
Intelligent	To purposively and patiently create a mobility system that is data-driven, truly multi-modal, and resilient to changing mobility patterns.

Key features and principles of the future system

4.4 It will be vital for Science Transit to get the basics of mobility right to satisfy the demands of both users and non-users. Science Transit must be accessible, affordable, reliable, and frequent. It must offer a rapid journey time, with seamless interchange, and serve desired origins and destinations. To additionally attract non-users to the system, and therefore generate modal shift, other aspects of the system also need to be high quality and appeal to people that would not usually consider using non car-based forms of mobility.

4.5 In designing and developing the system we will use the following hierarchical series of questions that users, or potential users, might ask themselves when considering whether Science Transit's mobility options are relevant to them:

- Does it do the job I need?
- If it suits my travel needs, is it usable?
- Does it diminish me as a person to use it?
- Am I willing to pay for this service quality?
- Do I consider this a quality product, and is it ethical?

4.6 Critically therefore, Science Transit must do a core job of meeting individuals' mobility requirements, and everything else is secondary. To achieve this, the main effort behind Science Transit will involve:

- Investing in sound product design for linkages, frequency, speed, and reliability.
- Holistic system design based on an accurate understanding of actual travel needs.
- Recognising no amount of added value or marketing can overcome core product deficiencies, but that they are a key part of the mix - particularly for generating mode-shift.

4.7 On this basis, the key design features of our fully-realised Science Transit vision are shown in the table to the right.

4.8 Deeply embedded intelligent, and data-driven, mobility technologies will cut across all four of these key design features; and is considered a critical enabler to achieving our long-term vision for Science Transit.

Smooth interchange

- Transport interchanges and vehicles that are truly accessible for all
- High quality audio-visual information
- Free WiFi at Transport interchanges
- Linked to local walk and cycle networks
- Seamless transition between different modes of travel
- Retail and service activities to enable productive use of time

High quality services

- Fast and efficient bus, rail, and autonomous small vehicle connections.
- Reliable journey times achieved via priority use of road networks.
- Safety and security paramount
- Free WiFi connectivity on-board.
- Easy to access vehicles for all users
- Responsive to demand based on data-driven operational management and adaptive learning from user's feedback.

An easy to use mobility system

- Cashless payment systems using smartcards, bank cards and smartphones.
- Identifiable branding across multiple modes of travel.
- Rewards and incentives for repeated use of the Science Transit network and off-peak travel[9].

Joined-up smart mobility information

- Relevant to different user contexts and journey purposes at all journey stages.
- Available via multiple digital sources (web, smartphone app, digital TV).
- Updated in real-time, to provide the latest insights and intelligence.
- Comparative travel time and cost information for an individual's options.

[9] Incentives such as those provided in Singapore might be considered: http://www.lta.gov.sg/content/ltaweb/en/public-transport/mrt-and-lrt-trains/travel-smart/for-commuters.html

Evolving Oxfordshire's existing transport networks

4.9 Our starting point for the delivery of Science Transit is the county's existing transport networks. The following assets provide the basis on which our strategy will be implemented:

- **Park and Ride** sites that are already well-used, and have potential to act as strategic multimodal interchange facilities for trips through and within the Knowledge Spine.
- **Modern hybrid or emission-free buses with high levels of service** between key residential areas and Oxford city centre, and recently introduced services between Knowledge Spine Innovation Hubs and local residential areas.
- **Strategic rail connections** direct to London, Birmingham, Manchester, Newcastle, and Reading, with planned improvements through East-West rail.
- **Direct, high quality coach services** to Heathrow, Gatwick and Luton airports, and central London with free WiFi on-board.
- **Smart cards** that enable cashless payments, faster loading at stops, and create an integrated ticketing zone within Oxford and surrounding residential areas.
- **Real Time Information** systems covering most buses operating in and around Oxford city centre, with satellite tracking of bus vehicles powering underlying operational data systems and countdown departure displays at stops in the city.

4.10 These assets are currently focused around Oxford, as the county's largest urban area and primary generator and attractor of trips.

4.11 In practical delivery terms, Science Transit, alongside other related transport strategies and policies, will bring these disparate transport network components together over time and mould them into a cohesive system. It will deliberately broaden the range of mobility options beyond the main corridors into Oxford, to better connect residential areas across the county with the Knowledge Spine and its key employment locations. In doing so we will seek to address the following weaknesses currently present in local transport networks:

- **Comparatively long bus journey times** to Innovation Hubs across the Knowledge Spine, and service frequencies that do not allow for spontaneous travel.
- **Regular traffic congestion** on a highway network that is vulnerable to disruptions and extreme weather, and on which local public transport services also critically rely.
- **Fragmented and occasionally inaccurate local travel information** across multiple formats, making it hard for people to intelligently plan local trips.
- **Little multi-operator ticketing outside of Oxford city**, and disjointed rail and parking payment systems.
- **Lack of fast, direct rail connections to Heathrow and Gatwick**; and infrequent buses to London Oxford airport.
- **High carbon footprint of transport in Oxfordshire**, with air quality in Oxford exceeding EU and World Health Organisation limits.

4.12 At the heart of Science Transit is the recognition it needs to be conceived, developed and implemented as an integrated system. It needs to allow users to make seamless door-to-door journeys more productively than if they were made by car, and within comparable journey times.

4.13 By taking the strengths and weaknesses listed above into account, and mapping them against the key components that will make up Science Transit, we can indicate where Oxfordshire's transport networks currently sit in relation to our desired level of development for each one. Each component can be developed at different rates across different areas of the network. The figure below illustrates the various stages of evolution that might be considered, and identifies where today's system sits within that framework:

Possible evolution of Science Transit

		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
Relevant to all	**Intelligent data-driven mobility**	Limited automatic data collection	Increased data collection and use by individual organisations	Some sharing of schedules and pricing data between different stakeholders	Open data sharing platform for real-time traffic and local public transport data	Data shared by all mobility services. Real-time & historic feeds power predictive models and autonomous systems	
High Quality Services	**Priority**	Shared lanes in mixed traffic no priority	Shared lanes but with some preferential treatment	Designated lanes, heightened priority	Dedicated lanes and segregated facilities	Exclusive alignment with full grade separation	
	Vehicles	Functional	Exterior aesthetic and ride/comfort features	Improved boarding accessibility and information features	Diversified vehicle sizes, materials, capacities, alternative fuels	Guidance, propulsion and demand responsive routing	
Seamless Interchange	**Stops/ interchanges**	Basic flag, some shelters	Improved shelters, signage and amenities	Additional passenger information, safety and security amenities	Enhanced station services and fare collection	Enhanced berthing, loading and land use features	
	Route structure	Basic regular service	Improved service frequency with transfer connections	Extended stop distances with skip-stop and express services	Regional coordination, high frequency and reliability	Flexible route options to increase one seat rides, on/off alignment operations and convenient transfers	
Easy to use mobility system	**Publicity/ branding**	Limited	Marketing with minimal differentiation from other routes	Wider use of branding to differentiate services	Marketed and branded as a separate tier of service	Full branding and marketing as single service system	
	Fare collection	On-board only	Increase pre paid fare sales	Proof of payment fare systems	Electronic fare collection using smart card systems	Multi modal multi operator ticketless travel and e-payment	
Smart mobility information	**Information**	Basic timetable information at stops and public locations	Web-based information, improved distribution, some real time information	Wider roll out of real time information	Real time information at all key stops and public places	Personalised, context-aware information and alerts through multiple digital devices.	
	Handling small demands	Car and taxi based	Car, bike, and taxi sharing schemes, bike hire service	Semi-flexible bus services, Car Club	Demand responsive small vehicles. E-bike hire system	Intelligent demand responsive transport	

4.14 The remainder of this section outlines how we will approach the implementation of the components which make-up the four key design features of Science Transit.

Creating an easy to use mobility system

Smarter fare collection

4.15 Alongside traveller information, fare collection is a business-critical support system that will respond to, and facilitate, the broader Science Transit system's operational design and business model.

4.16 Fare collection is considerably more than just a background technical system. It represents the 'front-end' of the most fundamental business and pricing decisions for local transport operators. Similarly the price being charged, and the mechanism for making payment, is a key point of interaction between system users and the mobility service.

4.17 Through our delivery of Science Transit we intend to evolve fare collection systems across all mobility services in the county. In the not-so-distant future we envisage county-wide cashless and ticketless travel, with integration into national rail, coach, and park and ride parking payment systems. To make this a reality the focus of our work will be on:

- Developing technical and data interoperability frameworks with transport operators to allow for multi-mode and multi-operator ticketing and cashless payments.
- Establishing branded Science Transit fare products that extend to connecting services, and allow for revenue sharing between different service operators.
- Simplifying pricing mechanisms so users can easily identify their best fares via Science Transit publicity materials and digital information channels.
- Developing online and interactive services via the web and smartphone apps that including on-the-fly payment for travel (while in motion or progress).
- Exploring and testing the potential for location-aware fare collection to facilitate automated payments.
- Opening-up anonymised fare revenue and patronage data to allow for predictive and pattern-analyses that could inform more intelligent transit route investment decision-making in the future.

4.18 Several of these activities present scope for collaborative R&D with local innovation partners in order to accelerate routes to market for locally-developed fare collection and payment systems.

Consistent branding

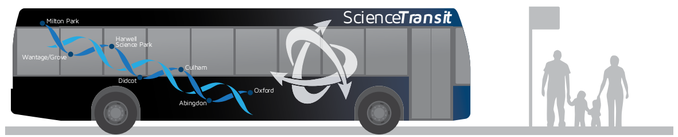
4.19 Developing a strong, coherent brand and identity for the Science Transit system is an important consideration of overall system design. Whether a sign, symbol, slogan or word, branding the system will ensure a constant message to the audience, aiding recognition and building awareness amongst the population. An engaging brand will help us to reach the general public and assist with achieving support and buy-in.

4.20 Our work to brand the system will consider concepts tapping into what people want, need, and require; as well as - ultimately - what they desire. The brand needs to create an image in the minds of users and non-users so as to clearly communicate a positive and accurate perception of the services on offer through Science Transit.

4.21 Through our development of this Science Transit Strategy document, we have created the following outline concepts which can be tested and developed with potential system users as we progress this component of the strategy.

4.22 There are already some very strong branded images for Oxfordshire and it is important that any new brand is minded of this to enhance customer experience rather than add uncertainty. We need to consider how the Science Transit Brand integrates with other brands while remaining inclusive.

Possible Science Transit Branding



ScienceTransit

ScienceTransit ScienceTransit

Joining-up smart mobility information

More intelligent information for system users

4.23 Travel Information, like fare collection, has traditionally been a supporting system that should ideally be carefully tailored to the customer service and operational objectives and features of Science Transit. Reliable and accurate mobility information is central to empowering public transport users and non-users into making more intelligent decisions about their choice of travel modes. The world's most successful transit systems can be negotiated in relative comfort without the need to interact with anyone. These are often urban light rail and metro systems where every effort is made to reassure the user along the course of their journey. The same principles have been successfully applied to local bus-based systems (e.g. Trans-val-de-Marne busway in Paris and Zuidtangent in Holland).

4.24 Outside of London, Oxford has one of the most comprehensive real-time passenger information systems in the UK. This information has to date been delivered at-stop, via digital displays, but is increasingly becoming available through web-based feeds so that it can be embedded into various forms of digital media.

4.25 The growing availability of real-time transport data feeds (particularly in major cities) is rapidly changing our historic reliance on timetables and paper-based information distribution approaches. Personalised travel information is increasingly available from queryable online sources that allow prospective travellers to provide details of the origin, destination, and timing of their trip to receive relevant information in return. Widely used smartphone apps like CityMapper and MyCityWay are driving-up the quality and relevance of multi-modal travel information in large global cities. Their users are gaining deeper insight into the travel options available to them, enabling enhanced decision-making about the optimal route and mode combinations for the combinations of trips they need to make.

4.26 Our expectation is that similar personalised, context-specific, journey planning tools will trickle-down to smaller cities like Oxford as the multiple open real time data feeds they depend on become reliably available. Science Transit aims not to overlook user groups that will continue to need clear and concise paper-based and at-stop information, but provides a growing alternative. We envisage the bulk of work we do to deliver this strategy will involve:

- Working with local transport operators, highway network managers, and other mobility service providers (on and off-street car parking, bike hire systems, car clubs, and car share providers) to broker real-time open data feeds that can be shared publicly and used to power next generation information tools.
- Exploring the possibility of crowd-sourcing user feedback and sentiment in relation to their experiences of using the Science Transit system, to inform future service planning and identify which system components work well / require attention.
- Enhancing the quality of information on board Science Transit system vehicles, with better insights into the performance of connecting services and mobility options.
- Fully opening-up and exploiting all of the mobility-related data owned by local authorities in the region, including Urban Traffic Management Control centre datasets.
- Collaborating with local R&D partners to develop innovative, locally-relevant, mobility information tools that improve the efficiency with which people use the Science Transit system alongside the rest of the county's transport networks.
- Working with local property developers to ensure intelligent mobility information services are 'designed-in' to new residential developments and dwellings constructed over the course of the next 20 years.
- Engaging with other UK cities and transport groups to play an active role in the development of open global standards for sharing mobility-related data.

4.27 By implementing these initiatives, Oxfordshire's mobility data feeds will come to act as the glue that binds together disparate transport networks into a truly multi-modal, integrated Science Transit system. The mobility information products described above will likely become central to the way people choose how to travel, as well as providing the means to procure and pay for mobility 'as a service'.

Handling small demands

4.28 The process of accommodating small demands (both short trips, and longer trips from locations where there is limited demand) is increasingly thought of as a data problem. 'Inefficient', and operationally inconvenient, taxi and car passenger trips are traditionally accommodated at major interchanges with limited provision elsewhere. Data-driven, location-aware mobility services like Uber, and automated bike sharing/car club services, mean it is becoming easier than ever before for people to plan and make multimodal trips with minimal interchange penalty. In the most densely populated urban areas these lifestyle oriented services are enabling growing numbers of people to reduce their dependency on the private car – and in some cases live totally car-free.

4.29 Our delivery of Science Transit will recognise that the semi-rural and rural nature of many of the county's residential areas currently places limitations on the viability of these kinds of 'next generation' services. In doing so our work to accommodate small travel demands across the system will combine the following activities:

- Working with local taxi and private hire companies to explore ways we can enhance integration and interchange at Strategic Science Transit Interchanges.
- Improving the provision of physical interchange facilities at Transit and Strategic Interchanges for private and hired vehicles, allowing for both pre-planned and on-the-fly connectivity with scheduled/high frequency public transport services.
- Working with local R&D partners to scope, design, test, and implement a family of scalable, and replicable location-aware vehicle hire and ride sharing technologies focused on bike hire, car share, car clubs and other on-demand vehicle services. By developing new products and technologies that are both relevant and financially viable for smaller cities like Oxford, we envisage scope for innovation-led growth and re-sale to other similarly sized cities around the world.
- Partnering with local Universities and automotive companies to create and test intelligent, driverless, demand-responsive mobility services. We envisage this scaling from existing local work to develop and trial the Robotcar vehicle into a viable product.

4.30 Implementing many of these initiatives will be a long-term undertaking that necessitates significant collaborations with industry and academic partners. We believe the long-term gain from investing time and resources – and being receptive to opening-up the county's highway networks to provide the living lab needed to test their real-world viability – presents genuine scope for us to establish new forms of mobility that are globally relevant and exportable.

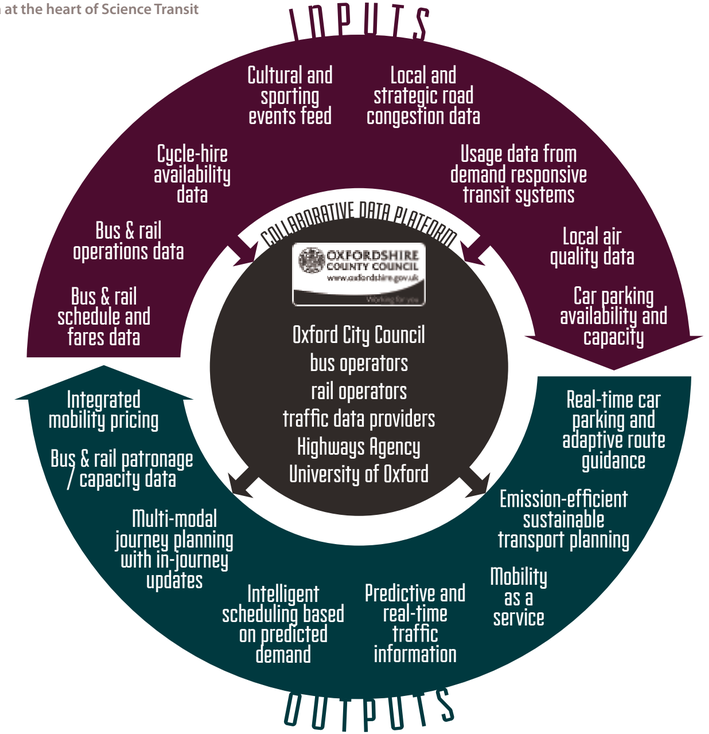
Embracing intelligent data-driven mobility

4.31 Our desire to embrace intelligent, data-driven, mobility is guided by our observation they are already disrupting[10] existing transport networks, and look set to pervade new forms of mobility for the foreseeable future. Our expectation is that intelligent mobility techniques and practices will cross-cut all of the Science Transit system's components. The Strategy sets out a plan that ensures Oxfordshire is at the forefront of influencing and embracing the new disrupting technologies.

4.32 While this is a long-term aspiration and is not something we can expect to achieve overnight, the intelligent mobility sector is gathering pace rapidly. To set the 20 year Science Transit time-horizon in context, technologies that were pure science fiction just 20-25 years ago are increasingly commonplace. As such it is very difficult to predict with any precision where our pursuit of Science Transit will take us, or how quickly current public transport providers will respond to the disruptive innovations on the horizon.

4.33 As a practical first step towards achieving more intelligent mobility, the collection and storage of transport-related data from a range of local and national data sources will underpin the development and design of Science Transit. Oxfordshire County Council will play a central role in coordinating this automated data collection effort, working in partnership with local transport providers (e.g. bus and rail companies, bike hire providers) and secondary service providers (parking providers, free public WiFi, ticket sellers). The diagram below shows how data generated through the process of providing these services can feed back in to the design and delivery of the better optimised Science Transit system.

Data at the heart of Science Transit



[10] A disruptive innovation is an innovation that helps create a new market and value network, and eventually disrupts an existing market and value network (over a few years or decades), displacing an earlier technology. The term is used in business and technology literature to describe innovations that improve a product or service in ways that the market does not expect, typically first by designing for a different set of consumers in a new market and later by lowering prices in the existing market.

4.34 Not all of the datasets required for intelligent mobility are currently freely and openly available, and some are unlikely to ever be made available in this way, but when collected and combined in real-time they offer scope for deeper understanding of the way transport systems interact with the world around them. Further integration with data flows from social media, restaurants, venues, shops and other trip-generating destinations is ultimately envisaged as critical to the development of mobility systems that are responsive to the changing aggregated travel demands of people.

4.35 Resolving the technical problems associated with collating and combining the data flows from the multiple sources described above is a common challenge across the established transport industry as a whole. From the perspective of the financial business case for Science Transit, any data costs associated with procuring or collecting missing datasets will need to be considered. Long-term, these costs may be integrated within the price of travelling in and around the Oxfordshire Knowledge Spine, or borne by new commercial models (e.g. through sales of seemingly unrelated products).

4.36 The table to the right summarises the key drivers and opportunities for Oxfordshire businesses and research industries in respect of the five strands for Intelligent Mobility identified by the Transport Systems Catapult.

4.37 Projects that could be delivered in partnership with local R&D centres to exploit these opportunities include:

- Dynamic traffic and transport modelling.
- Fully interoperable payments systems across all locally present forms of transport.
- Next generation electric vehicle charging infrastructure.
- Ultra low emission vehicle propulsion technologies.
- Exploitation of free public WiFi connectivity for pedestrian footfall and vehicle tracking.
- Electric vehicle driver information.
- Intelligent two-way feedback between driver and vehicle, including crowd sourcing feedback on journey satisfaction and performance.
- Autonomous passenger and freight vehicle design, implementation and service delivery.

Intelligent mobility strand	Drivers & opportunities for exploitation through Science Transit
Autonomous systems	▪ Optimised performance and control of existing transport services ▪ Reduced operating costs and staffing requirements ▪ Better use of existing transport network capacity ▪ Reductions in fuel costs and transport emissions ▪ Driverless technologies and control systems
End-to-end journeys	▪ Greater convenience for transport users ▪ Inclusive access for people with limited mobility ▪ Mobility as a service procured on-demand ▪ Reduce time and costs associated with moving people
Information exploitation and customer experience	▪ Easier to use, more navigable transport networks ▪ Tailored, contextual assistance for travellers with particular needs ▪ Reduce time and costs associated with moving people and goods ▪ Add value by leading consumers to relevant goods and services
Resilience	▪ Faster response to emergencies and incidents ▪ Better-informed strategic plans for winter readiness ▪ Dynamic switching between transport networks ▪ Reduced costs associated with service delays and cancellations
Smart infrastructure	▪ Adaptive capacity to accommodate primary movement flows ▪ New sources of data from connected infrastructure ▪ Reduce/delay need for additional road/rail/air infrastructure ▪ Optimise maintenance and repair activities based on sensor data

- Data mining, predictive analyses using historic datasets, and autonomous control systems for individual mobility services and system managers.
- Partnering with local mobility service operators to ensure real-time information feeds are converted into actionable real-time intelligence for system coordinators (and autonomous control systems), as well as being made available retrospectively for pattern analyses and predictive modelling.
- Exploitation of GNSS[11] and Internet of Things data flows from increasingly connected vehicles and infrastructure.

[11] GNSS - Global Navigation Satellite System (GNSS) receivers commonly-used for surveying and navigation.

Delivering smooth interchange

4.38 All journeys involve some form of interchange, whether it is walking to the bus stop to get on a bus, transferring from bus to train, or parking the car and walking to the office. In the context of Science Transit, the ambition is to make all interchanges as smooth and seamless as possible.

4.39 To this end through the Science Transit, public transport and Area Strategies we will establish a network of stops and interchanges that serve key destinations across the Knowledge Spine, and act as interchange points between multiple modes of transport. These will differ in scale from one location to another, but as a general rule will:

- Accommodate high frequency services, and large flows of people, at peak times.
- Facilitate seamless, stress-free transfer across multiple modes of travel.
- Be situated in locations that are close to the strategic highway network, providing maximum opportunity for park and ride and mode-shift from private car use.
- Maintain safe walk and cycle access by keeping people segregated from public transport and vehicle movements.
- Become an integral part of the land-use mix to create vibrant centres of activity that reduce 'dead-time' commonly associated with interchange between travel modes.

4.40 The following hierarchy is envisaged for the future Interchanges:

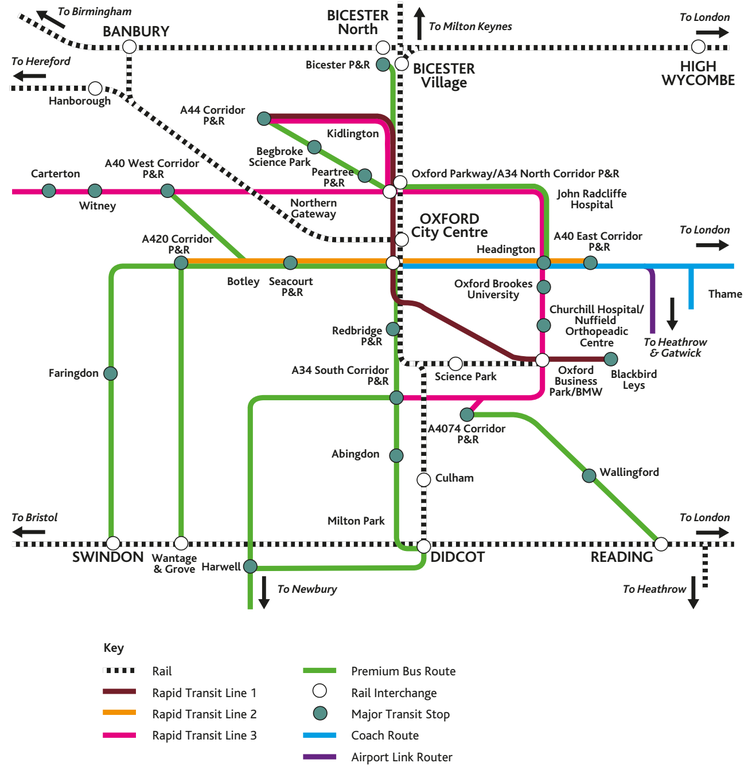
- **Local** - a simple stop serving a limited number of routes, with safe and convenient access by walking and cycling, and perhaps some cycle parking
- **Transit** - an interchange served by a range of different services, perhaps with a number of stops/shelters, at the convergence of walking and cycling routes, with pick up/drop off facilities, and possibly some parking to facilitate park and ride
- **Strategic** - a major interchange potentially served by national and regional rail or bus services, many local bus services, and including existing and proposed Park and Ride sites.

4.41 We envisage that many Strategic Interchanges will, over time, become connected to each other by rapid transit services designed to move large volumes of people at regular frequencies. Where passenger volumes do not support mass rapid transit, buses with high levels of service will operate at peak hour frequencies that are sufficient for users not to need a timetable (e.g. every 15 minutes). Key residential areas and smaller destinations, such as satellite campuses at each of the county's various science parks, will be connected by feeder bus or small vehicle services as well as secondary walk/cycle and demand responsive mobility services.

Intercange type	Potential locations	Facilities	Transit Modes
Local	Less accessible parts of residential and employment areas	RTPI, information, shelter	Local bus, small vehicles, DRT, driverless "Pods"
Transit	Major residential developments, innovation areas, town centres	RTPI, information, improved shelters, plus some retail and service activities	As above plus higher capacity/frequency services
Strategic	Railway stations, park and ride interchanges	RTPI, information, interchange building offering wide range of retail and service opportunities	As above plus rail, regional and national coach, park and ride

4.42 The existing network already has the benefit of some good quality stops and interchanges, particularly in and around Oxford. Moving forward, it will be necessary to identify the location of local, transit and strategic interchanges in conjunction with the connections between them. An impression of how Science Transit Interchanges could be connected to form a system is set out on the following page (indicative plan).

Illustrative Transit Network



4.43 The aim of the Science Transit system will be to provide the majority of people who work in Oxfordshire with journey options that involve no more than a single, logical, interchange through a Science Transit Interchange and minimise the need for private car use. In developing and improving the quality of local interchanges, some of the features that will need to be implemented include:

- Further roll out of Real Time Passenger Information.
- Relocation and increase in the number of Park and Ride sites, as proposed in the Oxford Transport Strategy; to serve more routes, increase interchange potential, and enhance facilities on-site (retail and other services).
- Improvements to existing/creation of new national rail stations to serve as Strategic Interchanges with a wide range of retail and other services to ensure productive interchange.
- Creation of Transit Interchanges in new developments and existing Innovation Areas, with improvements to existing town centre interchange facilities.
- Design for a wider range of vehicle-types to serve graduated demand across routes.

Achieving high quality services

Deploying appropriate transit vehicles

4.44 Travel demand between, within, to, and from the Knowledge Spine is highly varied. As such, an important consideration in the design of Science Transit system will be to provide for a range of movement patterns along different corridors. Using vehicles of appropriate capacity levels will allow for service frequencies that are attractive to users, and deliverable at an affordable price.

4.45 The Science Transit system will integrate a combination of walk/cycle, demand responsive small vehicles, conventional bus services with high levels of service, dedicated Rapid Transit, and Heavy Rail connections into a cohesive mobility network. The key service types, and the roles they are envisaged to play, are outlined to the right.

Service type	Role in Science Transit
National Rail links	▪ Fast connection between Banbury, Bicester, Didcot, and Oxford Strategic Interchanges. ▪ Fast connection to London, Heathrow and key destinations in neighbouring counties. ▪ High volume people movements at regular intervals.
Rapid Transit (RT)	▪ High frequency links between Strategic Interchanges ▪ High degree of segregation and priority from road traffic delivering reliable journey times. ▪ High quality vehicles offering mass-transit system capacity, where needed. ▪ Deployed on high-demand corridors.
Premium Transit Routes - Buses with high levels of service	▪ Regular services linking larger residential areas' Transit Interchanges with nearby Strategic Interchanges ▪ Act as a feeder service to RT and National Rail links.
Connector Transit - Smaller vehicles operating on scheduled and flexible demand-responsive routes	▪ Minibus shuttle services operating at peak hours. ▪ Feeder services to connect Local Interchanges in residential / destination locations with lower levels of travel demand. ▪ Demand responsive services on semi-fixed routes to connect smaller residential areas with nearby Strategic Interchanges and destinations.
Premium/Super cycle routes & walking	▪ Direct, segregated active travel links that connect destinations and residential areas to their nearest Science Transit Interchange (set out in Oxford Transport Strategy).
Private car travel	▪ Frequent interchange opportunities with high quality public transport and demand-responsive services. ▪ Essential connection into Science Transit network for people living and working in rural parts of the county. ▪ Scope for driverless vehicle technologies to dramatically change demand for private car use.

4.46 The service types described above represent a continuum. Lower cost services that are more flexible and can be implemented with little lead-time are ideal for areas where limited demand for non-car based travel exists. If through their introduction, or local development, the scale of passenger demand changes over time, these services can be scaled-up gradually through the provision of larger vehicles and improved network infrastructure.

4.47 An important feature of the Science Transit system will be its flexibility. Some aspects of network infrastructure (bus priority at junctions, RT running lane segregation, walk/cycle paths connecting Interchanges to places), and the services that use them, will be permanent fixtures. However, other components will be designed to operate on a flexible basis – reducing the need for expensive infrastructure that is only used for part of the day. Flexible components of the Science Transit network are anticipated to evolve over the 20 year delivery horizon to include:

- Small vehicle services operating on scheduled routes, which can be amended with minimal lead-time to respond to travel demand from new housing development or specific scenarios (e.g. University term start and end, annual festivals and cultural events). Data collected from the Science Transit system, and combined with local road traffic/event data feeds, will inform the scheduling of these services.
- Demand responsive mobility services that do not operate on a scheduled basis, but instead use computer algorithms to match requests for short distance travel from multiple users. Several such systems are currently in development in the UK (Simply Connect) and internationally (Bridj), and are anticipated to become increasingly common as intelligent mobility services become more commonplace. The Science Transit system roadmap will plan for the integration of these kinds of data-driven transport services alongside existing forms of mass rapid transit and public transport.

4.48 Over the timescale being considered by Science Transit, greater volumes of services will come directly to people - rather than necessarily requiring people to move to them. Early signs of these kinds of system are evident in the form of services like Click & Collect, which are changing people's movement patterns and mobility demands. The Science Transit Strategy will need to adapt to these technology-driven changes in order to ensure it remains relevant over the life of its 20 year delivery horizon.

Improved priority and segregation

4.49 Science Transit's aim is for more rapid services to deliver travel time savings and more reliable journey times, particularly between Strategic Interchanges. Only high levels of segregation and priority will deliver this. Bus gates, bus lanes, grade separated lanes, or exclusive transit ways - such as disused rail corridors - will be implemented, as appropriate, across the Knowledge Spine and on interconnecting routes from neighbouring residential areas. These will all be explored as part of individual Area Strategies.

4.50 Just as railway tracks indicate where a train travels, treatments or markings to differentiate a running way can effectively convey where a dedicated bus service operates. Differentiating the appearance of bus running ways can be accommodated through a number of techniques including pavement markings, lane delineators, alternative pavement texture, alternative pavement colour, and separate rights-of-way. These are likely to be features of routes that connect Transit and Strategic Interchanges.

4.51 We anticipate investment in a guided system will also help promote a stronger image, and generate greater modal shift. However, this needs to be balanced against the lower costs and greater flexibility offered by high quality conventional bus-based systems. The lead-time, cost, and permanent nature of any form of segregated running way means they are only likely to be appropriate for high-demand links between Strategic Interchanges that also serve major employment sites (e.g. Innovation Hubs) and residential areas.

5 DELIVERY ROADMAP

Context

5.1 As a long-term vision for improving mobility options and connectivity into, and within, the Oxfordshire Knowledge Spine, we envisage Science Transit will be delivered gradually over a 20 year timeframe.

5.2 This 'future-focused' time-horizon, and desire to proactively integrate intelligent mobility into the Science Transit system, means anticipated technological innovations and research-led development will introduce considerable variability over when specific components can feasibly be delivered. As identified in the previous section, future levels of public funding available, the actual scale and location of demand for movement created through settlement growth in Oxfordshire, and relative transport priorities all impact upon the accuracy with which we can plan and deliver our vision.

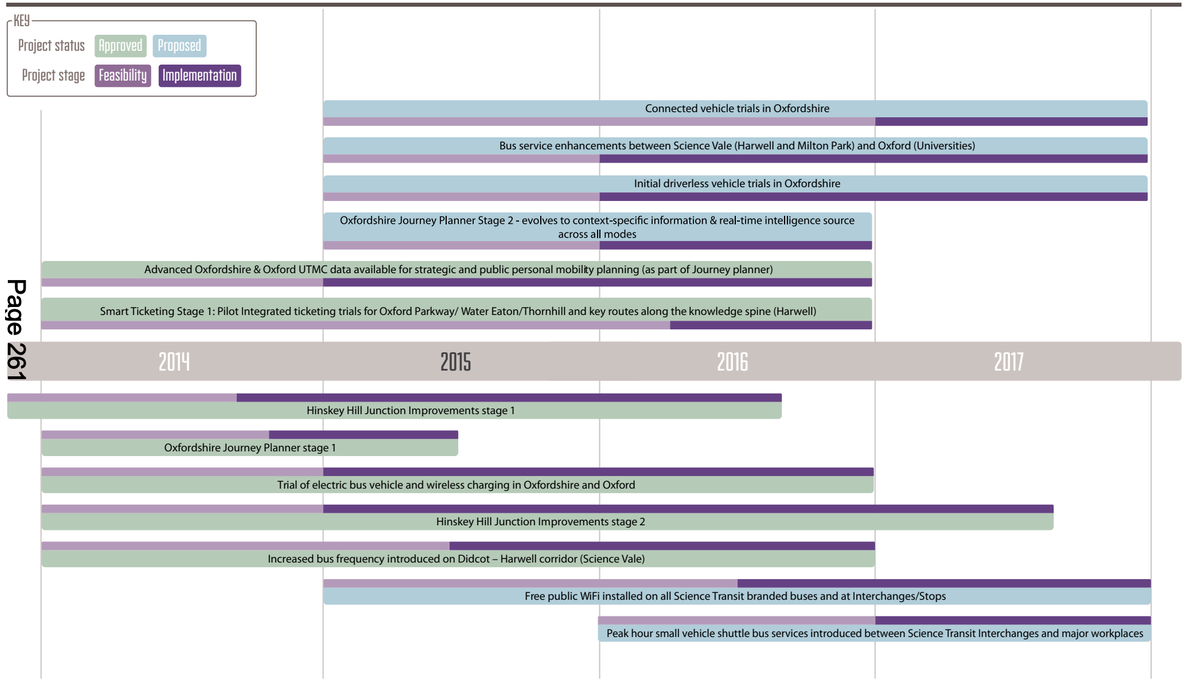
5.3 Our roadmap for delivering Science Transit needs to account for this inherent uncertainty, and to allow different components of the Science Transit system described in the previous section to move forward at different speeds – whenever demand, funding and private sector opportunities emerge. The timeline on the following page therefore constitutes an outline plan, with the near-term activities grounded in current and planned projects. The kinds of projects considered necessary to fully achieving all of the Science Transit objectives, but which may currently appear aspirational, are shown as medium and longer-term activities. We note these projects may not be delivered in the precise order they are described overleaf, but envisage they are likely to come to fruition over time in a manner that ensures the components of Science Transit are gradually assembled as part of an integrated system.

The Roadmap

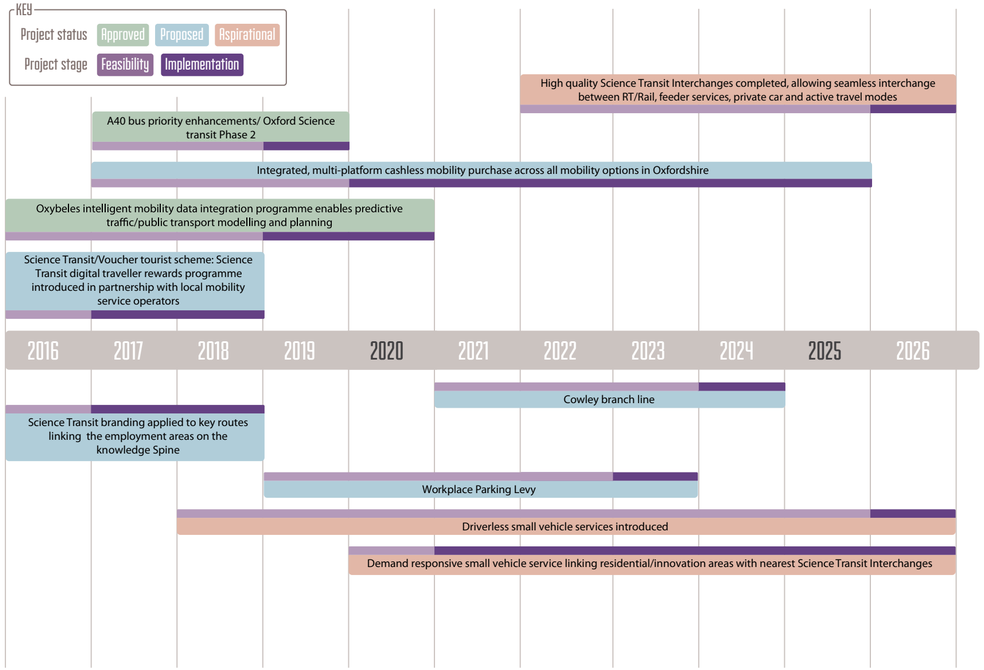
5.4 On this basis our indicative Science Transit delivery roadmap is set out overleaf. For each potential Science Transit project we have estimated the amount of time related to the three key stages of:

- **Aspiration**: Pre-feasibility work to appraise and prioritise new project ideas.
- **Feasibility**: Detailed appraisal to determine each idea's viability and deliverability.
- **Implementation**: Technical delivery of the project, resulting in improved mobility.

Science Transit Roadmap - projects implemented by 2017



Science Transit Roadmap - projects implemented beyond 2017



6 KEY SUCCESS FACTORS

6.1 The Science Transit Strategy cannot be delivered successfully in isolation. It needs to be supported by supportive transport and land use planning policies, by a robust funding strategy, by clear governance, and involve both the public and private sectors.

6.2 The figure below provides insight into how we envisage these different aspects will be delivered through Science Transit in order to ensure the necessary supporting policies and conditions are in place for the strategy to be a success.

Supporting policies

Managing car-based demand for travel

6.3 Successful transport strategies typically combine "carrots" to encourage a particular behaviour and "sticks" that discourage choices that have significant environmental, economic, or social impacts. Science Transit will offer a high quality door-to-door service to encourage passengers to use the system, but will require supportive measures to reduce growth in car use and lock-in the benefits of modal shift. This is not about being anti-car, it is about making the best possible use of existing and future infrastructure and services for the benefit of all residents, businesses and visitors to Oxfordshire.

6.4 Controlling the supply, pricing, and location of car parking is an established policy that has been used to manage car-based demands in Oxfordshire, and in Oxford particularly, for many years. By restricting demand in the city centre and encouraging park and ride through supply measures and differential parking charges, the number of vehicles entering Oxford city centre has been strongly managed.

6.5 It is important that this continues and is extended in a way that is complementary and supportive to the Science Transit Strategy. Whilst existing policies influence the demand for public parking, a considerable proportion of spaces in Oxford city centre and virtually all of the spaces at the Innovation Area, are privately owned. Where appropriate, the potential for workplace parking charging should be explored in order to manage demand at these locations. Alternatively, congestion charging could be used in areas where there is high travel demand and very limited road space, as a way to influence behaviour and choice.

6.6 With the intelligent real time data available on congestion, parking availability, and public transport capacity, it is possible to envisage a dynamic approach to pricing for road usage, car parking and transit services that optimises the use of available parking and highway capacity. We envisage this will become technologically feasible in both urban centres and in more remote locations. It offers scope to simultaneously maximise revenue for further re-investment in Science Transit by encouraging the use of vacant spaces or seats that would otherwise remain empty. So, for example, during the parts of the day when travel demand is at its highest and pressure on the road network is at its most severe, the differential between the pricing of Science Transit services and driving/parking would be at its greatest. During quieter periods of the day, where spare road and parking capacity existed, the differential could be smaller. Re-investing revenue from any such user charges to develop improved public transport infrastructure and services would be essential from an acceptability perspective.

Spatial Planning

6.7 There is a need for 100,000 homes or 5000 per annum to be built in Oxfordshire between 2011-2031. There is currently a large shortfall in provision with only 5,360 homes having been built in the three years 2011-2014. While there are many reasons for this shortfall, a clear commitment to delivering Science Transit, together with its integration within the spatial plans for the county, will help address concerns over the impact of growth on transport networks and infrastructure. To achieve this, Science Transit must become embedded within the future growth, development and urban design of the areas it serves.

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	
Land use integration		No integration	Ad hoc policies to encourage integration	Integrated transport and land use planning becoming embedded within Planning Policy	Policies on uses, densities and parking standards related directly to public transport accessibility	Hard and fast rules requiring transit oriented development	
Demand management		No parking or other fiscal measures	Parking charges and some supply limitations	Differential charging according to location and purpose	Congestion charging/ workplace parking levy	Dynamic pricing of parking, road use and public transport	
Funding		Government grants	Increased private sector funding, eg from developers	Private sector becomes responsible for the majority of investment	Innovative mechanisms to capture land value increases to allow borrowing and reinvestment in system	Self-sustaining system	

6.8 NPPF provides the policy requirement to locate major developments where the need to travel can be minimised and the use of sustainable modes of travel can be maximised, there is the opportunity through future Local Plans and to better integrate future development with Science Transit. Transit Oriented Development (TOD), which lies at the interface of land use planning, transport planning and urban design, will become part of future land use plans in Oxfordshire. In land use planning terms, TOD means clustering mixed use development around existing or proposed public transport interchanges and stops, with the highest density development closest to the public transport node. The short walk/cycle distances create a high demand for public transport services, with the mixed use characteristics helping to reduce motorised trips and generate the bi-directional demands that facilitate efficient public transport operation.

6.9 To support funding of Science Transit, the potential level of developer financial contribution to new infrastructure and services should be clearly based on proximity to the Science Transit network. Development sites located closer to stops or interchanges should pay a lower level of contribution (or in some cases nothing at all) compared with locations which are more remote and likely to be more car-dependent in nature.

Land for parking

6.10 Over the time horizon for delivering Science Transit, there are likely to be many changes to the way in which we choose to travel, either because of global issues such as climate change and peak oil, national or local issues driven by political decisions, or behaviour change stimulated by Science Transit itself. One of the impacts of this might be that ownership and use of private vehicles is very different to today, with greater focus on the use of public vehicles (be they mass transit, demand responsive or autonomous) and therefore less demand for parking in city and town centres, and at innovation and business parks. This would create an opportunity for using land currently taken up by parking for more productive and valuable use, thereby increasing density, with positive impacts on the commerciality of transit services, and land values, creating additional revenue for re-investment in Science Transit.

Funding

6.11 Science Transit will be developed and delivered over the next 20 years and whilst immediate funding from the Local Growth and City Deals is available for initial projects, a flexible and scalable strategy is required for the longer term. Both capital and revenue funding will be required and it is the very nature of political and economic cycles that the availability of grant funding from Government is unpredictable. Staying ahead of the game, and being able to demonstrate economic, environmental and social benefit from investment will, however, always remain the best approach to securing investment. The following sections set out some of the key principles of the funding strategy and discuss the potential sources of funding that will facilitate the delivery of Science Transit.

Principles

6.12 **Self-sustaining**. The overriding aspiration is that over the long term, Science Transit should be self-sustaining, with a commercial network of services and the financial ability to invest in upgraded and new infrastructure and services. This will require all stakeholders to play and pay their part; and for new funding mechanisms to be developed, tested and employed.

6.13 **Advance preparation**. Oxfordshire has a strong recent track record in securing significant grant funding. To continue this success it is vital that new ideas are developed, appraised, and designed so they are "oven ready" for funding submissions; and powered by clear, positive business cases. Increasing involvement of private sector industry partners is envisaged.

Sources of funding

6.14 **Government**. In the short term, Government is likely to continue to make the largest contributions to the funding of Science Transit. This might come through Government Departments, for example, DfT, DCLG and BIS, or through research and innovation bodies such as Innovate UK and similar EU funding such as Horizon 2020. Such funding, however, is unpredictable, and with current policies aimed at reducing national debt, competition for funding for transport-related schemes will only increase, therefore reinforcing the need for robust and positive businesses cases and the ability to leverage funds from other sources, including the private sector.

6.15 **Operators**. Oxfordshire's Growth strategy will attract close to a quarter of a million new residents and create 85,000 new jobs - effectively the size of a new city. This will generate significant demand for travel, and massive potential for mobility service operators to increase ridership and revenue. Existing and new operators must be encouraged to invest in new services and, potentially, infrastructure.

6.16 **Developers**. Contributions towards delivery of the Science Transit Strategy can be expected from developers through Section 106 agreements and the Community Infrastructure Levy. This will require a clear strategy that needs to be grounded in transparent and accessible planning policies so it is clear what is expected in respect of different types and sizes of development.

6.17 **Industry**. Oxfordshire's research, innovation and academic communities will have the opportunity to pilot and trial new technologies and systems in a "living lab" environment. With the scale of the global intelligent mobility market put at around £900bn, there is significant incentive for local industry partners to invest in Science Transit to test and prove their technology solutions with the longer term aim of securing reward through international sales. Close working with industry, and developing the living laboratory, will put Oxfordshire in a stronger position to successfully attract R&D investment and funding through channels such as Innovate UK and Horizon 2020.

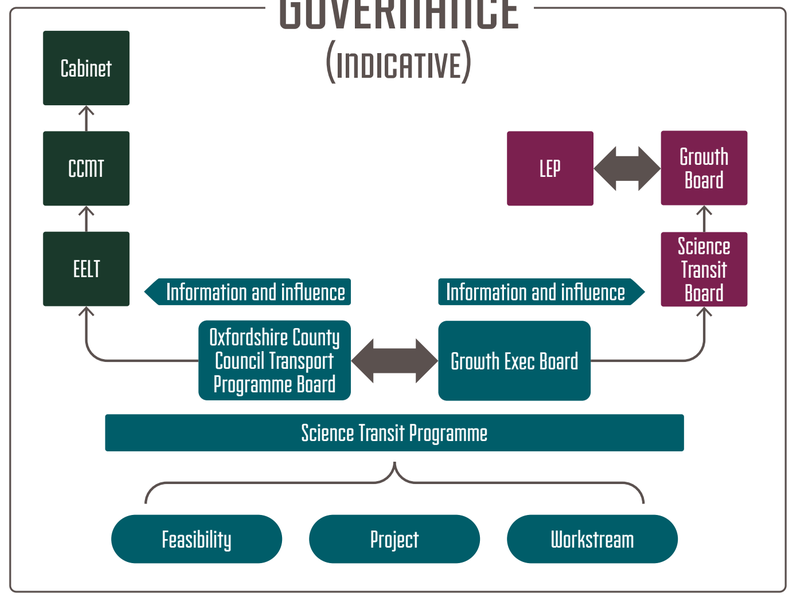
6.18 **Users**. Science Transit users will pay for their use of the system through fares. Successful delivery of this strategy is expected to drive-up revenues from local mobility services over time, attracting trips that would usually be made by private car. Effective branding and promotion of new high quality services will help users from around the county to recognise the value of Science Transit services, and begin switching modes to benefit from it.

6.19 **Land value capture**. A potentially significant contribution to funding could be made through mechanisms such as land taxes, business rates and Tax Increment Financing (TIF) to capture increases in land value generated by new and improved transit services. Such mechanisms require investigation, detailing and buy-in from relevant stakeholders.

Governance

6.20 A clear governance structure has been established to manage the development and delivery of the Science Transit Programme, as shown in the figure to the right.

6.21 The Science Transport programme will report to the Transport Programme Board and Growth Board Exec Group which will form the primary governance and decision making point for the project.



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Connecting Oxfordshire: Local Transport Plan 2015-2031

A40 & A420 Route Strategies

A40 Route Strategy

Role/function of A40 as a principal route

1. The A40 is an important through route linking Gloucestershire and South Wales with London via M40. It is also critical in linking West Oxfordshire - particularly Witney and Carterton - to the Knowledge Spine through connections to the A44 and A34.

A40 route within Oxfordshire

2. Witney and Carterton are the two largest towns in West Oxfordshire. They have both seen considerable growth over the last 30 years and this is expected to continue in the future. The A40 forms the main route between both of these towns and Oxford; this is used by most of the bus routes as well as general traffic. Neither Witney nor Carterton have a direct rail connection; their nearest stations are at Hanborough or Oxford.

3. The A40 is a single carriageway Primary Route. It carries a daily flow of between 23,000 and 30,000 vehicles per day - well above the road's link capacity. This is exacerbated by junction capacity issues at Eynsham/Cassington and Wolvercote. This results in congestion on the route for much of the day, including at weekends. During school term times the average journey speed on the A40 between Cassington and Wolvercote in the morning peak is 17 mph, while on the worst days it can be as low as 10 mph.

4. The current bus services have achieved a notable success in attracting people who are travelling from Witney and Carterton to Oxford city centre, but there is still considerable scope for increasing bus use in journeys to the rest of the city.

Growth Context - Oxfordshire growth, West Oxfordshire Local Plan, Oxford City

5. The A40 strategies are being developed alongside the emerging West Oxfordshire Local Plan. Growth proposals from the WODC Pre-submission Draft Local Plan 2011-2031 (March 2015) comprise provision of at least 10,500 homes between 2011 and 2031. The majority of new homes will be provided in the Witney, Carterton and Chipping Norton sub-areas.

6. The proposed indicative distribution of housing is as follows:

West Oxfordshire sub-area	Proposed number of dwellings
Witney sub-area	3,700
Carterton sub-area	2,600
Chipping Norton sub-area	1,800
Eynsham – Woodstock sub-area	1,600
Burford – Charlbury sub area	800

7. Following the Examination in Public (EiP) of West Oxfordshire's Local Plan in 2015 the District are considering options to increasing the level of housing growth, as recommended by the Inspector. These proposals will be considered within the context of transport schemes for the A40.

8. Following the publication of the Oxfordshire Strategic Housing Market Assessment (SHMA), which identified a need for 28,000 new homes for Oxford within the period 2011-31, the Oxfordshire councils have agreed a working assumption of 15,000 homes as the scale of Oxford's unmet need to be planned outside the city. This will need to be taken into account in emerging and future Local Plans, and from a transport perspective, is likely to place further travel demands on the A40 and north Oxford junctions in particular.

Strategies

9. These strategies focus on the stretch of the A40 to the west of Oxford running between Carterton and Wolvercote. For many users of the A40 this section forms just part of their journey, nonetheless the part where they experience significant delay.

10. Two strategies are outlined below for the A40. The first, A40 Science Transit 2, will deliver a package of schemes providing short term relief to the A40 by 2021. These improvements are unlikely to wholly resolve the current capacity issues on A40 let alone deal with the impact of future developments in West Oxfordshire and Oxford city. Therefore a long term strategy for improving the A40 is currently being developed.

A40 Science Transit 2 Scheme – Short Term Strategy

11. In the short term we have been provisionally awarded £35 million from the Government's Local Growth Fund for public transport improvements in the A40 corridor for delivery between 2019 and 2021.

12. The purpose of this proposal is to provide a congestion free route into Oxford from the west for public transport. In turn this provision, and associated improvements in public transport service provision, will encourage a transfer of trips from private transport to bus thereby reducing overall congestion levels on the A40 for all vehicles. Together these measures will prevent or reduce congestion and pollution increasing on the A40 travelling alongside Oxford Meadows.

13. In developing the strategy the proposed scheme package comprises:

POLICY A40 - We will improve access between towns in West Oxfordshire, and Oxford, including the new employment site at Oxford's 'Northern Gateway' by utilising the Local Growth Fund to deliver public transport improvements in the A40 corridor.

The proposed scheme includes:

- **An eastbound bus lane** between Eynsham roundabout and the Duke's Cut, Wolvercote;
- **Westbound bus priority** on the approaches to Cassington traffic signals and Eynsham roundabout;
- **A Park and Ride car park** on the A40 corridor at a location to be determined through the county council's Park & Ride study, due to be published in spring 2016;
- **Junction improvements along the A40 corridor** between Witney bypass and Eynsham roundabout, including bus priority on the approach to Swinford Tollbridge;

In implementing this scheme the current Witney to Oxford cycle route will be retained and will be developed into a part of the Oxfordshire Cycle Premium Route network.

Alignment with other A40 and rail schemes

14. The County Council has secured City Deal funding to improve Wolvercote roundabout and Cutteslowe roundabouts in north Oxford (to be completed winter 2016). Some funding has also been secured for a new link road between the A40 and A44, which will provide improved access from west Oxfordshire to the A44 & A34, avoiding Wolvercote roundabout. Planning and design work is being progressed before consultation and a future planning application is submitted. Further funding will also need to be secured.

15. Development at Northern Gateway will require major transport infrastructure improvements, including improvements to the A40, A44 and Peartree interchange. These proposals will need to fit with the A40 strategy and help to deliver it.

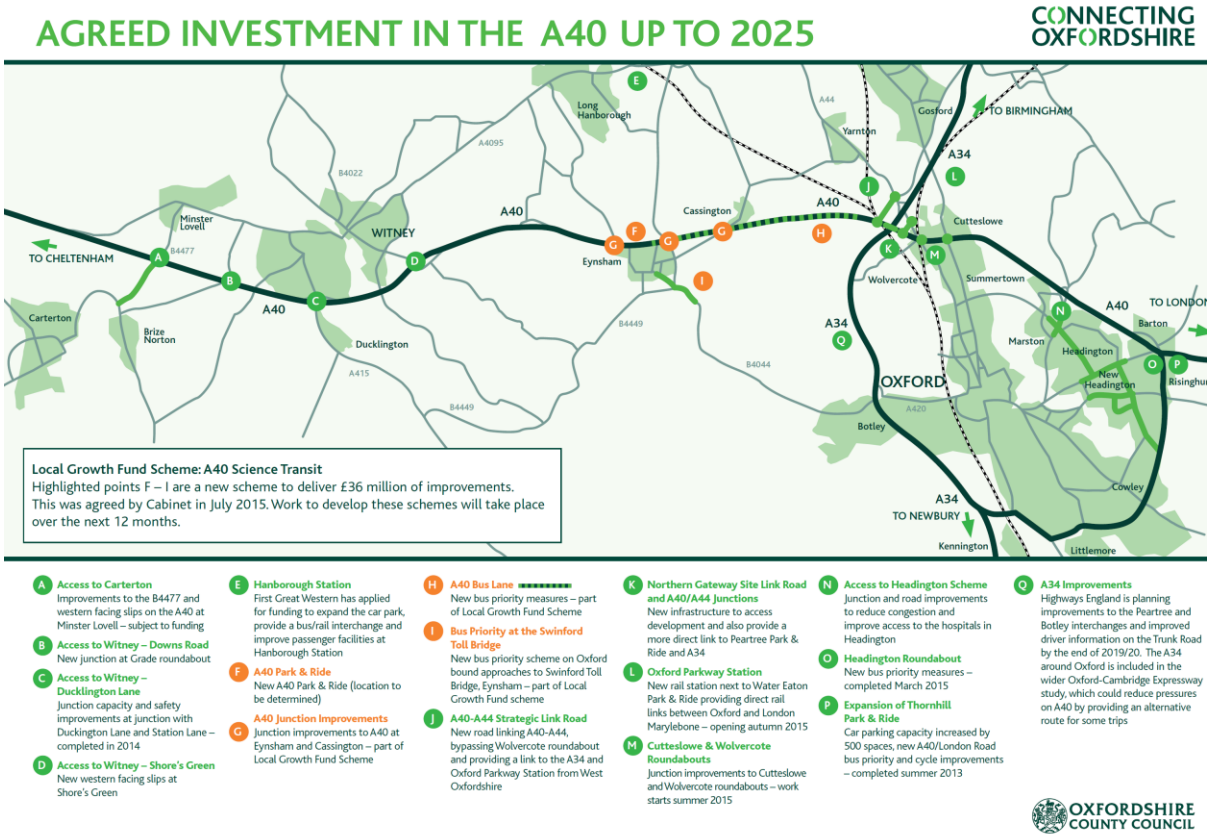
16. In addition to these schemes for the A40 corridor, we will seek the completion of the Cotswold Line redoubling and the development of Hanborough station into a local interchange and Park & Rail facility, with additional platform and parking.

Table 1: A40 Science Transit 2: Project Delivery Timetable & Procurement Plan

Activity	Start Date	Finish Date	Milestone/decision point & scheduled technical gateways
Feasibility & Preliminary Design	01/10/15	31/06/16	Approval of stage 1 Business Case
Land Acquisition	01/09/16	30/09/17	
Detailed Design	01/09/16	30/09/17	
WebTAG assessment	01/09/16	31/08/17	DfT Business Case
Planning Application	01/10/17	30/04/17	If required
DfT Funding Approval	01/09/17	31/12/17	
Procurement	01/01/18	30/03/18	Approval of stage 2 Business Case
Construction	01/09/18	31/09/20	

Extract from Initial Business Case (Stage 0b Commit to Investigate), 2015

Figure 1: A40 Science Transit 2 Map



Investing in the A40 - Long Term Strategy

17. In July 2015, Oxfordshire County Council's Cabinet agreed the **A40 Science Transit 2 Scheme** a major infrastructure project for public transport improvements to be made along the A40 from Eynsham to Wolvercote. This was largely funded through the Local Growth Fund in order to provide congestion relief in the short to medium term. This £40m project, in addition to the other investments across the length of the A40 corridor, set the stage for a much larger undertaking to tackle congestion in the long term.

18. Oxfordshire County Council is committed to finding a long-term strategy to tackle current and projected congestion on the A40.

19. In developing a long term strategy for improving the A40 the following objectives have been identified:

- Improve travel times and journey reliability along the A40 corridor, particularly between Witney and Oxford,
- Stimulate economic growth, in line with the Oxfordshire Strategic Economic Plan,
- Improve safety and reduce environmental impacts such as air pollution and noise along the A40 corridor.

20. The long term strategy for the A40 takes a combination approach which includes both increased road capacity as well as improvements to the public transport offer. The Council has committed to investigate in detail a combined scheme for further feasibility comprising a package of measures:

    i) a dual-carriageway from Witney to a park and ride at Eynsham

    ii) bus lanes in both directions along the A40 from a park and ride at Eynsham to the Duke's Cut canal bridge approaching Wolvercote roundabout

    iii) provision of high quality cycleways along the length of the route.

Figure 2: Investing in the A40 corridor long term strategy

References

WODC Local Plan 2031 (March 2015)

http://www.westoxon.gov.uk/residents/planning-building/planning-policy/local-development-framework/local-plan-2031-examination/

A420 Route Strategy

Purpose of this strategy

This chapter aims to set out a non-exhaustive list of short to medium term improvements along the A420. This document will be updated as the needs of the A420 and surrounding areas are further understood. It should be noted that Oxfordshire County Council does not have any capital funding to spend on these improvements; schemes will only be possible through development in the surrounding areas and successful Central Government funding bids.

The Local Context

Role/function of A420 as a principal route

1. The A420 is the principal and only direct route between Swindon and Oxford. It is an important strategic link in the Oxfordshire hierarchy, and a primary route which the Council expects to be of a standard to allow for free passage of current (20,000 vehicles per day) and expected future traffic for the majority of the traffic day. It should therefore operate with minimal congestion in order to avoid rat running on minor roads.

A420 route within Oxfordshire

1. In addition to providing a direct route to Oxford city centre from Swindon, the A420 serves the many settlements along the corridor including, for example Shrivenham, Watchfield, Faringdon, Kingston Bagpuize and Cumnor. At peak times, certain points operate over capacity resulting in congestion, particularly at the northern end near Botley. Although lorries are advised to use the M4 and A34, locals report 'significant and growing' HGV usage of the route for through as well as local journeys. Up-to-date traffic surveys have been commissioned to quantify this.

3. The A420 is also a Premium bus route corridor, and is served by a highly successful commercial bus route with a frequency of up to three buses per hour Monday to Saturday, plus evening and half hourly Sunday services. Usage of the service has doubled over the last 5 years: this significant growth has resulted in increased service frequency and plans for further upgrades. At times of congestion, buses are subject to the same delays as all other vehicles.

Growth Context - Oxfordshire growth, Vale of White Horse Local Plan, Swindon Local Plan and Eastern Villages

4. This Strategy will take account of and evaluate the likely individual and cumulative effect on the capacity of and operational effect on the A420 of planned growth in Swindon Borough and the Vale of White Horse District. The cumulative effect will be quantified using the county council's strategic traffic model, the results of which are published as part of the Vale of White Horse Local Plan evidence base titled "Evaluation of Transport Impacts".

5. Any planning application for development in Swindon Borough or the Vale of White Horse District that will generate significant amounts of movement shall be supported by a Transport Statement or Transport Assessment that takes into account the planned growth in both authorities and the proper accommodation of its traffic consequences on the network.

6. The Vale of White Horse Local Plan 2031 aims to make provisions for growth of 23,000 new jobs and at least 20,560 new homes by 2031. It lists 21 strategic site allocations: six of these are along the A420, as shown on the plan at the end of this chapter. These housing figures include the allocation for the Vale arising from the Oxfordshire Strategic Housing Market Assessment, although as yet they do not take into account any unmet need arising from neighbouring authorities. This will be assessed in the future but as there are a number of methods for addressing this, no timescale can be put on it at present.

7. Swindon Borough Council's Local Plan (2026) identifies an area called 'Eastern Villages' with an allocation of around 8,000 new homes plus employment land on the eastern edge of the town, adjacent to the Oxfordshire boundary and the A420. A joint A420 Working Group including Swindon Borough Council has been set up, to understand and plan for the transport impacts on Oxfordshire and infrastructure requirements arising from this development.

8. The Council will continue to work with partners and stakeholders on this Group to develop and deliver a strategy for the A420 corridor, including Vale of White Horse District Council, Swindon Borough Council, Western Vale Villages consortium, Town and Parish Councils, the police and businesses, such as the Watchfield Defence Academy.

Transport Aims

9. To have a strategic highway and public transport corridor capable of moving a significant number of people along it whilst maintaining suitable access to and from the A420 from communities along the route, both for vehicular access to the A420 and pedestrian or cycle access to bus stops for the Premium bus route. This will be achieved by:

- Improved junctions on the A420 to improve access to main settlements including Faringdon and Shrivenham, focusing on where new Local Plan development is proposed and existing 'priority' junctions require upgrading. Critical junctions within Oxfordshire on the A420 for evaluation in the Route Strategy will include the following:
    - A significant junction improvement will be required at the A420 junction with Coxwell Road to accommodate known housing growth in the area. The Highway Authority has been negotiating with the developers through the planning process and a full signalisation of the junction is an agreeable solution in principle.
    - The A420/B4508 roundabout at Watchfield, to be funded and delivered by the development sites.
    - A new roundabout at the A420 junction with Coxwell Road. This upgrade is partially funded by developers of nearby strategic sites.
    - A420 / A417 Park Road, Faringdon – in particular increased capacity on the approach from Faringdon
    - Additional junctions may be identified through transport modelling work.

- Enhancement of the A420 Premium bus route, focusing on enhancing service frequency to four buses per hour in each direction, improved bus stops (including changing on-carriageway stops to bus stop laybys where feasible), better walk/cycle connections and crossing provision, cycle parking and high quality waiting/shelter provision (including real time passenger information) and, where appropriate, parking provision at selected bus stops. The accompanying Active & Healthy Travel strategy provides guidance on Door to Door travel (e.g. walking or cycling in combination with bus/rail) and emphasises the importance of good quality cycle parking at popular bus stops as well as safe, direct routes to the stops

- Improved access and increased capacity of the A420 and associated junctions on the approach to Swindon, including White Hart Junction, Gablecross Roundabout, Police Station access, Old Vicarage Lane, new Eastern access to Rowborough and new/existing access to the Eastern Villages development area south of the A420, as identified in the Swindon and Wiltshire Growth Deal package of schemes.

- Improved access into Oxford, including approaches to the A420/A34 interchange at Botley, to be developed as part of the Oxford Transport Strategy, including a new A420 corridor Park & Ride site at Cumnor and improvements to Botley Interchange by Highways England.

- Reviewing and managing the impact on the surrounding road network, including parallel roads to quantify the likelihood of rat running being caused by proposed and allocated development traffic and identifying effective measures to combat this. Potential mitigation measures required to reduce the impact of through traffic on these include local traffic calming and traffic/speed management measures, to be agreed with the relevant local communities. Oxfordshire County

Council will request that planning applicants consult local communities and bring forward measures with their application for development, subject to funding. Routes to be evaluated include:

- B4508 east of Shrivenham
- B4000 south of Shrivenham
- B4507 Swindon – Wantage

Baseline Information

8. Traffic accident data for 2009 to 2014 shows there were 157 accidents along the A420 between Botley and the county boundary. Of these, 5% were fatal, 22% serious and 73% slight. They led to 251 casualties: 4% fatal, 17% serious and 80% slight. 146 (93%) of the accidents were motor vehicle only. The forecast increase in traffic flows could increase the number of accidents along the route. Automatic traffic counter data along the route for the period 2009 to 2014 shows a 4.4% increase in vehicle numbers travelling towards Oxford, and a 2.5% increase in vehicle numbers travelling towards Swindon.

9. Traffic modelling data for forecast year 2030 (base year 2007) shows that:

- The eastbound route will be over capacity in the AM peak period at Botley Interchange, Fyfield, Buckland, Faringdon.
- The eastbound route will be over capacity in the PM peak period at Botley Interchange
- The westbound route will be over capacity in the PM peak period at Fyfield and Buckland
- Many other sections of the route will be near capacity in both the AM and PM peak periods

Strategy

10. A major upgrade of the A420 corridor is not proposed for the current LTP period. Any significant scheme (such as further dualling of all or part of the route) would attract more traffic and be likely to encourage further sites on this corridor to be identified for development. However there is a need to balance this approach with allowing for the significant transport impact arising from planned development, particularly in terms of providing appropriate route/junction improvements, enabling access onto and off the A420 from local communities and preventing rat-running.

11. The Strategy is based upon 3 main proposals:

A420 Proposal 1 Ensure the A420 continues to perform a strategic function operating as a principal road	**A420 1.1** Promoting improvements to Botley Interchange as part of Highways England's A34 Route Strategy
	A420 1.2 Ensuring junction designs continue to support the main east-west

moving people quickly and efficiently between Swindon and Oxford by:	general traffic and bus flow, with a consistent approach to junction type
	A420 1.3 Reviewing speed limits to ensure that changes in limit are at the most appropriate locations
	A420 1.4 Identifying opportunities for bus priority as required
	A420 1.5 Working with partners and agencies to ensure the A420 is resilient to issues such as flooding, ensuring that the network can continue to operate
	A420 1.6 Work with Swindon Borough Council on cross-border issues
A420 Proposal 2 Maintain suitable access from settlements along the A420 ensuring:	**A420 2.1** Safe and timely movement onto and off the A420 by ensuring new and enhanced junctions enable local access and egress along the route (as described in the tables and map at end of this chapter)
	A420 2.2 Safe access to and from bus stops along the A420
	A420 2.3 High quality bus stop facilities, including cycle parking at key locations
A420 Proposal 3 Safeguard and maintain the ability to deliver strategic pieces of infrastructure if required in the future due to significant additional development. For the A420 corridor these include:	**A420 3.1** Safeguard land for a new access onto A420 at/near Highworth Road in the vicinity of the Shrivenham strategic site. Continue to safeguard land at the Townsend Road junction with the A420 (Local Plan reference E17)
	A420 3.2 Safeguard the Coxwell Road junction (E18).

Safeguarding

12. To achieve proposal 3, we will support the Vale of the White Horse District Council in safeguarding land for transport schemes in areas where it is possible that significant development may occur in the future, including that which is more likely to take place beyond the period of this Plan.

Funding

13. Funding to deliver the strategy will primarily need to be secured via Developer Contributions, which will either be sought through Section 106 agreements or the Community Infrastructure Levy (CIL) when it is introduced by the District Council. It may also be appropriate for development to directly deliver proposed strategy schemes. We will secure strategic transport infrastructure contributions from all new development based on the contribution rate per dwelling or per m^2 for non-residential developments, based on the total cost

(tbc) of the transport package. Due to the large scale of growth we will also seek central Government funding where possible.

14. Contributions would also be sought from major residential and other development sites towards the strategic bus service identified in the A420 strategy, including funding service enhancements until they become commercially viable and bus stop infrastructure. Other residential sites would make a contribution based on the estimated cost of an improved commercially viable service across the western Vale area, divided proportionally by the amount of planned growth to give a cost per development site.

15. Developments are also required to provide modern bus stop infrastructure including shelters and Real Time Information, and high quality access to the bus network, usually secured through section 106 or section 278 agreements.

16. The Strategic Transport Contribution does not include direct mitigation measures, which will be sought separately. These schemes are delivered by developers when specific mitigation measures are solely linked to enabling that development. This is as opposed to the county council pooling funds for schemes to mitigate the impact of more than one development proposal.

Timescales

17. The schemes and projects described in this chapter will be implemented at different stages of the Plan period, as outlined in the table below. The most likely source of funding will be to secure these improvements through the planning application process for housing and other development sites. Some schemes have already been secured or are the subject of discussion as part of current applications. Others can only come forward in line with development yet to enter into this process. Some schemes will be the responsibility of delivery partners, such as Highways England. Timescales are influenced by a number of different factors, including when development applications come forward and when other funding opportunities are available. The timeframes for delivery will be monitored and updated if necessary in conjunction with the future Local Transport Plan updates. A study is currently underway to prioritise the schemes below, which are being assessed against a range of policy and deliverability objectives. The tables will be updated once this is completed.

Proposed Junction schemes

18. The following schemes are for upgrades to existing junctions or completely new junctions and will be requested through the planning application process, to mitigate the impact of development along the A420:

Project/Scheme	Timescale period
Secure a new junction (roundabout) at Highworth Road, Shrivenham in proximity to the Strategic Site allocation for 500 dwellings.	Exact timing dependent upon application and planning permission: 2015-2020.
Secure a new junction improvement at the A420 junction with Coxwell Road to accommodate known housing growth in the area. A full signalisation of the junction is an agreeable solution in principle.	Exact timing dependent upon application and planning permission: 2015-2020.
Investigate upgrading of the T-junction at the Little Coxwell/Fernham Road on the A420 junction to a roundabout or other upgrade to improve access, safety and the vision through this junction.	To be determined
Investigate upgrading of the A420 / A417 Park Road junction, Faringdon.	To be determined
Review the Buckland Road/A420 junction, to include assessment of the junction splay and right-turn lane on the A420.	To be determined
Investigate improvements to signage at the Pine Woods Road/Charney Road junction, Southmoor, on the A420.	To be determined

Proposed new/upgraded crossings

24. The following proposed schemes are to ensure communities are accessible by sustainable travel, and movement across the A420 between towns and villages located on it or nearby can be undertaken safely. As above, they will be requested through the planning application process to mitigate the impact of development along the A420:

Project/Scheme	Timescale period
Secure a crossing on the A420 to link Kingston Bagpuize with Fyfield.	Exact timing dependent upon application and planning permission: 2015-2020
Improve connections to the subway under the A420 near Fyfield, for use by pedestrians and cyclists to link Kingston Bagpuize to Cumnor via Fyfield and Appleton.	To be determined
Investigate a new crossing on the A420 at the Little Coxwell/Fernham Road junction.	To be determined

Proposed Speed Limit changes and safety improvements

Project/Scheme	Timescale period
On the A420, investigate speed limit changes on the Faringdon 'bypass' between Little Coxwell and Littleworth - reduce from 60mph.	To be determined
Investigate speed limit changes on B4507 through Ashbury Village – reduce to 20mph.	To be determined
Investigate speed limit changes on B4507 Ashbury to Wantage – reduce from 60mph.	To be determined
Investigate speed limit changes on B4508 Watchfield to Pusey Common Wood – reduce from 50mph.	To be determined
Investigate speed limit reduction on B4000.	To be determined

Public Transport

Project/Scheme	Timescale period
Investigate providing car park(s) for bus users in Shrivenham to enable an alternative to public on-street parking.	Exact timing dependent upon application and planning permission: 2015-2020
Provide secure cycle parking at well used bus stops and also consider shelters to encourage more journeys by sustainable modes.	To be determined
Review footway access, pedestrian signage and hard-standing facilities at bus stops on the A420.	To be determined
Improved frequency of Premium Bus Route service (number 66) between Swindon and Oxford and consider cycle parking at popular stops to enable Door to Door sustainable travel (see Active & Healthy Travel Strategy)	On-going
Take account of new Oxford outer Park & Ride site proposal on the A420 corridor, in the vicinity of Cumnor which is being progressed through the Oxford Transport Strategy Park & Ride study	To be determined

Measures to improve safety and deter rat-running through local communities

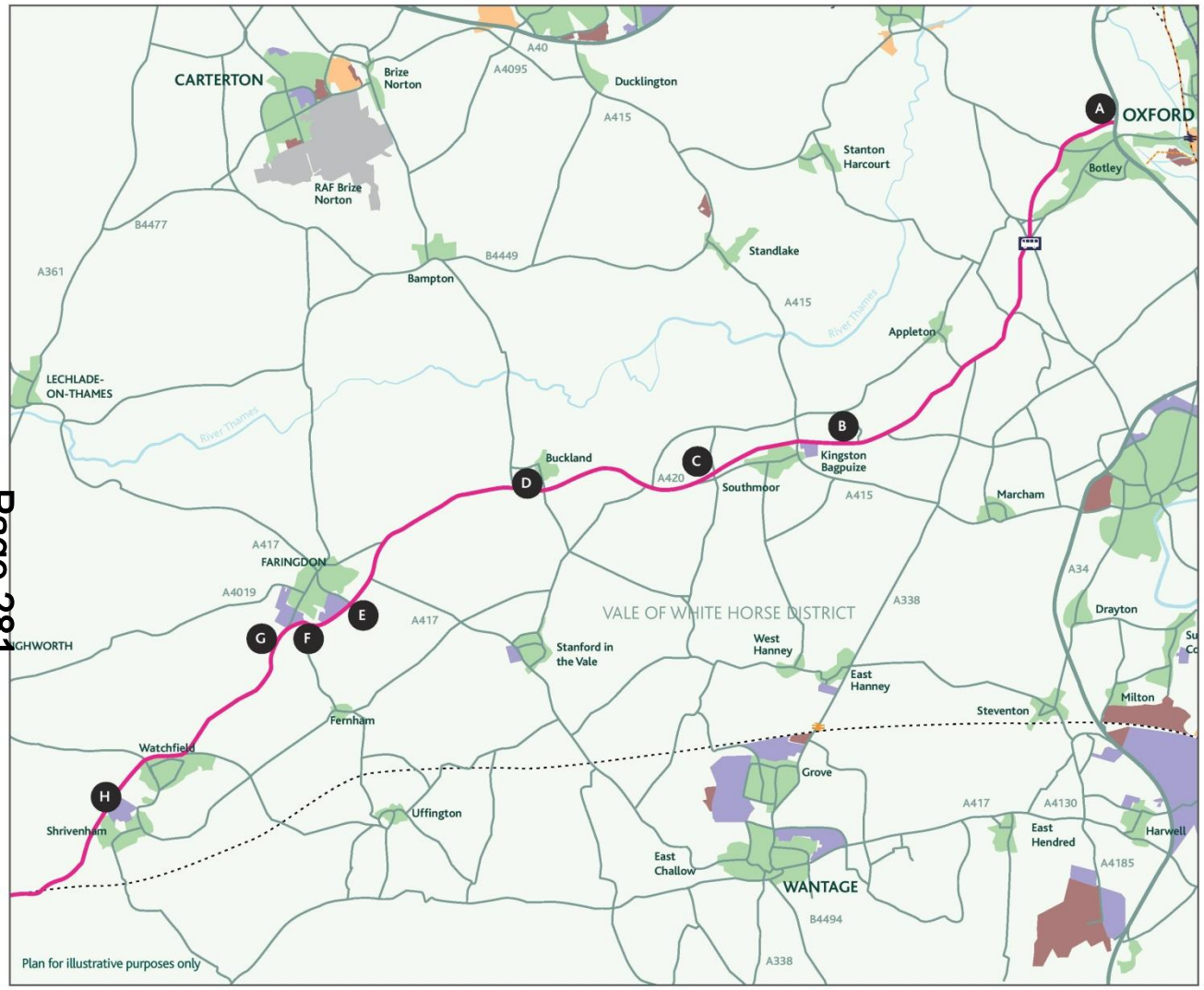
Project/Scheme	Timescale period
Investigate deterring rat running through Great Coxwell by replacing "Village Only" sign with a "No Right Turn" sign and accompanying Traffic Regulation Order at B4019 junction with The Hollow	Exact timing dependent upon option feasibility: 2015-2020.
At Bourton, investigate traffic calming measures on the Bishopstone entrance to the village and on the Avenue Road entrance.	To be determined
At Bourton, investigate the feasibility of installing traffic lights on the railway bridge at Lower Bourton. This is a narrow bridge and would improve safety.	To be determined

Delivery Partner Schemes

Project/Scheme	Timescale period
Highways England improvements at Botley Interchange.	Exact timing dependent upon option feasibility: 2015-2020.

References

Oxfordshire Local Enterprise Partnership http://www.oxfordshirelep.org.uk/cms/
Vale of White Horse draft new Local Plan 2031 (published November 2014) http://www.whitehorsedc.gov.uk/services-and-advice/planning-and-building/planning-policy/new-local-plan-2031
South Oxfordshire Core Strategy 2027 (adopted December 2012) http://www.southoxon.gov.uk/services-and-advice/planning-and-building/planning-policy
Oxfordshire Growth Board - http://www.oxfordshire.gov.uk/cms/content/oxfordshire-local-transport-board-0
Swindon Local Plan http://ww1.swindon.gov.uk/ep/ep-planning/planningpolicy/ep-planning-localdev/Pages/ep-planning-localdev-localplan.aspx



A420 Figure 1:

Indicative plan of transport infrastructure and proposed growth along the A420 corridor

Schemes to be investigated
(map is not exhaustive)

- A Botley Interchange and approaches
- B Kingston Bagpuize to Fyfield crossings and subway
- C Pine Woods Road/Charney Road
- D Buckland Road
- E Park Road
- F Fernham Road
- G Coxwell Road junction
- H Shrivenham junction

Key

- Local Plan residential areas
- Local Plan mixed use areas comprising residential and employment
- Existing commercial/employment areas
- Existing settlement
- RAF Brize Norton
- Proposed Park and Ride
- A420
- Railway
- Rail Station
- Proposed Rail Station

Oxford Transport Strategy

CONNECTING OXFORDSHIRE

OXFORDSHIRE COUNTY COUNCIL

Contents

1. The Oxford Transport Strategy

The purpose of the strategy

The Oxford Transport Strategy (OTS) sets out Oxfordshire County Council's transport vision and strategy for Oxford over the next 20 years, as part of the fourth Local Transport Plan (LTP4). It identifies the current and future challenges for transport in the city and sets out a strategy based on a combination of infrastructure projects and supporting measures to enable economic and housing growth.

This strategy builds on a legacy of success in tackling Oxford's transport challenges through pioneering and innovative approaches which have enabled the city to grow and develop without year on year rises in traffic levels. For instance, the city's world first Park & Ride system, which began in the 1970s, has not only proven successful in containing traffic in the city, it has gone on to become a model subsequently adopted by cities around the world to address their own congestion problems.

This strategy builds on the successes of the past, quantifies the scale of the future challenges and proposes bold and innovative solutions.

Place

The future economic growth and attractiveness of Oxford is dependent on improving the quality of the entire city as a place

High quality and sustainable transport access is essential to accommodating growth and changing travel demand within the city's physical and environmental constraints

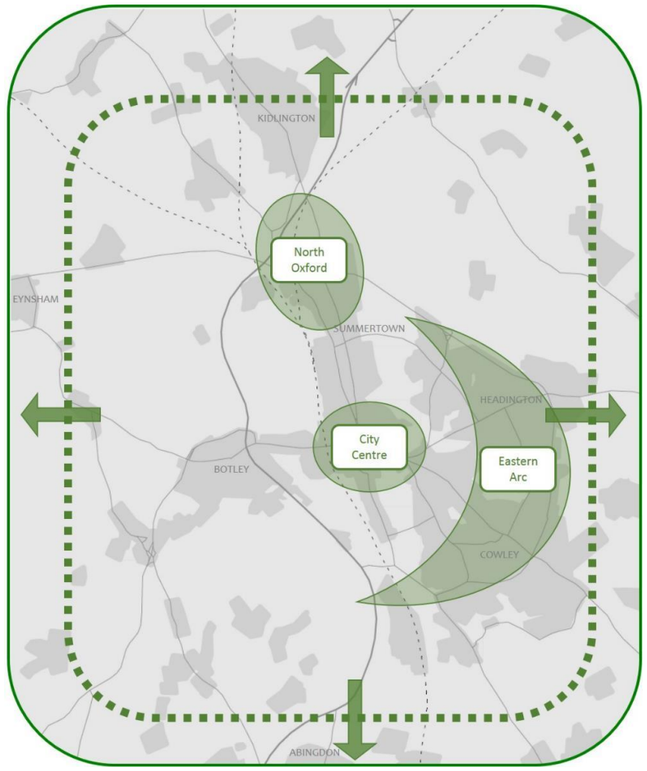
Access

The area it covers

Oxford's influence on transport does not stop at the city boundary. The OTS has been developed to cover the urban area of Oxford as well as the main transport corridors to and from the city.

There are three locations which will be the focus for future employment, housing and regeneration. These are:

- the **City Centre** – the cultural and historic heart of Oxford;
- the **Eastern Arc** – the largest employment area and most populated part of the city (which includes Marston, Headington, Cowley and Littlemore); and
- **North Oxford** – which includes Cutteslowe and Wolvercote and major corridors into Oxford from north of the outer ring road.



2. The Scale of the Challenge

Transport impacts of growth

Oxford is an attractive, enterprising and dynamic city – a place that people from around the world want to visit and increasingly want to live and work in.

Oxford's population has grown at an unprecedented rate in recent years, with the number of residents rising by 14% between 2001 and 2013 (from 135,500 to 154,800 people). Despite the sizeable impacts of recession, overall job growth has been equally impressive, with 118,000 jobs in 2012, compared to 99,000 in 2001. Oxford has 33% more jobs per head of working age population (aged 16-64) than the South East as a whole.[1]

The additional travel demand generated by this growth has been well-contained in Oxford: overall, rises in traffic within the city have been avoided or minimised by the local authorities' transport and planning policies and schemes.

But despite these successes, the trend of sustained growth has brought challenges.

As a medieval city, Oxford's often narrow streets are, in many areas, unsuited to motorised vehicles. Peak period congestion is a persistent problem, with traffic building at bottlenecks which cannot realistically be entirely removed. Within the centre, cars, buses and delivery vehicles compete for limited space with pedestrians and cyclists. These create an uneasy tension between the demands for movement and access, and the desire to ensure the centre offers a highly attractive and vibrant environment for people.

As more people have moved to Oxford, pressure has been added to the city's housing stock, helping to drive up house prices at a faster rate than other areas and intensifying population density. Limited space for new development has contributed to a significant shortfall in affordable housing (particularly around the centre), resulting in changes to where people are able to live and accordingly how far and how they travel.

Oxfordshire has ambitious plans for growth, with proposals for 100,000 new homes and 85,000 new jobs to be created by 2031. The county has evolved into one of the UK's major hubs for knowledge-based industries, with Oxford at its heart.

A new Oxford Local Plan is being prepared, for submission in 2018. This will determine the number and locations of new homes within the city to 2036.

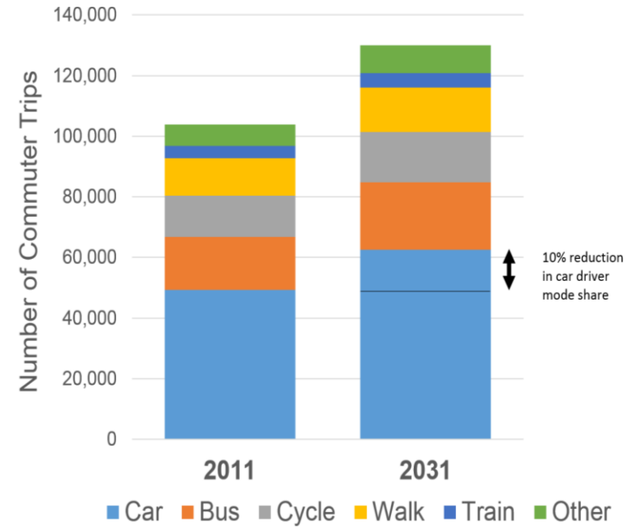
Following the publication of the Strategic Housing Market Assessment for Oxfordshire, the Oxfordshire councils have agreed a working assumption of 15,000 homes as the scale of Oxford's unmet need to be planned for outside the city.

Whilst the modal share for public transport for trips to the city has increased steadily in recent years, travel by car remains the dominant form of transport to all destinations other than the city centre. With existing congestion already requiring extensive engineering solutions to junctions on the ring-road, the predicted growth of homes and jobs in Oxford and throughout the county will only exacerbate the problem.

What this means in future

Growth on this kind of scale requires a transport strategy of comparable ambition. A continuation of existing travel behaviour amongst new residents would threaten to over-burden the transport network and in turn significantly compromise the character of Oxford and quality of life of those living and working here.

It is estimated that job growth within and outside Oxford, could result in 26,000 additional journeys within the city boundary by 2031 – a 25% increase from 2011. Initial estimates suggest that, without improvements to the transport network and changes of travel behaviour, this could result in approximately 13,000 more commuter car trips each day.



The graph on the right illustrates what the impacts of growth could be on the number of commuter trips into and within Oxford if

[1] Figures provided by the Office for National Statistics

current preferred modes of travel remain unchanged. A 10% decrease in the car driver mode share is needed to prevent traffic levels rising.

Even the current Local Plans' pre-SHMA housing allocations in Oxfordshire are forecast to result in a 16% increase in traffic on Oxford's radial roads and 21% on the ring road in peak hours. By 2031, the impact of the resulting congestion is forecast to result in a loss of around £150 million from the economy of the city. Car journey times from the surrounding Oxfordshire towns are anticipated to increase on average by 18% to the city centre and 14% to Headington.

This increased demand for movement will also have significant adverse impacts on the environment, quality of life and health of the city's population.

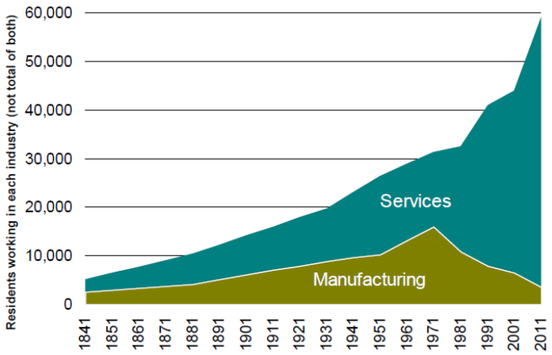
More demand also means more buses, with the number of vehicles entering the city centre set to grow by over 40% if left un-checked, putting substantial strain on the historic core. Increased traffic will impact on local communities, and longer journey times will make it more difficult to reach jobs and services.

Without a step change in the provision transport infrastructure and travel options, the city faces serious consequences.

The key challenges for the OTS

The OTS has therefore been developed to correspond to the eight most crucial challenges for transport in the city.

Challenge 1: Oxford's economy is growing and changing



Employment in service related positions has grown rapidly since 2001

Oxford's key economic strength lies in high-skilled, knowledge-intense industries (including science, research and technology), building on the city's international renown as a centre of excellence in education and research. These sectors now account for the majority of jobs, whilst the relative number of positions within more traditional sectors (such as manufacturing and retail) is declining (see graph).

The city's tourism industry also goes from strength to strength, with 9 million visitors each year, and an estimated worth of £770 million for local businesses.

Oxford's businesses typically function within a global marketplace making strategic transport connections as important as local ones. High-skilled roles also frequently attract a more mobile and affluent workforce, who are able and prepared to travel greater distances to work. This is likely to be contributing to an increase in commuting into Oxford.

Key implications for the OTS: Congestion is a barrier to a competitive economy and future growth requires a well-connected, reliable and efficient transport network. Capacity is needed, but with space a key constraint, **the on-going provision of more road space is not a long-term option**.

Challenge 2: Economic growth is happening in new locations

Economic growth is bringing changes to the location as well as the nature of development. The Eastern Arc now surpasses the centre as Oxford's main area of employment (with 43,600 jobs compared to 39,800 within central Oxford). As the city develops in future, the largest proportion of new growth will occur outside the centre.

Proposed employment sites in Oxford

Oxford's transport networks have historically been developed to provide access to the city centre. New areas of growth require appropriate levels of access and strengthened linkages. The growth of the "Knowledge Spine" that includes the Eastern Arc, North Oxford, Science Vale and Bicester will also increase the importance for strengthened connectivity between these locations and good connections to strategic road and rail networks – particularly to maintain access to and from London and Heathrow airport.

Key implications for the OTS: High quality and integrated public transport is needed to support good connectivity across the city and to areas beyond traditional boundaries. This needs to be accompanied with measures to manage growth in demand for car travel.

Challenge 3: Oxford is a tale of two cities

Whilst, overall, Oxford's economy has thrived, not all residents have been able to share in the city's success. Large pockets of inequality exist, with significant areas of economic and social deprivation – particularly within the Eastern Arc.

Persistent issues of unemployment, low income and health inequalities are most concentrated within these locations, with a decline in low-skilled jobs leaving significant numbers of residents mismatched to local employment opportunities. A shortage in housing availability has pushed up the cost of accommodation relative to income, placing further pressure on the finances of lower-income residents.

With these types of challenges, travel can be a contributing factor. If communities are not well connected to employment or higher education and essential services and amenities, the opportunities and overall quality of life of individuals can be compromised.

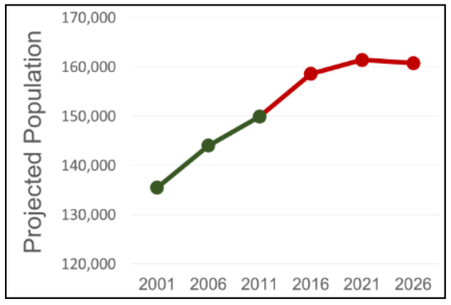
Key implications for the OTS: The OTS must support initiatives to overcome the inequalities that continue to exist in Oxford. In particular, transport has an important role to play in supporting regeneration by strengthening access and providing opportunities for reaching employment, training, essential services and amenities.

Challenge 4: Oxford is experiencing rapid population growth and demographic change

Oxford's rate of population growth is showing no sign of immediately abating as the city's universities and knowledge-based businesses continue to attract new residents.

With population growth comes increased demand for travel, but also opportunity for increased public transport. More densely populated places are more likely to support commercially viable public transport, supporting opportunities to manage traffic growth.

Whilst the majority will remain of working age, particular increases are predicted in those aged 14 or younger and 70 or older.



Oxford's population is projected to exceed 161,000 people by 2021

Key implications for the OTS: Managing the impacts of an increased population will require a strategy that seeks to encourage trips by walking, cycling or public transport over car travel. Changing demography means the OTS must deliver high quality transport choices which are accessible to all (irrespective of age, mobility level, or ethnic background).

Challenge 5: More people are travelling into Oxford each day and travel patterns are changing

The journey to work remains the most significant challenge for the transport network, and increasingly this involves people travelling in from outside the city. More jobs which require a commutable journey in Oxford are now held by those living outside the city (45,750) than those living within it (42,406).

Commuters who travel from outside of Oxford are typically far more car dependent and the total number of car commuting trips rose by 9% between 2001 and 2011. Trips to work by public transport have increased for those travelling from outside, but at far more modest levels.

People's travel is also changing: it is now the Eastern Arc, rather than the centre, which is home to more jobs than anywhere else in the city (43,600 compared to 39,800 within inner Oxford). As the city's growth plans are realised the transport network within the Eastern Arc is set to become even more important to Oxford's economic success.

Key implications for the OTS: A continuation of current commuting travel trends would represent a significant challenge to Oxford's growth. Congestion builds significantly at peak periods on the Outer Ring Road and along the A34 and A40 creating delays and unreliability. With more commuters travelling in, the only way that this future problem can be sustainably addressed is through a step change in commuting behaviour towards public transport.

Challenge 6: Housing demand is not being met and there is a need for new high quality neighbourhoods

There is a currently a large gap between housing demand and new house completions within the Oxford area, contributing to a growing shortfall in supply. This is especially significant for the availability of affordable homes.

House prices are accordingly rising quickly and the urban population density increasing, as higher costs drive up occupancy levels (with 6.2% of houses considered to be overcrowded in 2013). The impact of increasing population density may be beneficial to making public transport more commercially viable, but the housing gap is also resulting in more people commuting into Oxford from other areas, adding to commuting traffic on the ring road and key radial routes.

Scattered small settlements and dispersed patterns of growth favour car travel and make commercially viable public transport more difficult. Delivering housing at the volume and of the type which is required in locations where travel demand can be largely accommodated through public transport, walking and cycling will be crucial to managing future traffic growth. This is particularly important in the context of declining budgets for subsidised bus services.

Key implications for the OTS: The OTS should be used to help ensure development is located where it can be well served by public transport and where short-distance journeys can be made by walking or cycling.

Challenge 7: There is a need to better balance different needs in the city centre

The historic city centre and its narrow streets are part of the charm of Oxford to millions of visitors from around the world. But these streets also represent a challenge, with a public realm which is not befitting of a global tourist destination. With many major transport routes converging in the city centre, space for movement is at a premium.

Buses, coaches, cars, delivery and other motorised vehicles all need to gain access to the centre. But with large numbers doing so, they increase potential conflict with pedestrians and add traffic which impacts on Oxford's character.

Key implications for the OTS: The OTS has to strike the right balance between enabling efficient access to the city centre and providing a high quality place for people to enjoy once they arrive. Dealing with the implications of future growth in bus use is vital. The OTS needs to capitalise on current and committed public realm improvements and create a consistent character and feel that permeates across the city centre.

Challenge 8: There are major challenges with the urban environment and air quality

With space at premium, creating spaces for people and public enjoyment without compromising access becomes challenging.

Oxford provides an array of green areas, waterways and historic open spaces for outdoor enjoyment. But the city is affected by notable problems with airborne pollution which are a cause of health problems in some areas. Traffic noise affects some residential areas and certain city centre streets with high traffic or bus flows.

A citywide Air Quality Management Area was declared in 2010, with targets set for keeping Nitrogen Dioxide emissions at safe levels (below 45 µg/m3 by 2020) and reducing emissons of Carbon Dioxide (by 35% by 2020 from 2005 levels), Nitrogen Oxide and Particulate Matter (a 50% reduction of both).

Motorised vehicles are a key contributor to noise and poor air quality and a lasting solution will require a step-change in emission levels from vehicles within the built area. Without this, an increasing number of residents and visitors may be affected.

Key implications for the OTS: The OTS will need to consider how to work towards the targets for reducing transport-related noise and air pollution within the city. This will require measures to reduce traffic and to promote quieter, lower emission vehicles.

3. Objectives

A Vision for Oxford

By 2035 Oxford will have a progressive transport network, providing reliable and sustainable methods of movement, enabling growth and comprehensively linking all communities. This network will support:

- a thriving knowledge-based economy, by enabling businesses to draw on a wide pool of talented people, innovate and collectively grow through strong connections and interactions and trade within global markets;
- an enviable quality of life for Oxford's people, by providing safe, inclusive, healthy and convenient travel choices providing access for all to employment, services, retail and leisure opportunities; and
- Oxford as a city which best promotes its outstanding heritage through an attractive and vibrant public realm which offers a highly attractive environment to live and work and a visitor experience of global renown.

The OTS has been developed to complement the vision and goals of the Oxfordshire Local Transport Plan. The objectives of the OTS therefore respond to these goals, identifying the specific requirements for Oxford within the context of the LTP.

The OTS Objectives

LTP Goal	OTS Challenge	OTS objective
To support jobs and housing growth and economic vitality across Oxfordshire	Oxford's economy is growing and changing	Support the growth of Oxford's economy by providing access to appropriately skilled employees and key markets.
	Economic growth is happening in new locations and needs effective connectivity	Ensure business sectors are well connected to each other and are provided with effective and reliable access to strategic networks
	More people are travelling into Oxford and travel patterns are changing.	Provide effective travel choices for all movements into and within the city
To support the transition to a low carbon future	Oxford is experiencing rapid population growth and demographic change	Promote modes of travel and behaviours which minimise traffic and congestion
	Housing demand is not being met and there is a need for high quality new neighbourhoods	Focus development in locations which minimise the need to travel and encourage trips by sustainable transport choices including walking, cycling and Door to Door travel (e.g. cycling or walking in combination with public transport).
To support social inclusion and equality of opportunity	Oxford is a tale of two cities.	Provide a fully accessible transport network which meets the needs of all users
To protect and, where possible, enhance Oxfordshire's environment and improve quality of life	We need to better balance different needs in the city centre.	Provide an accessible city centre which offers a world class visitor experience
To improve public health, safety and individual wellbeing	There are major challenges with the urban environment and air quality.	Tackle the causes of transport-related noise and poor air quality within the city by encouraging and enabling cycling, walking and Door to Door travel

4. The strategy components

An integrated approach

The strategy has three components: **mass transit, walking and cycling, and managing traffic and travel demand.** There is no single solution to tackle Oxford's long-term challenges: all three components are needed in combination to deliver the objectives of the OTS.

A new mass transit network for Oxford will be critical in meeting future connectivity needs in the city. This will deliver a step-change in travel choices for diverse movements within and into the city. A city-wide walking and cycling network will include continuous pedestrian and cycle routes and high quality spaces for pedestrians in areas of high footfall. Mass transit and walking and cycling improvements will be enabled and supported by an ambitious agenda of road space reallocation, and a much stronger focus on reducing traffic demand in the city.

The OTS also includes detailed proposals for the city centre, Eastern Arc and north Oxford. Within these areas, consideration has been given as to how each component (mass transit, walking and cycling, and traffic management) can be integrated.

The OTS will not mean "business as usual" for transport in Oxford. The proposals described will require a strong will for change from stakeholders, concerted leadership from the local authorities, and major capital investment. However, the County Council considers that the proposals in the OTS could be truly transformational and will provide an effective platform to unlock the future growth of the city.

The OTS provides a "2035 vision" for each of the core components, showing how the continuous, integrated transport networks will look once complete. Rather than detailing the exact specifications of how every link or junction will work, the OTS provides the framework and technical principles from which future studies and programmes and schemes can be developed.

The OTS is an evolving strategy that will be adaptable to future challenges and new technologies. It aims to serve the needs of Oxford's growing population and economy, but also provide a vital influence in decisions about where future housing should be located. It seeks, in particular, to direct growth to places where sustainable travel options can be made more attractive.

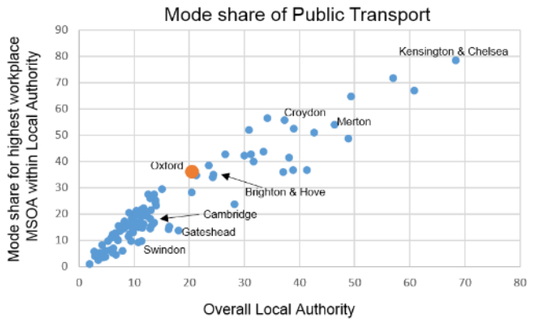
4. Mass Transit

Mass transit in Oxford is currently made up of the network of bus and rail services that provides strategic and local access to residents and visitors to the city. The anticipated growth of travel demand in the next 20 years means that the need for mass transit in the city, and throughout the county, will become increasing important because of its ability to move large numbers of people efficiently, making the best use of available infrastructure and minimising environmental impacts.

The existing situation

Mass transit in Oxford has been key to containing growth in traffic congestion in the city over the past 10 to 20 years, both enabling movement around the city for residents and for those entering the city from the wider county and beyond for work, retail and leisure.

In addition to dedicated city and inter-urban bus routes, the city's five peripheral Park & Ride sites provide excellent alternatives to the use of the private car in reaching the city, while Oxford's mainline rail station provides access for 5% of commuters to the city centre.



Oxford's position relative to other local authorities which have comparative workday populations, shows that the maturity of the public transport market is matched by few authorities outside of London (see the graph to the left showing 2011 Census Data).

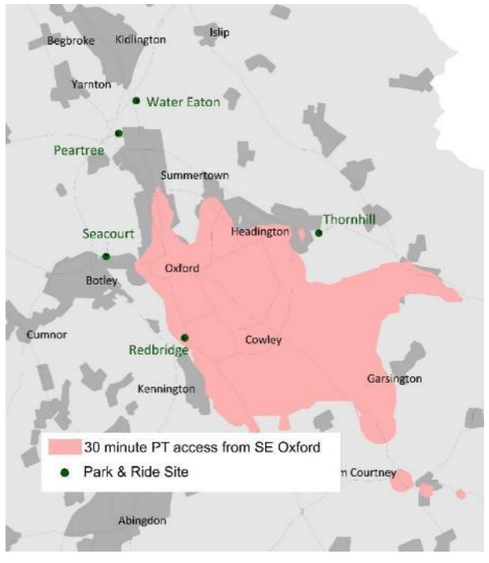
Limitations of the existing provision

Whilst the success of the bus network in the city has led to a continued rise in patronage, over the last decade the proportion of commuters travelling by bus has remained relatively static, particularly to areas such as Cowley and Blackbird Leys in the south-east of the city. At a city level, this has been partly due to the beneficial increases in walking and cycling as a major mode of travel for the city's residents.

However there are still areas of major employment for which have there have been no significant improvements to services to match the scale of growth. These include the area around Cowley and Blackbird Leys, home to over 18,000 jobs, which has no direct connection to a Park & Ride site and relatively poor connections to anywhere other than the city centre.

A drawback to the excellent bus service frequencies to the centre of Oxford (from a range of destinations both locally and further afield) is that upwards of 190 buses and coaches enter the city centre per hour at peak times, leading to noise, air pollution and substantial use of space in city centre streets.

The experience and movement of shoppers, students, workers and visitors to the city's 'flagship destination' is compromised by high volumes of buses. These buses are not just travelling through the centre, but also stopping and laying over. Since mass transit (and buses in particular) will be an even more important element of the city's transport system in future, it is vital that these negative impacts of the current system are recognised and addressed.



Oxford opened the world's first Park & Ride site in the 1970s. The Park & Ride system has grown since to provide over 5,000 parking spaces, helping to reduce traffic in the city centre by offering an easy and attractive alternative for those entering the city. All five sites are located close to the ring road, and are a popular choice for longer-distance commuting movements. However, this is exacerbating congestion on parts of the ring road, particularly around the junctions with the A40 and A34 in north Oxford. This congestion delays all traffic, including buses coming into the city. Traffic congestion is a serious issue affecting journey times and reliability of bus services from all parts of the city and county, particularly when approaching and crossing the ring road and on the radial routes into the city. Congestion also has a serious impact on public

transport within the Eastern Arc, making journeys on the orbital routes longer and less reliable (notably those which use the B4495).

Like many other cities of comparable size, Oxford's rail mode share is limited. The major commuter trip producers of Banbury, Didcot and Bicester are served by two or three direct Oxford services within peak commuting hours, whilst the position of the city's only station, to the west of the city centre, makes the Eastern Arc relatively inaccessible by rail without interchange onto local buses.

Future demand

Demand forecasts undertaken for Oxfordshire's 2013 Rail Strategy suggest that trips to Oxford Station could grow by as much as 70% by 2026, largely as a result of the improved connections and infrastructure proposed by Network Rail and the operators. Catering for this level of growth will require a marked improvement in access to the station from across the city, as well as major improvements to Oxford Station itself.

The bus network is also predicted to witness substantial increases in demand by 2031. Were travel to work patterns to remain as existing in terms of the main origins and destinations, over 4,500 new two-way bus trips would be made by commuters each day either into, within or out of the city – the equivalent of an additional 70 bus loads. With most services routing through, or terminating within the city centre, the additional congestion and conflict will only be exacerbated without a strategy to address the pressures placed on the city centre.

Vision for mass transit

The aspiration for 2035 is that Oxford will provide its residents and visitors with a connected, modern mass transit network which provides a cheaper, faster, and more reliable travel option than the private car for the majority of journeys to and between destinations in the city.

Mass transit in Oxford will consist of three modes:

- Rail;
- Rapid Transit (RT); and
- Buses and coaches.
- In addition, we will seek to improve cycling and walking access to these modes by providing secure cycle parking and signage for the hubs with the most potential for user numbers

The rail network serving the city will be modernised and extended. Existing and new stations will be integrated with the city's other transport networks and will provide a first-class passenger experience.

A new RT network will provide fast, high-capacity, zero emission transport on the city's busiest transport corridors, offering a tram-equivalent (or in future potentially tram) level of service and passenger experience.

The conventional bus and coach network will continue to grow to complement the RT and rail network, with more advanced vehicles and better infrastructure to improve journey speeds and reliability.

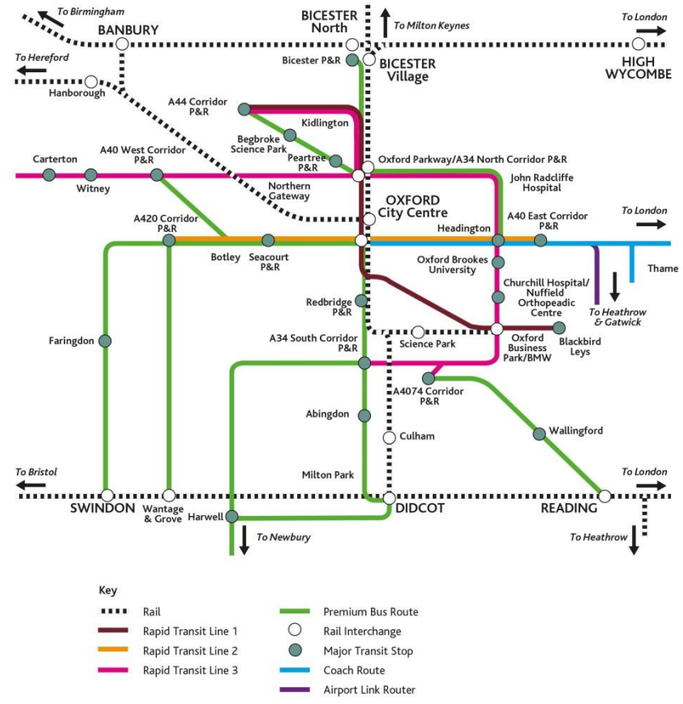
The problems associated with the predicted high intensity of RT and bus operation in the city centre will be tackled through a staged approach, culminating in the long term in the creation of transit tunnels under the city centre to fully reconcile the objectives of place-making and accessibility.

Proposed network

In combination with work on the Oxfordshire Science Transit and Oxfordshire Bus Strategy, the OTS helps to define the strategic transit network for the County (shown in the schematic plan). With Oxford as the central hub, the network will improve transport links within and beyond Oxfordshire; improve access for residents; and increase the connectivity to locations of major growth.

The OTS mass transit proposals are shown in more detail below.

Further work and consultation is required to develop the design and implementation plan for mass transit in the city. This will include



corridor studies of RT routes that will consider the design of facilities for mass transit alongside the provision for conventional bus services, cycling and walking, as well consideration of where routes should intersect.

Improvements to rail

If travel patterns and services remain unchanged, growth in Oxfordshire's population would increase patronage amongst commuters by 20% by 2031. However, due to the committed improvements to the rail network and services by2020, this growth could be as much as 70% at Oxford Station by 2026.

The following discussion considers the planned improvements of greatest significance to Oxford.

Oxford Station Masterplan

The City and County Councils and Network Rail have produced a joint master plan for Oxford Station (shown right). The master plan provides a bold vision and implementation strategy for the comprehensive redevelopment and improvement of the station, including:

- major rail capacity and passenger improvements;
- a new transport interchange, including bus station, taxi area and car parking;
- twice as much cycle parking as now, integrated into the station buildings;
- widening of Botley Road under the railway bridge to provide wider pavements and segregated cycle lanes; and
- complementary development to help fund the improvements and make the station a destination in its own right.

East-West Rail phase 1

Chiltern Railways have begun operating a new service from Oxford to London Marylebone, operating via Bicester Village, initially from a new Oxford Parkway Station at Water Eaton. These new links will provide Oxfordshire with new strategic rail connections (e.g. High Wycombe and Aylesbury) and an alternative route to London.

East-West Rail phase 2

The second phase will involve the re-opening (and subsequently electrification) of the line between Bicester Bletchley and Bedford/Milton Keynes, enabling passenger and freight trains to connect between the south and west of England and the West Coast and Midland Main Lines. This will place Oxford at the centre of this expanded network, with strategic connections to the Milton Keynes growth area. A future phase will extend the line and services to Cambridge and beyond

Great Western Modernisation

Network Rail are implementing the re-signalling and electrification of the main line from London to Bristol, South Wales, Newbury and Oxford by 2019. This will include the introduction of new Inter-city Express (IEP) trains.

Cowley Branch Line

The Cowley branch line is currently used only for transporting freight by BMW. However, the line's proximity to the new and expanding employment area of the southern Eastern Arc, suggests that it could play a key role in future increased transportation of both freight and passengers.

The County Council is currently working with Chiltern Railways on their proposal to reopen the Cowley branch for passenger trains, creating stations at Oxford Business Park and Oxford Science Park and served by an extension of the London Marylebone to Oxford East-West Rail Phase 1 service. As an early phase, this would provide a useful new connection to the Eastern Arc, intersecting RT Line 3 at Oxford Business Park.

Longer-term, and as additional development comes forward, upgrades to the Cowley Branch Line could allow for more and higher frequency services, with the potential to serve growth in this part of the city.

Longer term

Other longer term rail priorities for Oxfordshire include:

- Didcot-Oxford Capacity Enhancements – requirement for four tracking to accommodate demand, enable new/extended services and fully realise rail potential as an alternative to the A34 corridor;
- Direct access to Heathrow Airport from Oxford/Didcot; and
- Provision of an Enhanced East-West Rail service pattern.

Rapid Transit

At a more local level, the ease of movement within the city and from the nearby towns of central Oxfordshire will be transformed by developing a level of prioritised road-based mass transit well in advance of current conventional bus services.

In considering the available options for road based mass transit solutions, a number of major constraints to delivery caused by the geography and urban form of the city have been considered, including:

- narrow road widths;
- limited scope for dedication of entire corridors to mass transit due to the need for access via all transport modes and a lack of diversion routes for alternative means of access;
- the need to ensure a quality of place in district centres on the radial routes; and
- environmental constraints such as the flood-plain.

These constraints make the possibility of delivering a mass transit system that requires major infrastructure and segregation extremely difficult without having a substantial disbenefit to all other modes of transport, particularly other sustainable modes such as walking and cycling.

The table overleaf compares the strengths, weaknesses, opportunities and threats relating to the different mass transit options.

In light of this comparison and in recognition of physical constraints (in additional to factors such as cost, demand and network resilience) bus-based Rapid Transit is currently considered the optimum solution for Oxford and is likely to remain so into the medium-term. Beyond this point, and if demand reaches crucial thresholds through the long-term growth of the city, it may be appropriate for the network to be developed to include trams on certain corridors.

System	Conventional bus	Guided Bus	Bus-based Rapid Transit	Rail-based Rapid Transit / Tram
Strengths	Lowest cost of infrastructure and vehicle technology. Increases in capacity deliverable immediately. Vehicle size enables access throughout the road network.	High degree of priority on bus way sections. Can divert off the guided bus way if necessary. Outside of the city, space is available for widening and providing dedicated lanes.	Greater operating flexibility. Mixed running with traffic. Significantly lower capital and operating costs than rail or tram. Suited to dispersed urban form.	Permanence of infrastructure, vehicles and operations create confidence and aid long term locational decisions. High capacity services.
Weakness	High volumes of buses already add to congestion issues in the city centre and along the radial routes. The status quo is unlikely to encourage mode shift.	Sections of parallel guided kerb limit the scope for other traffic to cross the corridor. Width constraints make delivery within the ring road unfeasible. Shared use with cyclists not possible	Opportunities for additional priority over existing situation limited. Construction cost (£2m to £5m per km) is higher than standard bus prioritisation methods; Vehicles and technology are more expensive than conventional buses.	Space unavailable to allow complete segregation within ring road. On road operation with other traffic or roads would be closed to traffic. Inability to divert should problems be experienced on the road network.
Opportunity	Timed slot booking at stops will reduce bunching. Bus stop departure charges could raise revenue. Operators already implementing low emission technology.	High existing demand on radial routes within the city. Higher speeds from neighbouring towns would encourage modal shift.	Can be incrementally implemented - priority/stops/vehicles. Higher capacity vehicles to be introduced to reduce total volume of buses and deal with additional demand.	Connecting denser urban areas. High existing demand of corridors will be increased with growth.
Threat	Population and patronage growth are expected to be so high that excessive numbers of buses will add to congestion, noise and pollution	High construction cost. Ineffectual without RT-type solutions on most of the route (where guided track cannot be provided)	Increases in traffic flow caused by growth creates so much congestion that is not effective where road space is shared.	Very high construction cost (£20m+ per km of route), vehicle and operating cost. Failure to deliver necessary patronage will require subsidies. Technological advances could render scheme obsolete.

Bus-based Rapid Transit can offer significantly faster and more reliable journey times than conventional bus services. Rather than simply being a bus route with a higher level of priority over other traffic, bus-based Rapid Transit is an integrated system of facilities, services and amenities that collectively improve the speed, reliability, comfort and image of bus transport.

Typical features may include: a high level of road priority up to full segregation; larger, modern-looking, higher quality zero emisson vehicles; off-board ticket purchasing systems; faster methods of passenger boarding and fare collection; high quality passenger waiting facilities; real-time information systems; the extensive use of ‘Intelligent Transportation Systems’ in the operating control system; and a unique and attractive public image and identity. Rapid transit vehicles may be single or double-deck, depending on the operating conditions. With the large population growth in Oxford and in its wider catchment area over the next 20 years, Rapid Transit will be a vital component of Oxford’s transport network.

Oxford Rapid Transit routes

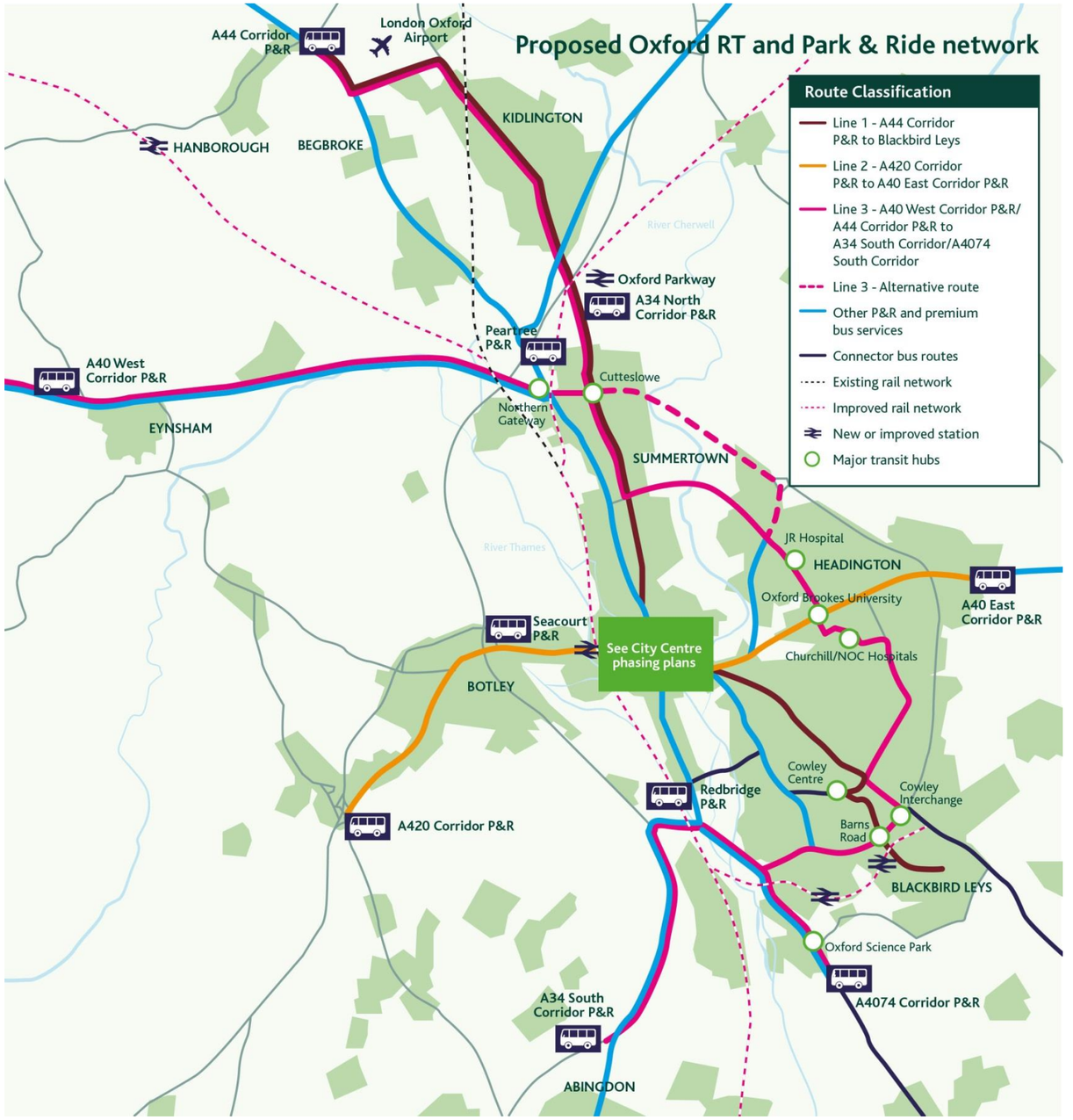
As shown on the plan on the next page, three RT lines have been identified for the city, linking a network of new Park & Ride sites (see later discussion) with the major employment and housing growth areas of the city centre, North Oxford and the Eastern Arc. All three lines are close to significant resident and workplace populations (see table below). Lines 1 and 2 are centred on existing corridors of significant bus patronage, serving as they do, the city centre, key radial routes and three of the city's Park & Ride sites.

Line		Length (km)	Catchment within 400m of proposed route	
			Resident Population	Workplace Population
1	A44 Corridor P&R to Blackbird Leys	18.435	64,251	54,499
2	Thornhill P&R to A420 Corridor P&R	13.289	38,916	35,567
3a	A40 Corridor P&R to A4074 Corridor P&R	23.248	45,022	32,091
3b	A44 Corridor P&R to A34 South Corridor P&R	25.547	53,473	37,418

Line 3, which separates into two branches in both the north and south of the city, delivers an orbital service, which has the potential to transform attitudes to travel both within and to the Eastern Arc. This is likely to be the most challenging line to deliver since existing bus use on this orbital route is relatively low, traffic congestion is substantial, and there are few existing bus priority measures in place.

Providing segregation on all parts of the RT network will not be possible (for example, where there is not sufficient space) or always necessary (particularly where congestion is not a problem). Where space is limited access restrictions can be installed to provide an almost traffic-free route, such as the one proposed on Hollow Way (see later discussion).

Providing direct RT access to the hospitals in Headington is also a major challenge, with opportunities limited by the density of development within the surrounding area. Longer term master planning of the John Radcliffe Hospital and Churchill Hospital sites may provide an opportunity to consider alternative access arrangements.



The conventional bus network

In addition to the proposed RT routes serving the city, the use of conventional buses, particularly as inter-urban connections will remain a vital part of Oxford's mass transit network.

Whilst there will be clear benefits to many existing bus services as a result of partial sharing of routes with the RT services, the County Council is committed to improving journey times and reliability through prioritisation on the network whilst working with operators to ensure that customer experience is maximised.

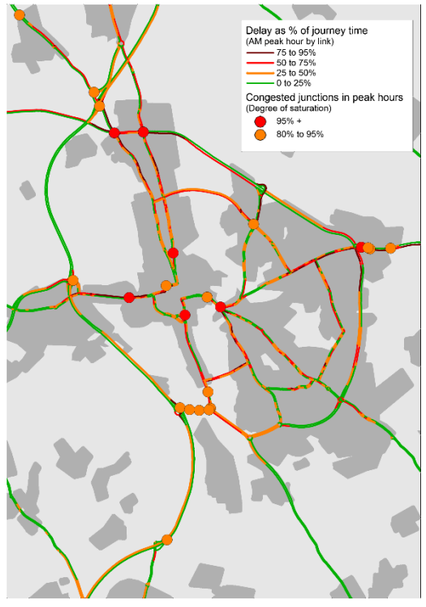
In line with the Oxfordshire Bus Strategy, bus corridors outside of the RT routes have been divided into 'Premium' and 'Connector' routes.

Within the city, routes which continue to provide services to the Park & Ride sites (but which do not follow the RT routes) will be classified as Premium routes, as will those which have service frequencies higher than two per hour. All other routes are classified as Connector.

The future of Park & Ride

Oxford's Park & Ride sites have been hugely successful in reducing traffic in the city centre by providing an easy and attractive option for visitors entering the city.

However, there are already substantial link and junction delays (as shown opposite) which occur on all approaches to the ring road, with particular hotspots located to the west (A420, A40), north-west (A44) and south (A34, A4074) during the morning period. In order to reduce congestion on the approaches to the city, it has become necessary to 'intercept' car trips further away from the city.



Morning arrivals at the Peartree, Water Eaton, Redbridge and Seacourt P&R sites contribute, in particular, to traffic using the three A34 interchanges to the west of the city. Removing this demand through capturing those users further from the city would have an immediate positive impact on the operation of the A34 and the other roads that it intersects as vehicles using the sites would no longer need to cross it.

Future housing and employment growth within Oxfordshire is set to further exacerbate congestion on the A34, the outer ring-road and other corridors that feed into the city, unless traffic can be captured before it reaches them. The expansion of the current city-edge Park & Ride sites to meet forecast levels of demand would add substantially to traffic levels on already congested routes.

New outer Park & Ride sites are therefore proposed for the following corridors. All of these corridors have direct access to the ring road and city, and are on routes that will pass through more residential areas so will have a greater potential catchment than existing sites. Linking outer Park & Ride directly to RT lines will also mean quicker journey times to and from the city, which will help to ameliorate the increase in distance travelled on mass transit and dedicated Park & Ride services.

P&R Corridor	Main Catchment	Proposed car park capacity
A40	Witney, Carterton, Cheltenham, Gloucester	1,000
A44	Chipping Norton, Banbury, Worcestershire, Warwickshire,	1,100
A34 (north)	Bicester, Banbury, Milton Keynes, Bedfordshire	1,700
A420	Cumnor, Farringdon, Swindon, Wiltshire	1,200
A34 (south)	Abingdon, Didcot, Science Vale, Newbury, Hampshire	1,600
A4074	Wallingford, Didcot, Henley, Reading, Berkshire	1,000

These new sites will be particularly important in providing attractive points for drivers to transfer from their cars to mass transit services across the city: either making use of direct services or being able to seamlessly transfer between services at key interchanges across the network.

In order to build upon the success of Park & Ride, attract new users and cater for the new demand generated by growth, the new sites will provide almost double the existing capacity. This increased capacity will be essential as more of Oxford's visitors and workforce originate from outside the city.

Facilities at the Park & Ride sites will fulfil the criteria required at high quality interchange hubs, with the design and layout also enabling passing services to interchange seamlessly. Facilities will need to include significant provision for those wishing to cycle for part of the journey, whether that is from their point of origin to the bus service (Cycle & Ride), or from the Park & Ride site to their destination (Park & Cycle).

The County Council has undertaken a study to understand the Park & Ride options available to help meet the challenges in housing and jobs growth in Oxfordshire to 2031 and beyond. The study assessed options for a new outer ring of Park & Ride sites and outlines a preferred package of infrastructure requirements for the new sites, and potential phasing of when they may come forward.

Mass transit corridor classification
Rapid Transit lines RT services will be prioritised through the application of the standard principles for Rapid Transit design. Services will be frequent, utilising higher-capacity and more advanced vehicles. RT corridors are those which form the most strategic level network, connecting key destinations, business clusters and providing access for skilled employees and key markets. RT corridors are those which have the highest levels of existing bus patronage or are expected to play critical roles in linking growth areas. The interchange between standard bus services and modes of transport to allow ease of movement to all destinations will be a core element of a RT.
Premium Bus Route Premium routes will be applied to corridors on which there are high levels of existing inter-urban or local patronage and which connect workers to employment destinations, and visitors to city centre. Premium routes will interchange with RT at key destinations along their routes, providing users with an increased level of flexibility for how they complete their journeys.
Connector Bus Route Connector routes will link local destinations within Oxford. Service frequencies will be lower than on other routes.

The future need at existing city-edge Park & Ride sites was considered as part of the study, including whether these should be closed or reduced in size. The study concludes that although there will be insufficient demand (based on weekday demand modelling) for inner P&R sites to operate in their current form together with the proposed outer sites, further work is needed to assess additional weekend and non-commuting travel demands in future, and to consider alternative uses at existing P&R sites that allow them to be retained as transport interchanges.

Given the need to reduce the amount of traffic approaching the city, and objectives to encourage a greater share of travellers to use mass transit for their entire journey, expansion of existing Park & Ride sites over the medium to long term is not supported. It is however recognised that small scale expansion of some existing sites may be necessary on a temporary interim basis as demand increases in the short term.

Supporting infrastructure

The classification of the road network will be important to delivering the vision for Rapid Transit, and in determining the scope of infrastructural work that will need to be implemented. Classifications need to not just reflect the existing strategic value of public transport on corridors throughout the city, but also to recognise how future demand will change and what the role of each corridor is in enabling economic growth.

Mass transit corridor prioritisation
Rapid Transit lines Full vehicle detection and prioritisation at traffic signals. Dedicated or fully segregated lanes included where achievable. Lanes extended to junction stop-lines. Bus gates and access restrictions to reduce traffic levels. Uncluttered low-traffic or traffic free streets in the city centre. Strict kerbside controls and daytime loading bans.
Premium bus routes Stricter kerbside control/ urban clearways. Kerbside parking removed at pinch points. Bus detection included at key junctions. Bus lanes where achievable.
Connector bus routes Some bus detection at signals. Kerbside parking removed at pinch points.

Corridor prioritisation

RT and buses will be prioritised to enable smooth, fast and reliable progress through:

- segregation (e.g. bus lanes);
- selective vehicle detection and prioritisation at traffic signals;
- traffic reduction;
- traffic management (e.g. queue relocation); and
- removal of obstacles such as loading and parking bays.

In turn, this will help to attract new users and, by reducing numbers of cars, will also help to tackle congestion on these corridors.

For the RT lines in particular, the aim of the above measures will be to create a continuous part-physical, part- virtual “track” for vehicles to make unimpeded progress. However, within

the ring road, existing road space is at a premium along all corridors, particularly in the district centres where speed of movement must be a secondary after the quality of place. In these instances it will be necessary to have a greater emphasis on ensuring that public realm provides excellent opportunities for stop and interchange facilities, and managing traffic, loading and parking to minimise delays to mass transit

The level and type of prioritisation will therefore vary significantly by corridor. For example:

- on the ring road and the approaches to the city, land is often available for widening to include dedicated or segregated bus lanes, possibly including tidal bus lanes;
- on Botley Road west of Binsey Lane there is sufficient highway land to provide a continuous outbound bus lane whilst improving the quality of cycle infrastructure;
- on Cowley Road, limited road width would be better allocated to improving the public realm in the district centre and the prioritisation of buses will be provided by relocating or rationalising kerbside parking and reducing traffic;
- along much of the inner ring road, widening to provide segregation will not be an option; instead, general traffic will be controlled through metering at traffic signals or restricted through the implementation of access controls such as bus gates, and parking and loading will be restricted.
- along each corridor the potential to alter priority at junctions, include or improve bus priority at traffic signals, and to extend bus lanes to stop lines will be assessed against the related expense to general traffic.

Stops

Stops along the RT routes will be located and designed to create the best possible access and environment for all users. Design features will include:

- sufficient length to accommodate multiple services at once, and for higher capacity multi-door vehicles in future which will enable free-flow boarding through multiple doors and fixed, short dwell times at stops as at tram or light rail stops;
- provision for level boarding - initially for existing low-floored vehicles but future proofed to ensure that all boarding points on higher capacity vehicles are equally accessible;
- off-board fare recognition;
- real-time arrival and onward journey displays;
- battery charging infrastructure for electric buses;
- being safe and convenient, minimising conflict between those waiting and other road users by allocating sufficient shelter capacity;
- providing secure cycle parking at major stops, to enable Door to Door sustainable journeys to be made (see Active & Healthy Travel Strategy), and
- being inset from the main carriageway and offset to stops for services in the opposite direction to minimise the opportunity for services blocking other vehicles.

Buses using RT corridors will also benefit from these facilities.

Corridor studies

Since the adoption of the OTS in September 2015, the county council has been working on a number of corridor studies to develop further proposals for rapid transit, pedestrian and cycle improvements on the city's main transport corridors. The corridors considered so far are Banbury Road, Woodstock Road and Botley Road, with further studies due to be completed in 2016/17.

Transit hubs

At strategic locations along the routes, such as the Park & Ride sites, rail stations and district centres, high quality interchange hubs will facilitate seamless interchange between RT and conventional bus services or onto an onward mode. Proposed hub locations are shown on the network diagram on page 12. Whilst hubs will differ in scale from one location to another they will offer all or most of the following elements:

- waiting and off-board payment facilities will be well sheltered or enclosed;
- accommodate high frequency services, and large flows of people, at peak times;
- facilitate seamless, stress-free transfer across multiple modes of travel;
- be situated in locations that are close to the strategic highway network, providing maximum opportunity for park and ride and mode-shift from private car use;
- maintain safe walk and cycle access by keeping people segregated from public transport and vehicle movements;
- have appropriate levels of convenient and secure cycle parking; and

- become an integral part of the land-use mix to create vibrant centres of activity that reduce ‘dead-time’ commonly associated with interchange between travel modes.

City centre

In the city centre, the key challenge is to cater for the forecast growth in conventional bus and RT patronage over the next 20 years, whilst also improving the visitor experience. This requires some radical thinking about how mass transit is accommodated, in terms of terminals, stops and routeing.

In the short-term, it is possible that some conventional bus services could be rerouted away from busy areas, including High Street, without impacting on service quality and access. This may include services to south-east Oxford, which could be routed along Abingdon Road. Further work is required with the bus operators to understand the potential for alternative patterns of service and whether this would provide any additional capacity within the city centre.

Similarly, further consideration of how longer distance scheduled coaches are routed and how the access the city centre is required, including services to London and the airports. Options may include relocating these to outer terminals and/or routing services through different parts of the city.

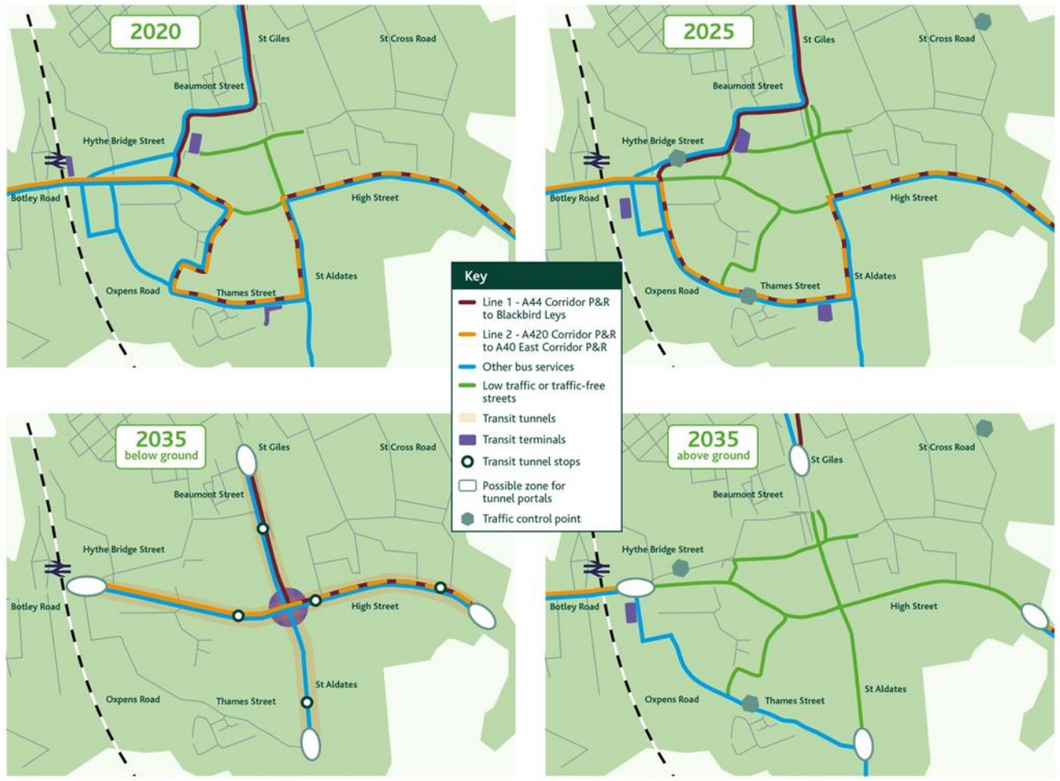
Tourist coaches are important in bringing large numbers of visitors to the city throughout the year but they can also cause congestion and other access issues with informal set down and pick up in the city centre. With growing numbers of tourists coming to the city and with increased restriction on vehicle access to the city centre proposed (see later discussion), more suitable and adequate arrangements to set down and pick up passengers will be required. In addition, the provision of adequate long stay off street coach parking is required. The temporary relocation of long stay coach parking to Redbridge Park & Ride since the closure of the Oxpens coach park, will be evaluated;the Redbridge area may be appropriate for a more permanent solution. Other city-edge Park & Ride sites may also be appropriate.

The proposals for transit terminals in the city centre build up in phases (detailed in the table and plans overleaf).

These will act as the termini for many of the existing services which currently require access and layover facilities in the central core. Increasing the overall capacity of off-highway terminal points, initially by developing surface level sites, will enable a better operating and passenger environment and reduce conflicts with other road users in busy city centre streets.

The measures identified for 2020 and 2025 will lead to a significant reduction in the number of buses in several key city centre streets. However, even with the 2025 proposals in place three issues remain: very intensive mass transit operation in High Street and St Aldate’s; the ambition for mass transit to have *direct* access through the city centre (only possible via the pedestrianised Cornmarket Street and proposed pedestrianised Queen Street); and walking distances between transit terminals and destinations (such as those experienced due to the pedestrianisation of Cornmarket Street).

Phasing of city centre bus terminals and access			
Terminal	**2020**	**2025**	**2035**
Oxford Rail station	The continued use of the existing stops and stands in the station forecourt and Frideswide Square prior to the completion of the Oxford Station Masterplan	Relocated bus facility to the south of Botley Road to include 13 stands on site and a further 5 on Becket Street.	Continued operation of station interchange, linked to transit tunnel stop(s) nearby
Gloucester Green	Refurbishment of the existing facility to improve passenger experience and operation	Complete refurbishment and expansion of the site to increase the capacity make better use of space including passenger facilities	Closure of the bus facility and the opportunity to redevelopment the site. All stops relocated to transit tunnels nearby.
Speedwell Street	Continued use and extension of existing bus stands at the Butterwyke Turn.	Closure of the on-street stands and change of use of an identified development site on Speedwell Street such as the Telephone Exchange.	
Transit tunnels	-	-	Terminals and stops within the tunnels for the majority of services
Access	**2020**	**2025**	**2035**
	Queen Street and George Street closed to buses.	Magdalen Street, Park End Street, New Road, Castle Street and Norfolk Street closed to buses. Services will route through Hythe Bridge Street and Oxpens Rd/ Thames St/ Speedwell Street with the benefit of traffic restrictions.	Majority of bus services in the city centre will operate within the tunnels, with limited surface running only.



A potential longer-term option to address the challenges of providing increased capacity for buses and RT within the city centre and preserving whilst also enhancing the centre's historic character, would be to tunnel beneath it, thereby removing the majority of the mass transit operation from street level. New 'stations' would be constructed underground, close to the main attractions in the city centre. RT and bus services could run with ease directly across the city centre, without being impeded by other road users or using indirect routes. Interchanges between north-south and east-west routes would be provided, solving several issues faced by passengers and operators in the existing situation.

Whilst the construction cost would be very high (benchmarked costs for similar schemes suggest a capital cost in excess of £500 million), the resulting positive impacts on the public realm, conservation, safety and accessibility would be substantial.

A growing number of cities around the world are looking to this type of a solution as an innovative and bold approach to reconciling what can be conflicting demands for space within their centres. Examples include the North American cities of Boston and Seattle (which has a tunnel and an underground terminal for both light rail and bus services) and Perth in Australia.

The technical or environmental feasibility of constructing transit tunnels has not yet been considered in detail. Clearly, there would be very substantial construction works (and construction risks) and environmental impacts. Within the central core, parts of commercial properties may need to be purchased to allow for street-level entrances to the tunnel stations.

Any business case for such a proposal would need to consider the benefits to passengers and reduced operating costs for the service operator(s). Innovative sources of financing would also need to be considered, including financing of borrowing costs through departure charges for all services (such as those often used to pay for maintenance or renewal of bus stations).

Vehicle technology

As the resident and workforce populations of the city grow, there will be additional impetus on providing capacity for passengers. To meet this challenge on the RT routes, it is proposed to cater for the additional demand whilst mitigating the impacts of additional vehicles on the network. Vehicles on the RT Lines will be:

- higher capacity than existing buses;
- capable of allowing free-flow boarding and alighting from multiple entrance points;
- fitted with on-board technology to facilitate fare recognition; and
- fully accessible from all stops along routes.

As bus-based RT becomes a standard convention in the provision of mass transit in cities, technology is improving to provide high-capacity, zero-emission vehicles. A fleet of vehicles (similar in style to the articulated Citea recently introduced in Cologne (pictured) are envisaged to provide short/medium distance trips along all RT lines.

Through the application of a Traffic Regulation Condition, Oxford city centre is already a Low Emission Zone and operators have made great efforts in delivering vehicles which met Euro V emission standards, and are working on introducing even cleaner technologies in the near future.

However, the ambition of the OTS is to start a city centre zero-emission zone for all vehicles by 2020, with the zone being gradually expanded over time as the required infrastructure and technology develops. This will support objectives to improve air quality and targets to reduce emissions from vehicles. Further private sector investment from operators on all routes will be required, not just the short to medium range services, and be achieved through the deployment of electric buses, advanced electric-diesel hybrid vehicles with an electric drive mode for emission-free operation in built up areas, and routeing changes as outlined above.

As battery and induction charging technology improves, vehicles will be able to cross the whole city whilst on full electric power, enabling the creation of a city-wide zero-emission zone by 2035. Vehicles which cannot comply with specific emission standards will be required to terminate at Park & Ride sites outside of the city.

Smart mobility

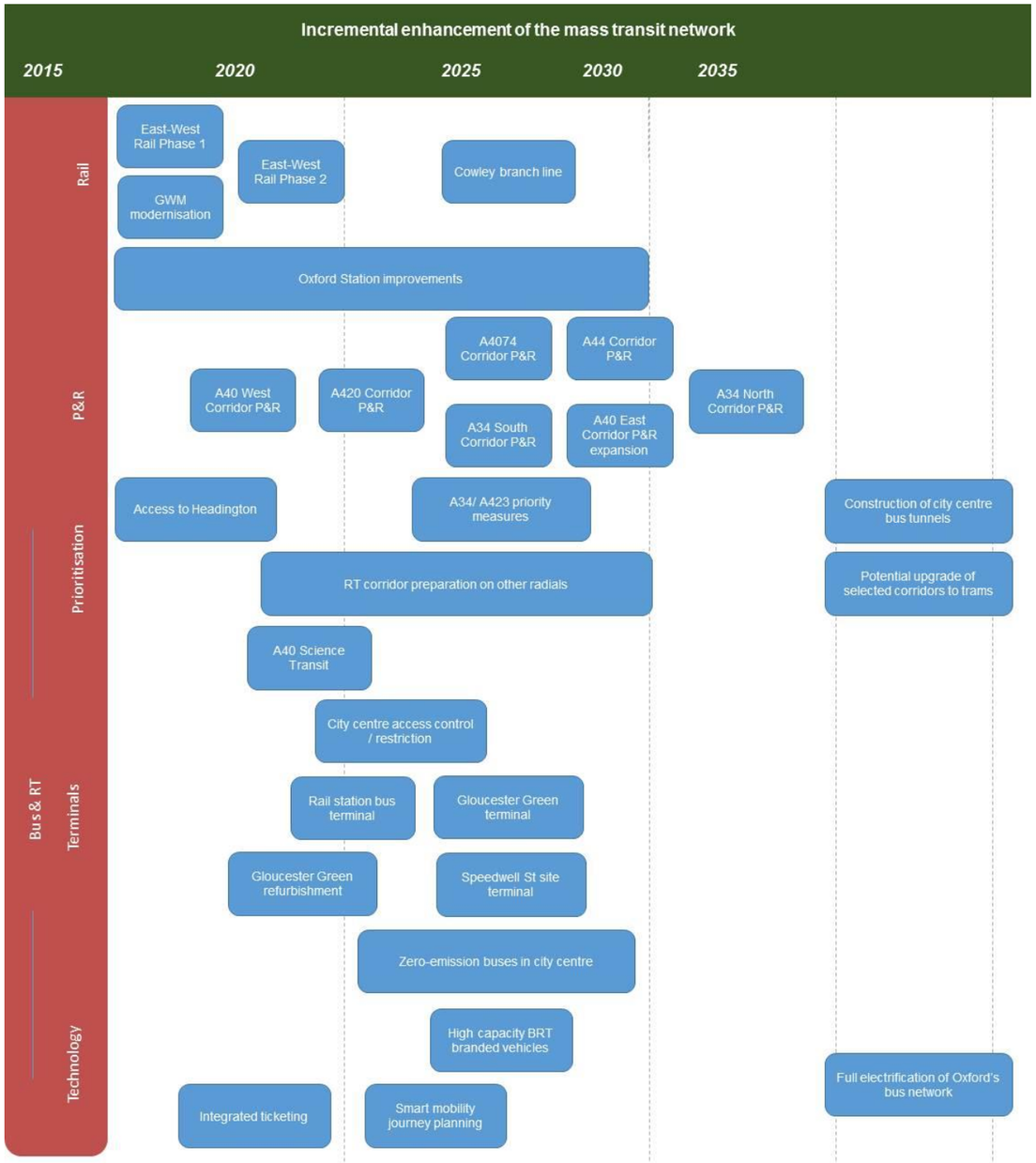
The Science Transit Strategy is leading initiatives for public and private sector partnership in the county to deliver cutting edge Smart Mobility Information in the form of digital data sources that will be:

- relevant to different user contexts and journey purposes at all journey stages;
- available via multiple sources (web, smartphone app, digital TV);
- updated in real-time, to provide the latest insights and intelligence; and
- capable of providing comparative travel time and cost information for an individual's options.

For those without access to personalised digital data sources, all information will be linked to displays at stops, hubs and on-board services.

Implementation

Phasing of capital investment



Future evolution of operator partnerships

From providing direct services from the Park & Ride initiative in the 1970s, the signing of a voluntary Quality Bus Partnership in 2006 to provide a policy framework for improvements to routes and corridors, to the creation of the city centre Low Emission Zone through the introduction of a Traffic Regulation Condition, and a Qualifying Agreement to coordinate bus timetables signed in 2011; OCC has a long tradition of working in partnership with bus operators. This has been a key element in achieving a significant level of bus patronage amongst residents and visitors of the city.

The Bus Strategy, completed in tandem with LTP4, proposes the continuation of this partnership working, in association with the operators and with particular focus within Oxford being on ensuring a quality of service and establishing the principles of RT operation:

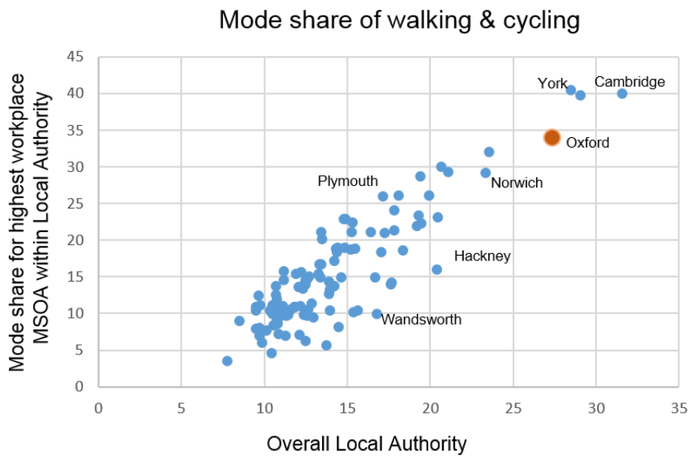
- Greater time-based and geographic coverage of bus services based on evidence of when and where people want to travel;
- Punctuality and reliability improvements through identifying the source of delays to bus services and jointly developing evidence-based solutions;
- Operation on busy radials and within the city centre to be managed through techniques such as Departure Slot Booking;
- Commercially appropriate consolidation and joint operation of services to further reduce the number of buses entering the city centre;
- Further availability of inter-operator (and multi-modal) smart payment building on the work in Oxford;
- Quality, capacity and environmental performance of vehicles; and;
- Interchange with other modes such as rail services and facilities for improving onward journeys by foot and bicycle and for those will mobility impairments.

4. Walking and Cycling

Walking and cycling are healthy, sustainable and enjoyable ways to travel and they are also extremely efficient forms of movement over short distances in terms of road space and impact on the highway network. Oxford is already one of the leading UK cities in terms of mode share of walking and cycling, however the ambition is to continue enhancing this position. To do so will require influencing further mode shift through encouraging and enabling people to walk and cycle by making their journeys easier, safer and more cost and time efficient in comparison to other modes.

The existing situation

A significant proportion of trips within Oxford are made on foot or by bicycle - 50% of commuter trips made by residents of the city. Investment in the transport network, including local public realm and cycle schemes, has contributed to a 30% increase in walking and cycling to work by residents in the city between 2001 and 2011. Oxford now has one of the highest mode shares for walking and cycling when compared to other local authorities (see graph of 2011 Census data) with similar sized workforces, and is of a similar maturity to many inner London authorities. Walking and cycling are also the favoured modes of the 30,000 full time students in the city.



Limitations of the current network

Given the size of the city (with no two points within the ring road being more than 11 km apart), Oxford should be able to challenge Cambridge as the city with the highest proportion of residents walking or cycling to work.

In consultation for the OTS, cycling interest groups have suggested the biggest barriers to further improving the cycling mode share are related to the lack of high quality routes which provide continuous facilities, conforming to a specific standard. The piecemeal, location specific approach is seen as discouraging new, inexperienced and safety-concerned cyclists from choosing to cycle as a preferred mode of transport.

Public realm improvements and pedestrian route enhancements have been made, particularly in the city centre and district centres. However, there is much more to do to make walking in Oxford a better experience. Further details of our plans for walking can be found in the Active & Healthy Travel section of LTP4.

The severance of walking and cycling routes is also a common issue at the edges of the city. As Oxford has expanded to include significant residential and workplace populations on the outside of the ring road, the dominance of motor vehicles in the transport hierarchy at junctions has not been challenged. With the committed developments at Northern Gateway and Barton Park likely to be added to in future, the issue of severance caused by the ring road will become even more critical, even for short journeys between homes and workplaces.

Future demand

Walking is a key element of Oxford's economy. A pleasant walking environment encourages users to spend time in city centres and contribute to the economy. The main commercial streets within the city centre already experience very high footfalls. In peak hours, Queen Street has an hourly footfall of between 3,000 and 4,000 – comparable to that of the wider and fully pedestrianised Cornmarket. Elsewhere in the centre, Broad Street and High Street can see footfalls of up to 2,300 people per hour at peak times.

The redevelopment of the Westgate Centre is expected to result in a 54% increase in retail space in the entire city centre and an increase in visitors to the Westgate Centre from 5 million to 16 million per year.

Were travel to work patterns to remain as they are now, over 5,500 new two-way commuter trips would be made by walking or cycling as the main mode each day within the city. It is also expected that they will feature as the critical modes for onward journeys for the additional 5,400 commuters arriving by bus or train.

Vision for walking & cycling

By 2035 Oxford will be a world-class cycling city that will be accessible to everyone, regardless of age, background or cycling experience.

Walking in the city will be a pleasant, comfortable experience, with an outstanding public realm in the city centre and district centres.

Cycling, walking and Door to Door travel (e.g. combining walking or cycling with bus/rail) will be at the heart of continued and sustainable growth and contribute to a higher quality of life for its residents and workers while maintaining its visitor appeal as a world renowned city of culture and history. More details of our plans for active travel can be found in the Active & Healthy Travel Strategy section.

Enhancing the cycle network

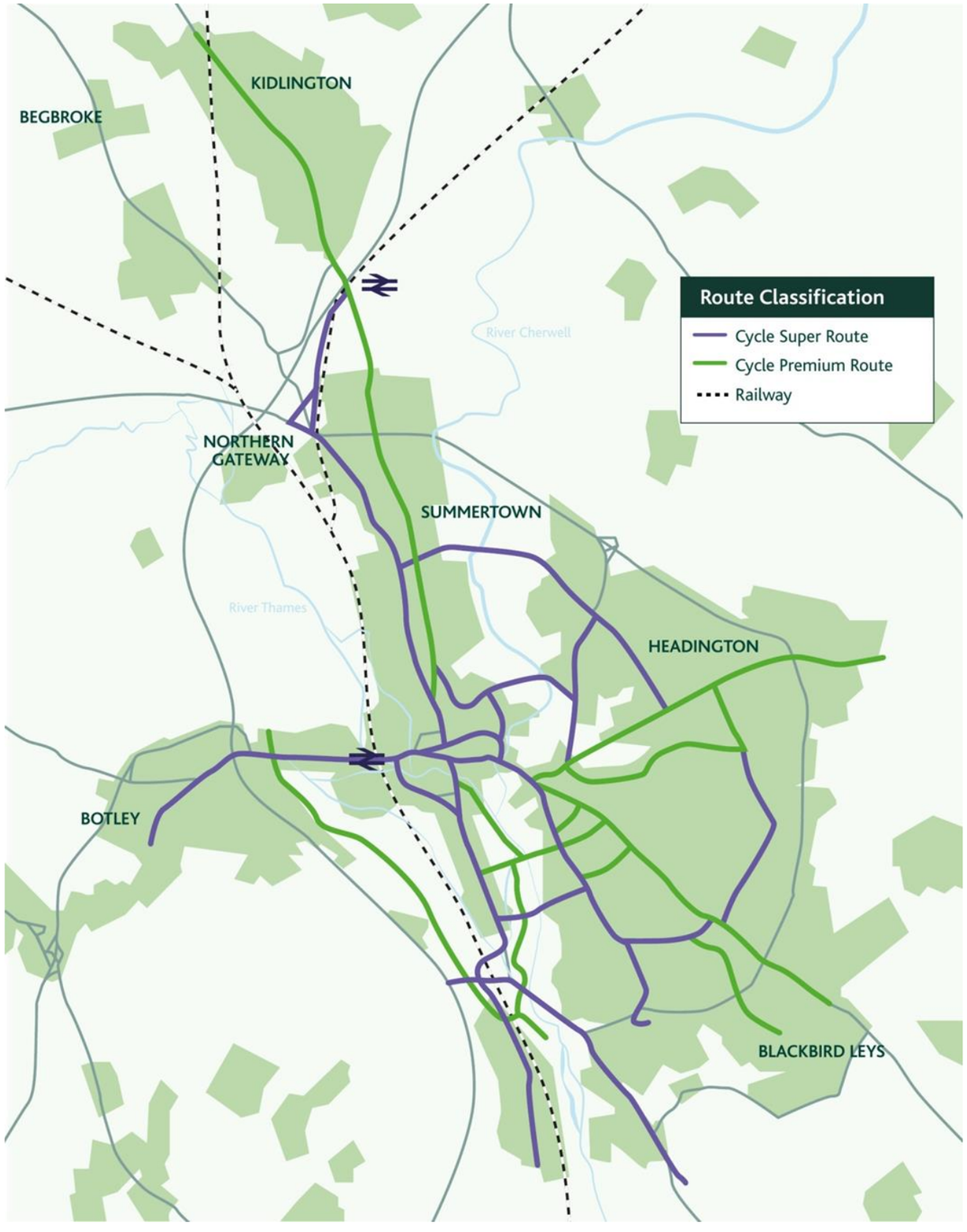
Cycle route enhancements are needed to provide safe and direct access to employment, educational and commercial destinations, but also to extend coverage across residential areas. Achieving this will require a combination of high quality routes providing access to key destinations, better cycle parking and other measures which make cycling easier and more attractive for short and medium-distance trips.

We propose a network based on a hierarchy of Cycle Super Routes and Premium Routes (shown in the figure opposite) and Connector Routes linking major origins and destinations. As with mass transit, particularly improvements are needed in the Eastern Arc, where 69% of journeys to work are 5km or less, but only 44% of trips (made by Eastern Arc residents within the city) are made by walking or cycling. The routes shown represent corridors - where possible, the actual route will follow the main road highlighted, but in some cases a direct parallel alternative may be necessary or more desirable.

Particular priorities for cycle route improvements are:

- Links to the city centre, especially radial routes;
- Orbital routes in the Eastern Arc; and
- Links to and between Northern Gateway and Oxford Parkway.

Whilst it would be desirable to provide Cycle Super Routes on all major routes in the city, this is not likely to be possible on all corridors, particularly where Rapid Transit facilities are proposed (e.g. Banbury Road), or where there are busy shopping areas (e.g. Cowley Road). In these cases a Cycle Super Route will be provided on a near-to-parallel alternative if possible (in the above cases, on Woodstock Road and Iffley Road).



OXFORDSHIRE COUNTY COUNCIL CONNECTING OXFORDSHIRE

Cycle network classification

Cycle corridor classification
Cycle Super Route • As a minimum requirement, there will be a high level of continuous and uniform provision for cyclists travelling in both directions; • On some corridors, cyclists will share wide bus lanes in at least one direction; • Complete or semi-segregation will be provided wherever possible (otherwise mandatory cycle lane markings will be used); • Cycle lanes will be designed for a minimum width of 1.5m; however 2m will be considered the default width for the busiest sections; • Advanced Stop Lines, already present at many signalised junctions in Oxford, will be the default standard and will include 1.5m feed-in lanes. Cycle lanes will continue through junctions to reaffirm the position of the cyclist in the view of other road users; • Loading and parking bans or timed restrictions will be in place and enforced during peak times or throughout the day; • Where segregation is not possible or desirable (e.g. parts of the city centre or the narrow part of Hollow Way) , traffic levels and speeds will be reduced to create shared-use low or traffic free streets.
Premium Route • Premium routes will also provide cyclists with uniform cycle lane provision in both directions. However these are likely to be shared with bus lanes, and will in many cases be standard width; • Dedicated cycle lanes will be mandatory in places and should continue through junctions to reaffirm priority; • As a minimum requirement, premium routes will be free from obstruction; • Advanced Stop Lines will have at least some form of feed-in lane; • In future development sites, design guidance for internal roads should meet the premium route criteria.
Connector Routes • Connector routes will be strategic quiet ways with a particular role in connecting Cycle Super Routes and Premium Routes to residential areas; • It will not always be possible or necessary to provide a continuous physical features on a connector route because of the need to balance road space for other users, however clear and consistent signage will be present along the routes and will be accompanied by wayfinding totems at decision points; • One-way streets will, where possible, be upgraded to include marked or segregated contraflow cycle lanes.

Those corridors considered appropriate for classification as Cycle Super Routes are:

- The B4495 from Summertown in the north through to Abingdon Road in the south;
- Woodstock Road and through the Science Area;
- Abingdon Road;
- Marston Road;
- Iffley Road;
- Botley Road; and
- Routes within the city centre.

Other routes may be added to this list, but based on known constraints and the need to provide RT infrastructure in other corridors this is considered a realistic starting point.

This long-term blueprint for cycling in Oxford can be implemented on a phased basis. Measures will be designed to enable them to be enhanced to accommodate a significant increase in future levels of cycling in the city.

Route treatment

The constraints of narrow roads, mature trees and street furniture are a challenge to providing continuous fully segregated cycle lanes or paths on most of the roads in the city. In many cases where full segregation is feasible, those schemes have already been implemented, albeit that in some cases improvements are still required to those schemes to bring them up to a higher standard. Where possible, every effort will be made to provide a similar level of segregation, however in most instances the most achievable (and best) form of high quality cycle provision on Cycle Super and Premium Routes will be on the carriageway.

In all cases, the reallocation of road space must consider other roads users and the built environment, but providing cycle lanes - whether mandatory, semi-segregated or advisory - will enable a far greater degree of continuity and uniform design than seen at present. As detailed in the cycle corridor classification table, on-street lanes will be designed to an absolute minimum width of 1.5 metre, with a recommended width of 2 metres on Cycle Super Routes. To achieve these widths it will often be necessary to undertake reallocation measures such as removing on-street parking, reducing footways to a minimum 1.8 metre width (in areas with a low footfall) and removing road centre lines.

To improve safety for cyclists, when placed into shared lanes with buses and RT vehicles, lane widths of 4 metres to 4.5 metres will be provided unless total road widths do not allow this. In the longer-term, it may be justified in some areas for cycle facilities to replace bus lanes.

Oxford already has a good network of recommended quiet routes for cyclists but a lack of signage and wayfinding information means they can be difficult to find or navigate. Essential to the success of the network will be improvements to those roads and paths which serve the purpose of connecting Super and Premium cycle routes to homes, workplaces and services which do not fall on the main corridors. In most cases it will not be necessary to provide any physical infrastructure beyond navigational aids, however work will be undertaken to provide

contraflow cycle facilities on one-way streets, and will progress opportunities to create additional crossings between the eastern and western halves of the city such as the Jackdaw Lane Bridge.

Oxford's waterways are an important part of the cycle and pedestrian network across the city, providing traffic free, and some cases, more direct alternatives to on road routes. Funding has already been secured to improve the Thames towpath and other connecting routes to the west and south east of the city centre. Further opportunities will be taken to further enhance waterway routes, including opportunities to provide a new cycle and pedestrian path as part of the proposed Western Conveyance Channel in the city.

Oxonbike Cycle Hire Scheme

Since 2013, Oxford has had a cycle hire scheme. Initially funded by the Government's Local Sustainable Travel Fund and managed by Oxfordshire County Council, the scheme originally linked Thornhill Park and Ride site with major employment destinations in Headington. Currently managed by a partnership, led by Oxford University, it has now expanded to other parts of the city and has the potential to increase cycling throughout the city. More details of Oxonbike can be found in the Active & Healthy Travel section

Corridor studies

Since the adoption of the OTS in September 2015, the county council has been working on a number of corridor studies to develop further proposals for rapid transit, pedestrian and cycle improvements on the city's main transport corridors. The corridors considered so far are Banbury Road, Woodstock Road and Botley Road, with further studies due to be completed in 2016/17.

Junction treatment

In the 5 years between 2009 and 2014, 75% of all cycle casualties occurring within Oxford as a result of traffic collisions, took place at or within 20m of a junction. Whilst improving the continuity of the network will encourage more people to take up cycling, without improvements to junction safety the casualty rate at junctions is likely to rise as flows increase.

A central concept of the Oxford Cycle Strategy is therefore to address key junctions with segregation, priority or safer treatments for cyclists.

Many of the signalised junctions within the city have had Advanced Stop-Lines (ASLs) added in recent years to provide priority for cyclists. It is proposed that these are added to the remaining junctions, or to new signalised junctions as standard. In all instances cycle lanes should be continuous providing a feed-in lane to the ASL. Where necessary this will require narrowing or reducing vehicle lanes on the approaches to junctions. Other, innovative treatments such as pre-signals for cyclist, two-stage right-turns, or cycle bypass-tracks will be considered in improving safety at large signalised junctions.

A significant barrier to cycling to and from the communities and workplaces outside of the ring-road is the lack of sufficient safe crossing opportunities. To reduce the severance caused by the ring-road, crossings, both at street-level or grade-separated will be provided. The signalisation plans for the Wolvercote and Cutteslowe roundabouts include toucan crossings for this purpose, for example. A crossing of the A40 east of Headington roundabout (linking Barton and Risinghurst) is also proposed, linked to future capacity improvements and bus priority measures at Headington roundabout and on the A40.

Cycle lanes on Super or Premium cycle routes will be continued through junctions, emphasising cyclists' priority at side road junctions. Side road entry treatments with raised tables and reduced corner radii to reduce vehicle speeds will further improve safety. On the Connector network, contraflow routes will be designed with physical protection for cyclists at entry points.

Cycle parking and signage

A significant increase in cycle use will require a substantial increase in secure cycle parking provision. The demand for cycle parking in the city and district centres considerably exceeds the formal provision in places and, at present, there is very little opportunity for substantial on-street expansion in the locations where it is needed most. Public realm schemes, which include rationalisation of on-street vehicle parking such as those for St Giles and Broad Street, will provide opportunities for increasing cycle parking. However they are still unlikely to meet demand as street level space is still scarce.

Throughout the city, innovative short-term approaches such as renting commercial premises and conversion to cycle parking facilities will provide additional parking supply, however these are likely to be expensive due to the limited supply of sites at the very centre of the city.

A longer term solution to providing significant quantities of cycle parking will be to provide underground or basement cycle hubs. The underground cycle park in Tokyo provides an

example of how additional cycle parking spaces can be provided in a crowded city. Opportunities to locate one or more in the city centre will be explored. The Oxford Station masterplan includes 1200 spaces within two such facilities on either side of Botley Road. Another example, which could be delivered in the short to medium term, is the conversion of the existing Gloucester Green underground car park to a dedicated cycle hub. These could become commercially operated cycle hubs which are run in partnership with private operators, providing bike hire and bike maintenance facilities.

Signing to all primary and secondary destinations will be provided throughout the city. This will be comprehensive and immediately recognisable along whole routes, and as a minimum each sign will show Destination, Direction and Distance. Further information such as named or branded routes, and whether a route is lit or unlit could also be provided. In conservation areas signing will need to be sensitive to the surroundings, whereas on busier routes, such as Super or Premium cycle routes, advanced and at junction signing will be required to enable cyclists to adopt the correct road position. Consideration will also be given to the use of road markings and other measures to avoid sign clutter. We will also seek to promote and enable Door to Door travel by providing cycle parking at popular bus hubs and increasing cycle parking at rail stations in the city.

Encouraging walking

Walking is the most sustainable travel option: it is feasible for the vast majority of the population, it is relatively quick for short distances, and it is a practical way of introducing physical activity into day-to-day life. Walking is already popular for many journeys in Oxford, particularly for relatively short distance journeys to work; approximately 25% of journeys to work for people who both live and work in the city are made on foot. However, 39% (over 17,500 trips) of all journeys to work within the city are under 2km in length, suggesting an opportunity to improve the mode share.

The key challenge is to improve the quality of the walking experience in the city – not just for existing pedestrians, but also to encourage more people to walk as a logical choice for short trips in the city.

As part of the proposed mass transit and cycle enhancements, pedestrian improvements will be implemented. There is a clear opportunity for local walking networks to integrate with the city-wide cycling network, to ensure a coherent approach to the roles of walking and cycling on quiet streets, and ensuring that pedestrians and cyclists can co-exist in the busier corridors, sharing space where appropriate.

There is also a clear role for public realm improvements to be integrated with measures to improve access on foot and transit stops and interchange hubs. The mass transit programme should, in particular, be considered as an important opportunity to improve public realm and simplify the local streetscape in Cowley, Headington and the Cowley Road. Public realm improvements should be integrated into multi-modal access improvements in the centres of Cowley and Headington, to improve pedestrian footfall, promote local shopping and stimulate local regeneration.

There is a need for major improvements to public realm and ‘sense of place’ in the city centre. In the short term, the pedestrianisation of George Street and Queen Street, as well as public realm improvements to St Giles, Magdalen Street and Frideswide Square will greatly improve the quality of public place within the city centre. By 2025, the establishment of the city periphery transit terminals and traffic control measures will allow Park End Street, New Road, Castle Street and Norfolk Street to become an extension of the low trafficked central core and will provide an almost uninterrupted walking route from the station to the centre. In the longer term, the ambitions for shifting bus movements underground will allow for more radical public realm improvements on High Street and St Aldates where opportunities are currently limited due to their key role as the only access to the centre from the east.

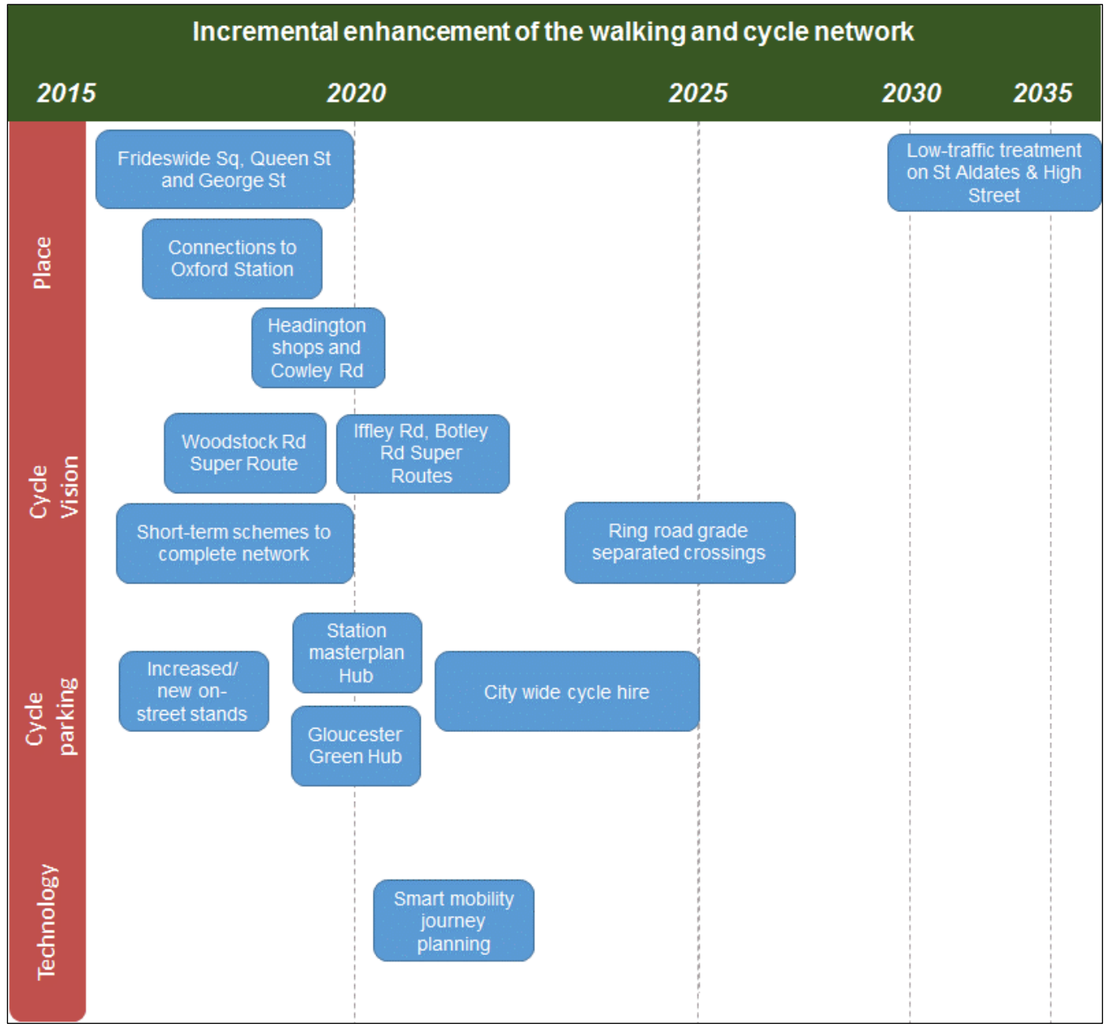
The walking improvements can be implemented on a phased basis, building on the interventions that have already been identified. The reduction in traffic in the city centre and, over the longer term, transformation of mass transit will enable an ambitious approach to walking and public realm improvements. Additionally, further improvements will be made to pedestrian crossing points within the centre (especially where side streets meet larger roads), with particular emphasis on improving safety and convenience.

Technology

Journey planning information for walking and cycling, and the benefits to health and the environment will be prioritised within the future intelligent mobility technology which is being progressed as part of the Science Transit project. This will include real-time comparative information for trips made by walking or cycling against other modes.

Implementation

Phasing of capital investment



4. Managing Traffic and Travel Demand

Why manage demand?

In broad terms, demand for travel arises as a result of economic and social activity. Densely populated, thriving and prosperous places have the highest levels of travel demand (though not necessarily the highest levels of *traffic* demand).

Transport planning tends to be focused on accommodating ever increasing travel demands by providing more capacity for travel, whether in the form of mass transit capacity, new pedestrian and cycle routes, or more road space for car traffic. Total transport capacity needs to be increased to enable growth in housing and employment. However it is widely understood that providing extra capacity (for any mode) also generates additional demand.

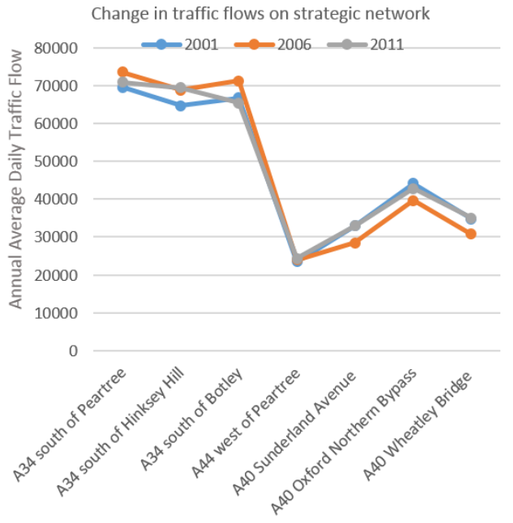
For road improvement schemes, for example, this sometimes means congestion relief is temporary because new capacity is quickly used up by new trips. Similarly, schemes that reduce car traffic through mode shift create new capacity in the road network, which then re-fills with new car trips. Neither case is a zero-benefit outcome, since the network is carrying more people, but congestion has not necessarily been reduced.

For this reason, the intention in Oxford is to combine schemes that increase transport capacity (for example the mass transit, walking and cycling schemes outlined in the previous two sections) with measures to manage car traffic and total travel demand.

Existing situation

In the ten years between the Census surveys of 2001 and 2011, Oxford's population grew by over 16,000 people (a change of 13%) whilst the number of jobs in the city increased by around 14,000 (16%).

Despite this, traffic flows on most key roads within the city (shown in the left-hand graph below) have actually dropped over the same period. On the ring-road and the strategic network outside of the city (shown on the right-hand graph), traffic flows have increased, albeit marginally, or remained relatively constant. Looking even further back, traffic flows into Oxford city centre have reduce by 24% since 1993.



These reductions in traffic have been achieved through a combination of measures, including:

- city centre traffic restrictions (e.g. the bus gate in High Street);
- high public parking charges;
- planning policies that restrict parking supply in new developments;
- controlled parking zones to remove free on-street visitor and commuter parking;
- public transport, walking and cycling improvements, including Park & Ride expansion; and
- targeted road capacity improvements – largely on the ring road

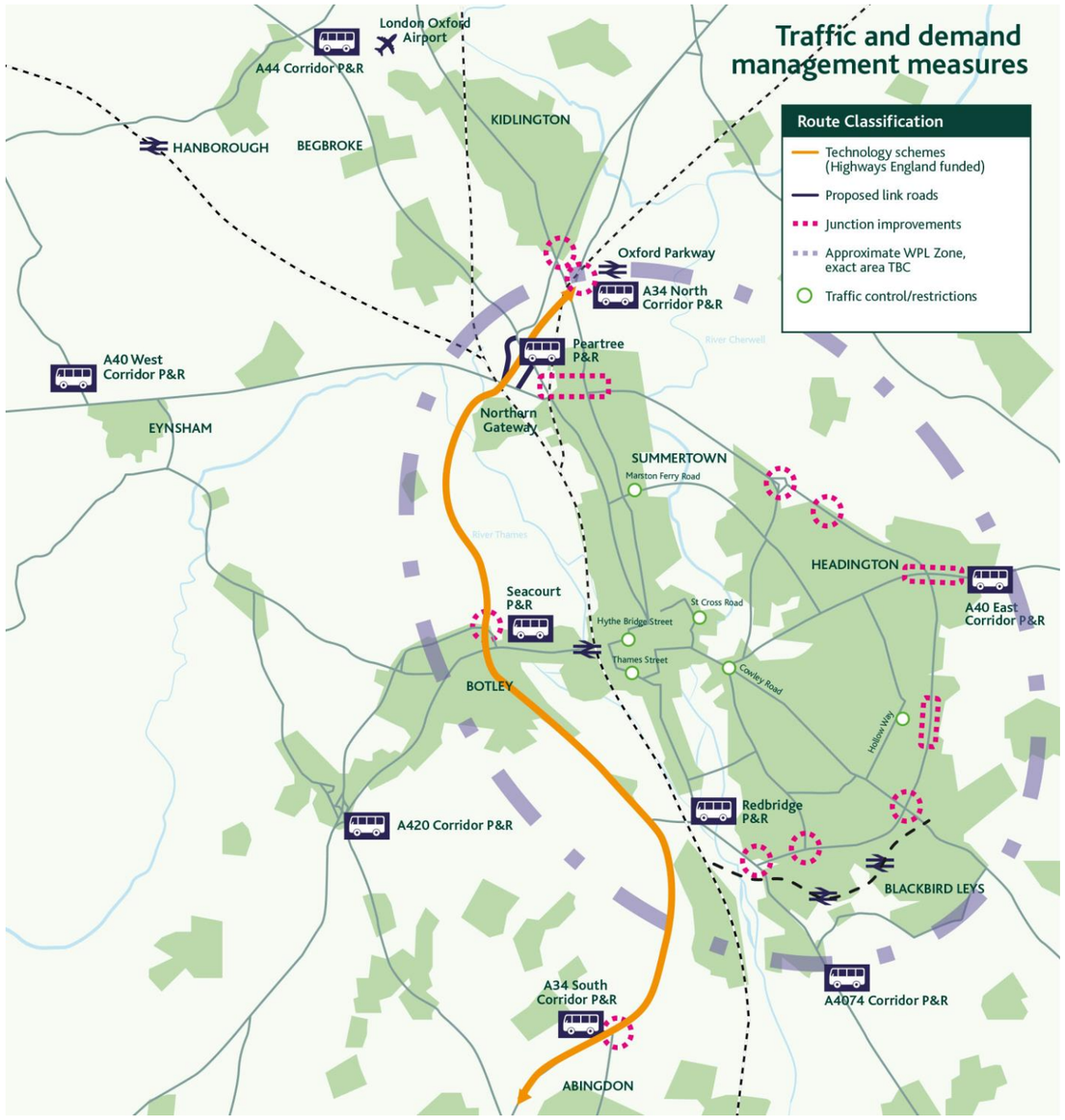
Vision for managing traffic and travel demand

By 2035, mass transit, walking and cycling including Door to Door journeys, will be seen by residents and visitors alike as the best and cheapest way to travel around the city. The wealth of information on travel conditions and options will enable people to make an informed choice of how best to access their chosen destination by any mode.

Driving alone to places of work will be significantly less desirable than other travel options, and there will be a general presumption against movement by car in favour of other more space-efficient modes within the urban area.

Learning from Oxford's past successes, this will be achieved through a combination of charging, traffic restrictions, planning policies, and targeted capacity improvements. Current and emerging network management and journey planning technology will also be used.

Future demand for travel



Despite the relatively stable level of traffic flow since 2001, the Department for Transport forecasts that the number of vehicle trips in Oxford during the peak hours will increase by 37% between 2011 and 2035 (taken from the National Trip End Model forecast which is based on the development growth outlined in the Local Plans).

Were travel to work patterns to remain as they are now, over 13,000 new two-way commuter trips with an origin or destination within the city would be made by car as a result of the SHMA related housing growth by 2035 (an increase of 27% against 2011).

With existing levels of congestion in and around the city already resulting in significant delays, any increase in traffic, let alone at the levels predicted above, will present serious challenges to enabling economic growth in Oxford.

Highway capacity improvements

The implementation of access restrictions in the city centre and Eastern Arc and reallocation of road space to other modes will support the goals and objectives of the LTP4 and the OTS by providing networks of sustainable travel options. This fundamental principle relies on the general presumption against travel by car within the urban area.

However, it is acknowledged that access by car is still a necessity in a dynamic city, and the outer ring road will be promoted as the primary route for all short-distance car trips.

The outer ring road will be increasingly important for cross-city movements because the OTS proposes to reallocate road space and introduce traffic restrictions on some of the roads within the city to enable mass transit, walking and cycling improvements,

The existing policy of improving the key ring road interchanges is consistent with the proposal to remove trips from the 'inner ring road' (the B4495) and other inner city routes. This will be continued in the short-term with the schemes at Cutteslowe and Wolvercote Roundabouts; whilst longer term plans at the A34 Botley and Peartree interchanges are being considered by Highways England, along with Intelligent Transport Systems (ITS) such as Variable Message Signs and variable speed limits to be applied along the A34 corridor. The proposed ring road improvements are shown on the plan opposite.

A direct highway link from Oxford's northern bypass to the John Radcliffe Hospital is considered inappropriate as environmental and planning constraints mean any solution is likely to be prohibitively expensive. There is also concern that it would merely shift existing traffic and environmental problems elsewhere. Reducing traffic on roads that serve the hospitals by providing a step-change in mass transit and improved walking and cycling routes, and through implementation of demand management measures, will improve access to all the hospital sites for all users.

Workplace parking

Whilst the package of OTS measures already examined will contribute to an increase in the share of trips made by non-car modes, the abundance of free workplace parking within the city is a significant threat to achieving the step-change required to avoid the considerable negative impacts of growth. The 2011 Census indicates that over 39,000 employees within the city use the private car as their main mode of travel to work, with a quarter being residents of the city. In common with most other towns and cities, parking charges levied by the local authorities in Oxford currently target public parking – i.e. on-street parking and parking in public car parks. This has been a useful tool in managing traffic, but given that a) there are many times more workplace parking spaces in the city than public parking spaces and b) car trips to workplace parking spaces are generally made at peak times, there would be clear benefits in being able to influence the use of these spaces.

An Oxford workplace parking levy

In order to gain much needed control over the use of the private car as a means of travelling to work within Oxford it is proposed, subject to further work and consultation, that a city-wide Workplace parking levy (WPL) is introduced.

It is believed that a WPL would have three significant benefits for the city, which will be critical to ensure growth is not limited by the constraints of traffic related congestion:

- shift to use sustainable modes – as those staff who have parking charges passed down by their employer will be incentivised to seek alternative methods of getting to work.
- funds generated through the application of a WPL would be ring-fenced solely for the reinvestment into the transport network (including operation of the WPL), improving alternatives to the private car and thus further influencing mode choice; and
- a charge will encourage employers to reduce their supply of private parking; saving the employer money spent on maintenance but also presenting the opportunity to redevelop land previously used for parking for employment or housing.

A similar overall approach to that used in Nottingham is proposed, but will need to be adapted for Oxford and its employers. With minimal exceptions, the levy would apply to all employers with a provision of employee parking over a certain threshold. Whilst the OTS proposes that the whole city is subject to a WPL, differential rates will be examined across the city – for example with a premium rate in the city centre and rates elsewhere which are dependent on the level of accessibility by sustainable modes.

Controlled parking zones

Growth in the city, coupled with demand management measures – in particular WPL – will mean further expansion of Controlled Parking Zones (CPZs) is required in the city to ensure that parking is not just displaced to residential streets. Large parts of the city are already covered by CPZs and where these have been implemented they have been extremely successful in removing commuter parking. Further work will be required to understand where additional CPZs are needed along with consultation with local residents. Over time is likely that the majority of streets in the city will be covered by parking restrictions.

In some areas of the city, it will be necessary to restrict the number of permits issued to existing properties and new developments to ensure parking pressure from residential parking is managed.

Spaces will be provided in controlled parking zones and other areas for car clubs and electric cars and car club vehicles, subject to local consultation.

Traffic control points

The implementation of the five city centre bus gates in 1999 marked a considerable improvement in the control of traffic volumes within the city centre. During peak hours, vehicles passing directly through the city centre only account for 15% to 20% of all trips entering the area, with the majority of people accessing workplace, education or retail destinations. Most users of the road network therefore already expect to use orbital traffic routes further out: either the B4495 route through the Eastern Arc connecting Summertown with Abingdon Road, or the A34/A40/A4144 ring road as the means of moving around the city.

Reducing city centre through trips

The ambition of maximising the city centre's value as a shopping and tourist destination depends on being able to vastly improve the public realm for pedestrians. There is also a risk that a WPL could, by reducing traffic into the city centre, release capacity which would be filled by through traffic. Therefore, it is proposed that traffic levels are reduced in the longer term by placing further restrictions on through traffic (whilst allowing unimpeded bus movements) by implementing access controls. These restriction points could be full or part-time closures – similar to the existing bus gates – or road user charging points (see below). A permit based system for those requiring access (residents, blue badge holders etc) will also be investigated.

These locations are shown on the map on the previous page and described below:

- On Thames Street – allowing access to Westgate from the south or west only but preventing or discouraging any through trips.
- In the vicinity of Worcester Street or Frideswide Square – thus preventing or discouraging trips from west to north but maintaining access close to the Oxford Rail station; and
- On St Cross Road, preventing or discouraging traffic from using the Science Area as a city centre ring road.

Inner ring road

To provide the necessary service journey time improvement for RT Line 3, it will be necessary to reduce the impact of congestion caused by high vehicle flows on the B4995. This will be achieved in part through junction improvements and priorities, as described in the mass transit section. In addition, traffic restrictions in the form of access restrictions (e.g. bus gates) or charging points will be used to redistribute traffic to the outer-ring road. Two measures already identified include:

- A timed access restriction (e.g. bus gate) or road user charging point, on Hollow Way
- Turning restrictions onto Banbury Road from Marston Ferry Road.

Road user charging

Road user charging could also be a potential option for reducing traffic levels on certain routes without a complete closure. This could be implemented in conjunction with a WPL (with some examples of where this could be applied listed above).

Despite the successful implementation of the London (2003) Congestion Charge schemes, no other UK city has since implemented a similar scheme, and there are relatively few examples in other European countries. This can be attributed to a lack of political will, but also as such schemes require large capital investment costs for the infrastructure, payment mechanisms and back-office equipment as well as significant operating costs - the 21km^2 London CC zone cost over £200 million to implement and requires an operating budget of £120 million per year.

Charging only for use of very specific "premium" road links in the city centre and Eastern Arc, would enable start-up and operating costs to be minimised. Nevertheless, a road user charge is unlikely to raise significant revenue and is best seen as a network and traffic management tool rather than a means of generating funding for transport improvements.

Public parking

Public parking in Oxford is already very limited compared to other cities, particularly in the city centre. In 2013, Oxford city centre had 1,670 public off-street car parking spaces, compared to 3300 in Cambridge city centre and 5,200 in the centre of Reading. Despite this, city centre spaces are rarely fully occupied, though this is likely to change once the Westgate Centre is redeveloped. Oxford's economy, including the retail and leisure sectors, is not heavily dependent on people driving into the city centre, largely because the Park & Ride, bus, walking and cycling networks provide convenient alternatives.

In the district centres, which are less well served by alternative modes, public parking is important to maintain the vitality of shops and services located close to residential areas.

City centre parking

In the city centre, levels of public parking will be maintained at approximately the same levels as in 2014, albeit reorganised to make better use of land. Specific measures include:

- consolidation of public parking into fewer locations, predominantly underground (e.g. new Westgate car park), with existing surface car parks redeveloped for other uses and on-street parking rationalised as part of public realm improvements (for example, St Giles and Broad Street);
- all parking to meet high standards of security and design to provide a welcoming experience;
- charges to encourage the efficient use of parking capacity throughout the day and year – no half-empty car parks – and to discourage arrivals during network peaks;

- charges should discourage or prevent long stay or commuter parking;
- consider discounts for full cars (4 + occupants);
- provide easy-to-use payment options, linked to retail/leisure discounts or other incentives to encourage off-peak arrivals;
- provide live parking space information from journey origin to parking space via journey planner, apps, web, electronic signs, GPS devices and in car-park systems;
- all public car park exits to be signal controlled with generous internal queuing space to allow controlled discharge of traffic onto the road network; and
- all car parks to provide for electric vehicle charging.

District centres

For district centres, the County Council's approach is to:

- Support the vitality of district centres (which offer local amenities in sustainable locations close to residential areas) by maintaining a modest level of attractive, low cost and easily accessible short stay parking;
- Maintain current levels of public parking in all district centres, except Cowley primary district centre which currently has substantial over-provision occupying land which could be redeveloped for other uses;
- Deck or build above car parks to make efficient use of land;
- Discourage or prevent commuter or long stay use through pricing or fines.

Zone-based parking charges

It is proposed that a zonal parking charge system is adopted across the city, including Park & Ride car parks. Classification of charging zones will be based partly on their level of accessibility by other modes, so may change as and when the other OTS measures (such as a RT or cycle super route connection) are introduced. The zonal system will be designed to encourage alternatives, in priority order:

Parking charges will therefore be lowest at outer Park & Ride sites, but are unlikely to be free because a) this could create an incentive to use Park & Ride even when another alternative is available and b) the operators of Park & Ride car parks will need to cover their costs.

Freight/ deliveries

Demand forecasting for 2031 indicates that around 2,500 HGV trips will be made to, from and within the city between 8am and 6pm per day, over a third of which would occur during the morning peak hour. To reduce the impact of freight on congestion, noise and air quality, the following measures will be developed:

- delivery & Servicing Plans;
- construction Logistics Plans;
- out of hours deliveries;
- freight will be expected to comply with increasing emissions requirements.
- local consolidation points; and
- freight consolidation centres for business, retail and construction.

Role of taxis

Taxis and private hire vehicles will continue to be an important part of Oxford's integrated transport network; perhaps even more so as further traffic controls and restrictions reduce the attractiveness of the private car as a means of accessing the city centre. As the nature of the city centre streetscape changes, with more streets becoming access only or closed to vehicles at certain times, so will route management for taxis.

Given the importance of taxis throughout the city, it will be vital to ensure that a high level of interchange is provided with the proposed RT routes at Park & Ride and major hubs, plus also at Oxford and Oxford Parkway stations.

As part of the objective for a zero-emission Oxford city centre by 2020 (and city-wide by 2035), taxi operators are being encouraged by Oxford City Council to invest in electric vehicles for their fleets. Oxfordshire County Council will work in partnership with taxi and private hire business to ensure that designs for RT transit hubs, Park & Ride sites, and other council run public locations with taxi stands will have facilities for electric vehicle charging.

Development management policy

Oxford City Council is preparing a new Local Plan, which is due to be adopted by 2019. The county council will work closely with the city council to ensure the new Local Plan supports the delivery of the OTS and vice-versa.

The evolution of policy will have a critical role to play in delivering growth without adding unnecessary traffic.

Parking standards throughout the city will be seen as an absolute maximum, which are to be applied only in exceptional circumstances, where accessibility by other modes is relatively poor. Low-car and car-free developments will be encouraged, particularly in areas with very good accessibility by non-car modes. Effective on-street parking controls are required in the areas surrounding low-car and car-free developments to ensure parking does not merely shift off site, and such developments will be required to contribute to the cost of introducing such controls where necessary.

In planning new development, there is increasing evidence that neighbourhood design – including housing density and layout of routes for public transport, walking and cycling – is a strong influence on use of these modes by residents. Traditional densely populated areas have lower overall travel demand and car ownership and higher use of sustainable modes than newer suburban developments.

In addition the strategy will need to "nudge" people towards travelling less or choosing sustainable modes, by promoting neighbourhood design that is based on research and best practice from other cities. Developers of homes and workplaces will also be required to apply vastly enhanced requirements to provide access and facilities for cyclists. Any new commercial operation will be required to adhere to standards for the management of logistics.

Access to Parking on Public Highway for New Developments and Change of Use Developments

The county council will seek to restrict access to parking on the public highway for new developments and change of use developments, such as Houses in Multiple Occupation (HMOs), to protect existing residents' access to parking and reduce parking demand in Oxford.

Should the development rely on parking on the public highway, the county council will require the following to be submitted with any planning application:

1. Scale and type of development;
2. The likely parking demand associated with the proposed development;
3. Sustainability of location / accessibility to sustainable transport modes and to amenities
4. Capacity for on-street parking in the vicinity of the site and surrounding area (this should demonstrated by the applicant through an on-street parking survey, details of which must be agreed with transport development control officers); and
5. The level of vehicular parking proposed on-site.

Taking the above into consideration, the county council may seek to exclude developments from eligibility to parking permits if the site is located within a Controlled Parking Zone. Should the development be located outside a Controlled Parking Zone or within a Controlled Parking Zone which operates for only part of the day, the above consideration could result in the county council recommending refusal of the development should it rely on parking on the public highway.

The role of the OTS in planning new development

A new Oxford Local Plan is being prepared, for submission in 2018. This will determine the number and locations of new homes within the city to 2036.

Following the publication of the Strategic Housing Market Assessment for Oxfordshire, the Oxfordshire councils have agreed a working assumption of 15,000 homes as the scale of Oxford's unmet need to be planned for outside the city.

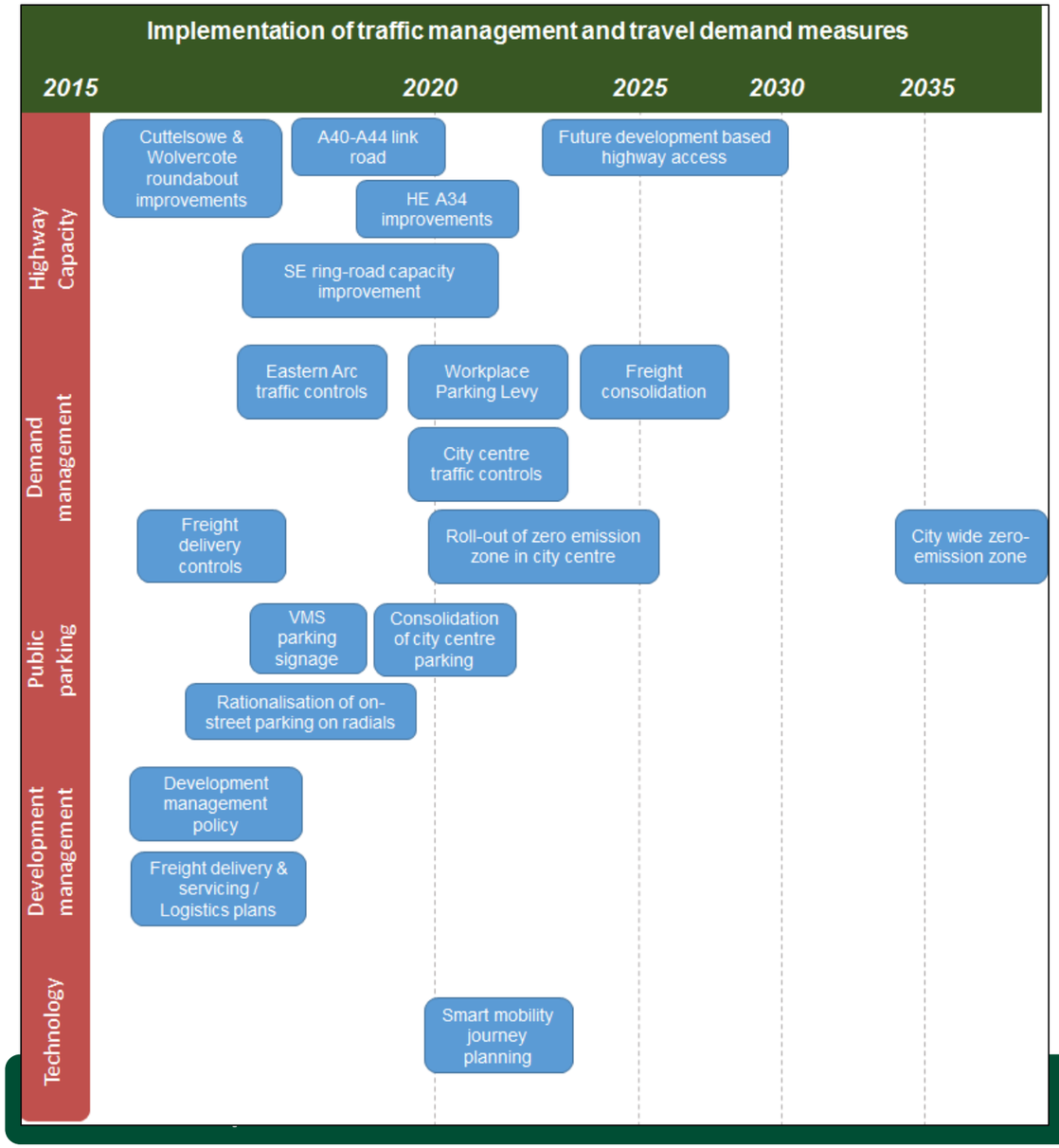
The OTS has defined the optimum corridors for RT and cycle networks, extensions of which should help to influence decisions about where future housing should be located.

To the south of the city, RT Lines 1 & 3 will provide a fast, high capacity transit service directly into the City Centre and Eastern Arc, with both having potential to be extended towards Abingdon and south of Grenoble Road. The future role for passenger services using the Cowley Branch Line is particularly relevant here, with the potential for a rail spur to link to a development south of Grenoble Road.

Similarly, to the north of Oxford, RT Lines 1 & 3 route through Kidlington and Eynsham, opening up large areas with access to a direct RT service to Oxford city centre and growth areas in the Eastern Arc.

Implementation

Phasing of capital investment – see overleaf



The cost of improvement

The OTS calls for a step change in transport investment within Oxford to preserve the vitality of one of the most important centres to the economy of the South East. Investment needs to

reflect the scale of change needed to achieve the city's vision for growth, but equally must be achievable with a recognition of the need to deliver the best value for money from constrained resources. This consideration is implicit with the principle of the incremental development of mass transit, where networks will be developed on the basis of allowing for future expansion as needed, not precluding this through fixed and inflexible infrastructure or technologies. Should demand in future necessitate greater segregation, the potential cost should be considered now.

Detailed costing will be determined through more in-depth studies into the measures identified within this strategy. However, initial estimates suggest that the implementation of the OTS will require a total capital investment (including funded schemes) of around £1.2 billion. When factored against the level of growth expected within the county in the next 20 years, this equates to an investment of approximately £14,000 per additional job and home.

Approximately half of this figure would be required to fund the city centre transit tunnels alone (which will require the most significant shift in the way transport infrastructure is currently funded). The remaining c£600m of capital investment would represent an annual investment of £30 million per year over the next 20 years, roughly double the County Council's current annual spend on transport infrastructure in Oxford.

The next steps

The transport improvements detailed within the OTS sets out a framework for progressive transformation of the transport network within the city by 2035. However, many of the more ambitious schemes will be developed incrementally, as and when the need for them to mitigate for the planned growth is established, and when funding is secured.

The County Council's 2 and 5 year capital investment programmes will see us deliver the schemes for which committed funding has been secured, including utilising the £93 million City Deal and Oxfordshire Growth Deal investments; developer funds and Community Infrastructure Levy funding, and local authority funds. The design, consultation and implementation of many of these short-term schemes are already underway.

The OTS provides a framework and context for future funding bids. Each corridor contains a combination of interconnected transit, cycle, place and demand management elements. In many cases, schemes will be developed and implemented on a whole corridor – rather than mode-specific – basis.

The County Council has therefore begun to develop specific corridor studies for Botley Road, and separately, the Woodstock Road and Banbury Road corridors. These studies will identify schemes that combine concept proposals for Rapid Transit, pedestrian, cycle and public realm improvements in order to deliver ambitions set out in the OTS. These studies will form the basis of future funding bids.

The OTS has introduced the County Council's ambitions for several high-profile schemes which will enable radical changes in how people move around the city. At present, schemes such as zero-emission RT and the Workplace Parking Levy are in the feasibility stage, and in the next year work will be undertaken to develop the optimum solutions and funding programmes through collaborative working with public transport operators, major employers and other stakeholders.

We will look to utilise Oxford's position as a home to a truly world-class research and development sector to work with the university, college and science sectors to help take the strategy forward, including the innovative Smart Mobility and technology proposals identified under the County Council's Science Transit Strategy.

Crucially, in light of the substantial potential housing and job growth within Oxford and the wider county, the County Council will work closely with the City Council and district planning authorities to implement the principles and infrastructure of the OTS.

Funding the OTS

The delivery of the measures and interventions recommended by the OTS will rely in part on private and private sector funding streams of an appropriate level, phasing and balance between revenue and capital funds.

- The long-term focus of the OTS means uncertainty for future availability of funding. The investment plan must therefore:
    - Be flexible and scalable to adjust to the value of future funding streams and the timescales for funding availability; and
    - Provide a business case for securing funding from the private and public sectors.

Central and local government, the private sector and transport operators and users all have a key role in future funding and delivery. The County Council's approach to funding will need to be as ambitious and forward-thinking as the strategy itself. A series of opportunities have been identified which are presented within the table opposite.

Potential Sources of Funding (£ = modest contribution; ££ = moderate contribution; £££ = significant contribution)		
Private sector	**Transport operators**	**Transport users**
Developer contributions (££) Contributions for new developments to be maximised and prioritised towards public transport and active sustainable travel (e.g. walking and cycling) wherever possible, over road infrastructure.	**Freight fees (£)** To be applicable until companies sign up for the use of a consolidation centre. Revenue can be ring-fenced for use on freight management and air quality improvement schemes.	**Workplace Parking Levy (£)** This will likely be a modest but valuable source of income for investment into further Mass Transit, walking and cycling schemes.
Local business rates (££) To be retained by Oxford City Council to generate funding for infrastructure, including transport. At a countywide level, business rate growth within the Enterprise Zones should be retained for reinvestment.	**Operator investment (£)** The roll-out of very low and zero emission vehicles is welcomed and must continue. Further support to schemes which will provide more reliable services should be sought.	**Parking charges (££)** Increases in public car parking charges outside of the city centre should be used to support the implementation of the Mass Transit lines.
Tax Increment Financing (£££) An increasingly used financing tool which uses future business rate income from new development to provide backing for infrastructure, including transport.	**Bus stop / bus stand departure fees (£)** Bus stop or bus stand departure fees should be implemented to help fund city centre revisions to the transit network. This may also encourage operators to consolidate services.	**City centre cordon / entry charges (£)** Given the limited existing through trips in the centre it is assumed that only a limited return on investment in operating costs would be gained.
Tourism business levy (£) Local business leaders should be encouraged to establish an Oxford Tourism Business Improvement Districts (TBIDs) which draws together private sector funding based on a scalable business rate levy to collectively invest in local improvements, including transport.	**Rail station use charges (£)** Rail station use charges on Train Operating Companies **Tourist coach entry fee (£)** Charge to be applied to companies for city entry (payable on parking within designated coach bays) will be used to pay towards Mass Transit prioritisation schemes.	

Connecting Oxfordshire: Local Transport Plan 2015 – 2031

Banbury, Bicester, Carterton, Science Vale & Science Vale Cycle Strategy and Witney Area Strategies

Page 320

Banbury Area Strategy

The Local Context

1. Banbury is Cherwell's largest town and Oxfordshire's second largest settlement, with a population of nearly 47,000[1]. Banbury acts as a Primary Regional Centre that serves a wide sub-region, with a diverse economy focused on manufacturing, logistics, distribution and services and increasingly, high tech manufacturing. In addition to provision of significant employment opportunities, the town also provides a focus for major retail, housing, cultural, leisure and community activities.
2. Located in north Oxfordshire, Banbury's central position in the wider region and its excellent transport links means that the town has a far-reaching catchment and area of influence extending north to Birmingham, Coventry and Northampton; east to Milton Keynes, Brackley and Buckingham; west to Stratford on Avon and Chipping Norton; and south to Oxford, Bicester and Aylesbury.
3. The aim in Banbury is to strengthen the town centre and its economy by boosting its vitality and attractiveness through strategic investment and regeneration thereby providing a full range of facilities, whilst safeguarding the town's historical character.
4. The *Cherwell Local Plan* anticipates that the town will continue to grow significantly by 2031, with new employment and residential areas proposed, and creation of a more diverse economy. By 2031, the adopted Local Plan[2] proposed that there will be an additional 7,319 houses[3] and 3,500 jobs in Banbury, at key employment sites including Central M40, to the east of Banbury (2,500 jobs); and on land North East of M40 Junction 11 (1,000 jobs)[4]. These sites are shown in Figure 15.1. In his report on the Local Plan (June 2015) the Inspector recommends that the scale of employment on land North East of M40 Junction 11 be reduced from 49ha to 13ha, in turn reducing the number of jobs to 1,000.
5. The emerging *Banbury Masterplan* supports the Local Plan proposals and will provide the overall framework and vision for guiding the sustainable growth of the town to 2031. It aims to rejuvenate the town centre with a focus on developing shopping, leisure and night time economy activities, and to secure the long term role of the town centre.
6. This Transport Strategy for Banbury supports delivery of the *Cherwell Local Plan*; the *Banbury Masterplan* and its overall vision for Banbury; and the *Canalside Supplementary Planning Document*.

[1] Census Data 2011, NOMIS
[2] Cherwell Local Plan 2011-2031 Part 1 (Adopted 20 July 2015)
[3] Inclusive of committed development and Cherwell Local Plan 2011-2031 Part 1 (Adopted 20 July 2015
[4] Policy Banbury 15: Employment Land North East of Junction 11, Cherwell Local Plan 2011-2031 Part 1 (Adopted 20 July 2015)

Transport in Banbury

7. Banbury has excellent road connections, with access to the M40 via Junction 11 and with several strategic A roads serving the town. Movement to, from and within Banbury has historically been influenced by a range of physical and environmental constraints including the rail line through the centre of the town and the Oxford Canal and River Cherwell, both of which dissect the town from north to south. The historic areas of Banbury also influence traffic movements, particularly around the town centre where there are a number of one-way, narrow and pedestrianised areas.
8. Banbury has a range of bus routes linking residential areas with the town centre; these have developed incrementally overtime and form an inefficient pattern. Many of these routes have required subsidy to operate as they are not serving the commercial commuter market. The quantum of development in Banbury, to be delivered through the Local Plan, offers an excellent opportunity to rationalise the bus network to link homes to employment across the town.
9. Banbury rail station is strategically located on the national rail network, between London and Birmingham. New investment in rail infrastructure has substantially reduced the travel time from Banbury to both cities, with regular high quality train services serving Banbury and excellent links to other centres including Bicester and Oxford. Nationally, there are emerging rail proposals for strategic electrification upgrades which are to be undertaken on the Oxford to Banbury line. These are likely to have a significant impact on the town's rail station and adjacent infrastructure and present an opportunity for complementary transport network improvements.

Transport Strategy Aims

10. This Transport Strategy identifies a series of improvements to address the existing transport issues in Banbury, and to manage the increased travel demand that will be generated by development in the town. The Strategy will:

    - **Deliver infrastructure improvements** to increase the overall capacity of the local transport networks whilst also supporting sustainable travel.
    - **Facilitate and promote sustainable travel** for trips to, in and around Banbury, including use of the bus, walking and cycling, including Door to Door travel (e.g. walking or cycling combined with bus/rail). Further details can be found in the Active & Healthy Travel section. A step-change in the increased use of sustainable transport modes is essential to support growth in Banbury. The Sustainable Transport element of the Strategy will play a key role in reducing the volume of traffic associated with the town's significant growth and mitigating the traffic impacts on local roads serving Banbury.

Infrastructure Improvements

11. Infrastructure schemes which seek to improve the operation of the existing highway network, address current transport issues in the town, and protect sensitive areas, continue to form a key element of the Transport Strategy for

Banbury[5]. These improvements comprise:

- **Promotion of Bankside, comprising**: i) Modification of traffic calming along Bankside; ii) Signalisation of Hightown Road / Bankside junction; and iii) Signal timing optimisation at Swan Close Road. This is being progressed and funded as part of the Longford Park development.
- **Traffic management along A361 the South Bar Street/ Horsefair corridor**. This is an historic corridor which has recently been declared an Air Quality Management Area (AQMA) primarily due to traffic impact. Measures to encourage alternative routing to reduce the number of vehicles using this route and improve traffic flow will be examined.
- **Developing the Cherwell Street 'Eastern Corridor' as the preferred north-south route through the town**. Due to the Air Quality Management Area at North Bar, and the weight limit restrictions at Queensway, Cherwell Street is the main north-south route through Banbury. While the focus will be to establish this corridor as the preferred north-south route through the town, a key consideration will be the need to balance the conflicting travel needs of vehicular access north-south, pedestrians crossing east-west, and bus movements. The Cherwell Street scheme will include improvements to the Bridge Street / Cherwell Street junction and a review of highway space from Swan Close Road to Bridge Street to improve traffic flow, and bus movements, but also reduce severance and increase the ability for pedestrians to cross the road. This scheme will be developed in conjunction with town centre redevelopment, in particular through the Canalside Supplementary Planning Document. Additionally, this scheme is co-dependent on the Bankside scheme, particularly the changes at Swan Close Road.
- **Provision of additional capacity at the Bloxham Road (A361) / South Bar Street junction** will also be implemented by the Longford Park development.

12. Additional infrastructure improvements will be delivered to support future regeneration of Banbury and the Local Plan development proposals:

- **A361 Bloxham Road to A4260 Oxford Road Spine Road through the residential development South of Salt Way:** The coordinated approach to development to the south of Banbury as outlined in the Cherwell Local Plan 2011 – 2031 (July 2015), will enable provision of essential infrastructure including delivery of an east-west link from the A361 Bloxham Road to join White Post Road and the A4260 Oxford Road. This road will support operation of commercially viable bus services through the development, increasing accessibility and long term sustainability of the development. The spine road will be built by the developer.
- **Capacity and traffic flow improvements along the Hennef Way to M40 Junction 11 corridor** (an AQMA), will be investigated in 2016/17 including:
  - Hennef Way/ Southam Road and Hennef Way/ Concord Avenue improvements.

[5] As identified in the Banbury Movement Study, 2013

- Hennef Way/ Ermont Way improvements: replacement of the existing roundabout with a signalised junction.
- Ermont Way/ Middleton Road improvements: increased capacity provided at entry to roundabout.
- Junction improvements/ traffic signal optimisation along Hennef Way and at M40 Junction 11.

- **As developments sites come forward, it is likely further capacity improvements will be required at other sensitive junctions. Where possible improvements will be directly secured from development sites. Improvements at, but not limited to, the following will be sought:**
  - Warwick Road (B4100) roundabout junctions with A422 Ruscote Avenue and Orchard Way
  - Bloxham Road (A361) junction with Queensway and Springfield Avenue
  - A361 Southam Road junction with Castle Street and Warwick Road.

13. In the longer term (post 2024), there is likely to be a need for additional road capacity to manage anticipated traffic growth at M40 Junction 11.

- **A new link road east of Junction 11** will provide a strategic solution to helping mitigate the impact of traffic travelling to/from Banbury from surrounding areas including from the M40.

14. The increase in Local Plan growth to the south of Banbury has renewed the need to investigate the opportunities, costs and benefits of a link road over the railway for the post 2024 period, to manage traffic movements within the town. A study will consider several route options such as Tramway Road to Higham Way and Bankside to Chalker Way and review other south east link road routes. These options will be assessed by the County Council and the evidence from this study will inform further decision making.

15. To improve traffic circulation around Banbury, signage will be reviewed and enhanced. Car parking in the town centre will also be reviewed and the distribution of car parks improved. Car parking matrix signs will be introduced to signpost drivers more effectively to car parks with spare parking capacity.

BAN1 – We will seek opportunities to deliver transport schemes which will support the regeneration and growth of Banbury to 2031 and protect the historically sensitive areas of the town through:

- Promotion of Bankside.
- Traffic management along A361 the South Bar Street/ Horsefair corridor.
- Bridge Street/ Cherwell Street eastern corridor improvements.
- Bloxham Road (A361)/ South Bar Street improvements.
- Provision of A361 Bloxham Road to A4260 Oxford Road Spine Road.

- Hennef Way/ Southam Road improvements.
- Hennef Way/ Concord Avenue improvements.
- Hennef Way/ Ermont Way improvements.
- Ermont Way/ Middleton Road improvements.
- Increasing the capacity of junctions along Warwick Road (B4100).
- Bloxham Road (A361) junction with Queensway and Springfield Avenue improvements.
- A361 Southam Road junction with Castle Street and Warwick Road improvements.
- Provision of a link road east of M40 Junction 11 (Overthorpe Road to A422).
- Investigating the impact of i) a link road crossing from Tramway Road to Higham Way; ii) a link road from Chalker Way at Central M40 site to Bankside (crossing either the railway, river and / or canal) iv) a south east link road.
- Reviewing the highway signage on routes into the town centre to sign north-south through-traffic away from sensitive areas of the town centre and promote appropriate route choices at key decision making junctions.
- A car park review and improvements, and provision of car park matrix signs.

Sustainable Transport Strategy

16. Travel to Work Census data (2011) highlights the significant opportunity that exists for encouraging sustainable travel in Banbury and delivering an increase in the use of sustainable modes for travel around the town. Whilst a significant number of Banbury residents travel to Oxford for work, 60% of journey to work trips are currently undertaken within the town i.e. with a home origin and a work destination in Banbury. However, despite the local pattern of work trips, whilst 32% of these trips are undertaken on foot, 57% of these local trips are undertaken by car. Only 3% are undertaken by bus and 6% by cycle.

17. A Bus Strategy (see LPT4 Volume 4) for Banbury is therefore being developed with the aim of improving the bus network. In conjunction with the local bus operators, a review is being undertaken of bus operations in the town which will identify short, medium and long term route changes (including any infrastructure requirements) to provide direct commercial bus routes from residential areas, via the town centre to the employment areas.

18. The first service improvements will be to improve bus links between residential development in the west of Banbury and employment sites on the east side of town. This will involve working closely with a range of

stakeholders including Cherwell District Council, bus operators, developers, local employers and business groups.

19. The aspiration to serve Banbury Rail station with an increased variety of bus services will be explored by examining opportunities to route buses from the town centre to the Thorpe Way employment area via Higham Way, thus serving the new eastern station entrance in the multi-storey car park. In addition, on the western side of the station, work will be undertaken with landowners to open Station Approach and Tramway Road to through bus services.

20. Improving bus journey time reliability will be considered as well other improvements, including bus-only access links. This will complement bus service enhancements by enabling faster, more reliable bus journeys to ensure that the bus becomes a genuinely attractive option.

21. The existing bus station in Banbury is unwelcoming for passengers and under-used by operators. The Banbury Masterplan will consider if the current bus station layout and access arrangements can be improved, or whether a bus station at a different town centre location offers greater benefit to the town, including considering if a bus station is required at all or whether a series of on street bus stops could better serve Banbury.

22. We will continue to ensure new development sites are served with high quality commercially viable public transport services, through a variety of mechanisms, including seeking pump priming funding.

BAN2 – We will work closely with Cherwell District Council, bus operators and other strategic partners to deliver the Banbury Bus Strategy, which seeks to deliver a commercial bus network for Banbury. Increased bus use will be achieved by:

- Promoting a bus route serving Bretch Hill>Banbury Town Centre>Rail Station (at Higham Way)>Thorpe Way>Wildmere Road>Banbury Gateway Retail Park. This scheme will explore the option of opening a bus-only route from Alma Road to Thorpe Way in order to provide bus journeys direct to the employment site. New bus stops will be introduced along the route.
- Undertaking feasibility work into the costs and benefits of routing buses through the pedestrianised town centre.
- Conducting, in line with the Banbury Masterplan, a comprehensive review of bus interchange facilities including the functionality of the bus station.
- Conducting, in partnership with bus operators, a comprehensive review of town wide bus services to identify short, medium and long term route changes (including any infrastructure requirements) to provide direct commercial bus routes from residential areas, via the town centre to the employment areas.
- Identifying suitable routes into and through the town centre.

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- Opening up Tramway Road as an access for cars into and out of the station car park and access to the Canalside development.
- Exploring opening Station Approach to through bus services via Tramway Road.
- Developing inter-urban services through enhancement of existing bus services or new services.
- Seeking funding from new development sites to ensure they are served by high quality commercial public transport services.

23. The Government's plans to electrify the rail line through Banbury will provide a catalyst for economic growth and will result in increased passengers at Banbury Rail Station. We will take advantage of the opportunities created by electrification, to revitalise the Rail Station and improve access to it.

24. Improvements to the Bridge Street junction, together with supporting public realm enhancements throughout Canalside, will provide greater connectivity to the railway station and the town centre, to accommodate trips associated with development in the area and promote sustainable access.

BAN3 - We will strengthen Banbury's position on the rail network through revitalising the railway station area and improving pedestrian, cycle and bus access to the station.

- We will work with our strategic partners to develop Banbury Station as a transport interchange. This is likely to involve re-designing the station forecourt to create an interchange that will feature a taxi rank; better cycle access and facilities (including secure cycle storage); an improved route to the station for people on foot, and improved public realm giving a sense of arrival.
- We will improve walking, cycling and public transport links to the station in order to meet future demand and to better connect the station to the town.
- Increase the variety of bus services passing the rail station, including exploring opportunities to route buses via Higham Way, and from Tramway Road to Station Approach.
- We will seek to maximise the opportunities national rail electrification proposals could bring to improving the transport networks, particularly at Bridge Street and around the rail station.

25. Walking and cycling will be promoted and encouraged for short trips in Banbury, through improvements to pedestrian and cycle infrastructure. As well as reducing car trips on the network, this will also promote healthy and active transport, as well as complement Oxfordshire County Council's Air Quality strategy. More information on our strategy for active travel in Oxfordshire can be found in Oxfordshire County Council's Active & Healthy Travel Strategy.

26. The current cycle network is fragmented and does not encourage cycling. In the medium/ longer term, a network of cycle routes will therefore be developed to serve those areas which are identified as having the greatest potential for an increase in cycling. In line with the Active & Healthy Travel Strategy, we will continue to work with developers of new residential and employment sites to provide facilities for pedestrians and cyclists to access key off-site amenities such as trips to work, school, and, as previously mentioned, access to the rail station.

BAN4 - We will work closely with Cherwell District Council and other strategic partners, and developers to provide facilities for pedestrians and cyclists and we will work to fill in the gaps in the walking and cycling network, including Public Rights of Way.

- Seek funding from new development sites to ensure they are served by high quality walking and cycling routes to off-site amenities.
- Conduct walking and cycling network assessment studies and prioritise improvements to deficiencies in the networks.
- As identified in the Cherwell Local Plan 2011 – 2031 (part one) seek new pedestrian and cycle bridges, as part of the Canalside development, crossing the Oxford Canal and River Cherwell which will connect the rail station to the town centre.

27. Residential Travel Plans and Workplace Travel Plans will be secured for all new developments that meet OCC's thresholds. Residential developers will be expected to support and promote sustainable travel options to new occupiers e.g. through personalised travel planning, whilst occupiers of employment sites will be required to implement a Workplace Travel Plan.

28. With the significant amount of employment proposed in Banbury, Delivery & Servicing Plans (DSPs) will also be an important tool for managing trips on the road network and protecting historic and sensitive areas. For example, DSPs will provide a mechanism for encouraging deliveries to take place outside of peak hours, and for larger vehicles to use designated routes.

29. We will work with HS2 Ltd to understand and identify means to mitigate the impact of the construction works associated with HS2 across North Cherwell, particularly at Banbury.

30. Construction Logistics Plans will also be required for development sites.

BAN5 - Travel Plans, Delivery & Servicing Plans and Construction Logistics Plans will be secured for all new developments that meet OCC's thresholds. Travel Plan/ DSP monitoring contributions will be secured.

- This policy supports delivery of the Sustainable Transport Strategy.
- We will seek mitigation from the impact of High Speed 2 (HS2) construction traffic across North Cherwell and Banbury.

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Scheme Delivery

31. Where transport schemes are needed to mitigate the impact of a particular development, provision of infrastructure and/or financial contributions will be secured from the developer.

32. This Area Strategy also identifies a package of transport measures that are required to mitigate the cumulative impact of development in Banbury. Developer contributions will therefore be sought towards schemes within the Area Strategy using a strategic transport infrastructure contribution rate to mitigate the cumulative impact of development. Additional funding for these strategic schemes may also be sought via the Local Enterprise Partnership and the Local Transport Board to the Local Growth Fund and other sources.

33. Major residential development sites are required to fund new or improved public transport services to key locations agreed with the County Council until they become commercially viable. Other residential sites will be required to make a public transport contribution towards improving bus services, including improved pedestrian/cycle routes to bus stops and cycle parking if appropriate, based on the size of the development.

34. Developments are also required to provide modern bus stop infrastructure, including shelters and Real Time Information, to enhance access to the public transport network. These are usually secured through Section 106 or Section 278 agreements.

35. When the Community Infrastructure Levy (CIL) is introduced by Cherwell District Council contributions will be sought via this new mechanism, as well as via S106 or S278 agreements.

BAN6 - Where schemes are needed to mitigate one particular development, the developer will be expected to deliver the infrastructure directly, or provide funding for the scheme. Where a scheme is required due to the impact of more than one development, each developer will be expected to make a contribution proportional to the scale of their impact. This will include contributions towards infrastructure improvements set out in Cherwell District Council's Infrastructure Delivery Plan for Banbury, as well as bus service enhancements and infrastructure improvements.

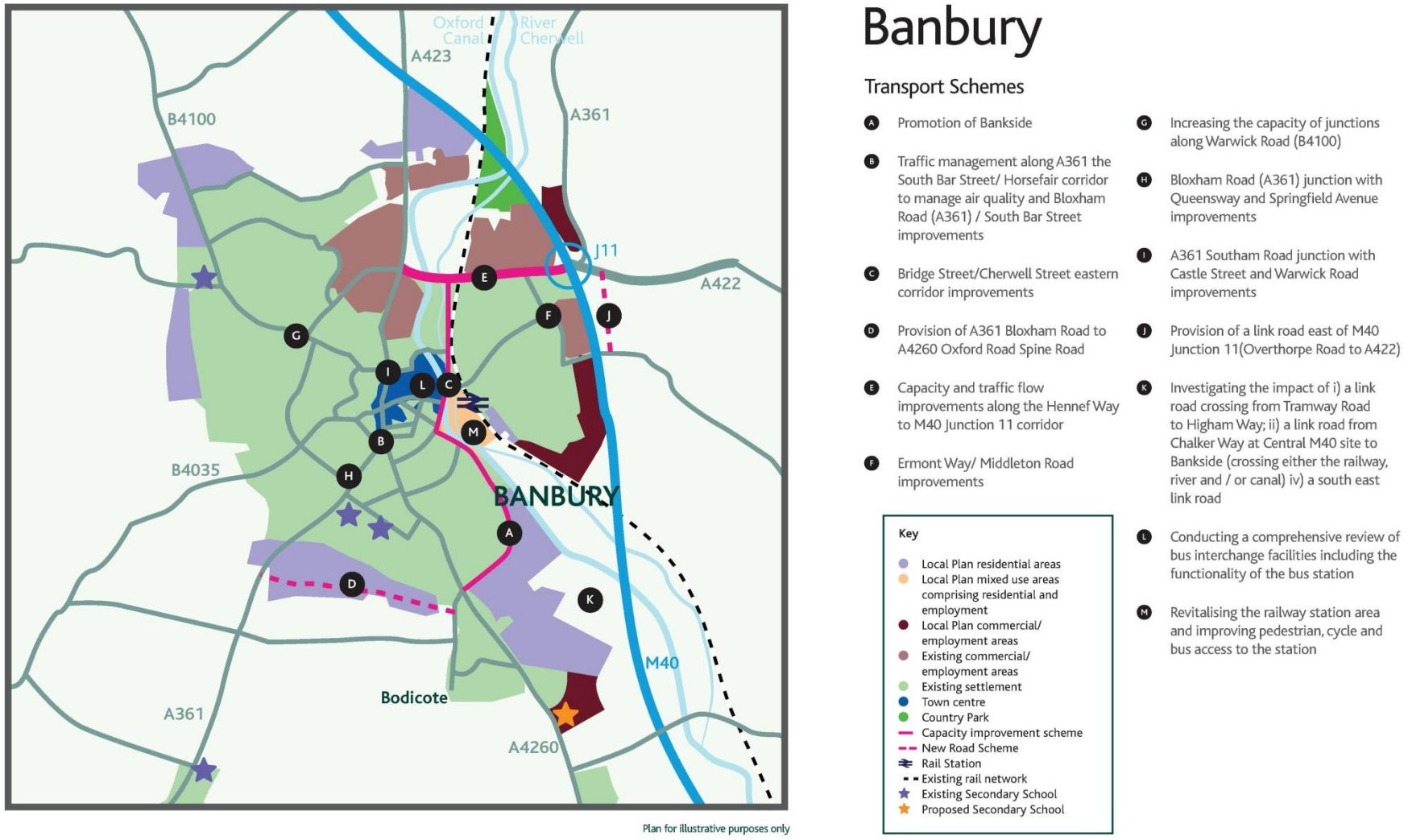
Oxfordshire County Council is working towards establishing a strategic Transport Contribution rate for developer funding, which will be adopted in a future update of this strategy.

36. This Area Strategy replaces previous strategies. Planning obligation

contributions, secured in order to mitigate the impacts of development, towards previous strategies will be able to be used to deliver the proposals in this strategy and be in accordance with the planning obligations.

Maps and Plans

37. The map below shows the key pieces of transport infrastructure required to deliver the proposed growth and investment in the area.



Banbury Figure 1: Indicative map of transport infrastructure and proposed growth in Banbury

Bicester Area Strategy

The Local Context

1. Bicester is one of the fastest growing economic centres in the country, with a population of approximately 33,000 people. Its economy is focused on storage, defence and distribution activities, food processing and engineering. Bicester Village shopping outlet is a significant UK tourist attraction, drawing in nearly six million visitors a year, including many from overseas. It benefits from good rail connections with London, which has been improved by a direct connection to London from Bicester Village Station as part of East-West Rail Phase One. Further improvements will come forward as part of East-West Rail Phase Two, which will connect Bicester with Milton Keynes, Bletchley and Bedford to the north and Didcot and Reading to the south.

2. The Oxfordshire Local Enterprise Partnership identifies Bicester as part of the Oxfordshire Knowledge Spine (Science Vale – Oxford – Bicester) and within the Strategic Economic Plan this is seen as a key driver for economic growth. Given its advantageous location on the transport network, which connects the town with Oxford, Science Vale and the wider south-east region, Bicester is identified for significant residential and economic growth. This is demonstrated through the expansion of Bicester Village, proposed business parks and employment sites allocated in the Local Plan, investment in the town centre as shown by the town centre redevelopment, and the shift to a low carbon community exemplified by North West Bicester eco development.

3. The adopted Cherwell Local Plan (July 2015) seeks to use this potential to deliver economic growth, supported by housing, with 138.5 ha of employment land and approximately 10,000 further new homes planned for Bicester. The Local Plan also sets out an ambition for Bicester to become a greener more pleasant place to live, work and visit as set out in the Eco Bicester One Shared Vision.

4. This strategy supports the *Cherwell Local Plan.* The Local Plan, together with the development of a *Bicester Masterplan* to be adopted as a Supplementary Planning Document (SPD), will provide the means to establish an integrated delivery plan for the growth of the town that respects its setting, meets the needs for a stronger economy, housing and community facilities and which helps deliver sustainable development. These documents promote an enlarged and vibrant town with a comprehensive range of employment opportunities and local amenities to complement its substantial role in the wider region's economy. The *Local Plan* stresses the importance of securing jobs-led growth in the town to address the critical employment shortfall and high levels of out-commuting.

5. The *Local Plan* will enable employment development on allocated sites, with the aim of creating a diverse economy that attracts growth and investment

from the business, manufacturing, science and hi-tech sectors. Amongst other sites, employment sites include the Bicester Business Park and South East Bicester that are expected to create up to 9000 jobs. Cherwell's Economic Development Strategy (2011-2016) highlights the current opportunities for Bicester to develop a low-carbon economy by developing green technologies and knowledge around existing and new employers, sectors and clusters to create a centre of expertise and potential competitive advantage. The *Local Plan* also seeks to strengthen the town centre and create additional green and recreational space.

6. Bicester has been awarded Garden Town status by the government, which will provide funding to help with the delivery of homes, jobs and open space as well as transport infrastructure. The transport infrastructure includes the exploration of the potential for a new motorway junction to the south of Junction 9, near to Arncott. Study work is needed to determine the impact of such a scheme and how it could fit within the overall transport strategy in the town and wider area. The study will also be carried out in the context of study work for the proposed Oxford to Cambridge Expressway being led by Highways England.

7. Enhancing access to the strategic transport network and making it easier for people to travel between homes and jobs is critical in accelerating and accommodating future growth in Bicester. Investment in core transport infrastructure, including the walking and cycling network and low emission vehicle technology, is one of the aspects that will boost the attractiveness and desirability of Bicester as a place where businesses want to locate and grow, and where people want to live and work.

Transport Strategy Aims

8. The priority for Bicester is to provide the transport infrastructure which supports the aspirations set out in the *Cherwell Local Plan* and the overall goals and policies of *Connecting Oxfordshire* as set out in volume 1 of the Local Transport Plan. This strategy needs to tackle the challenges identified in the *Bicester Movement Study* and the further technical reports prepared in support of the Local Plan. The principles of sustainable transport for Bicester were set out within the Supplementary Planning Document for North West Bicester as the trigger for modal shift across the town and have been worked up into a Sustainable Transport Strategy, which has been used to inform this overall transport strategy. Cherwell District Council has also commissioned a study to support the preparation of the future vision for Bicester Garden Town, working closely with local people to establish the tone, character and content of Bicester's emerging identity. These plans and policies will enable the town to thrive and realise its full growth potential, and its essential role in Oxfordshire's economy.

9. This strategy identifies a series of improvements to increase the overall capacity of transport networks and systems within the locality, enabling them to accommodate the additional trips generated by development; to adapt to

the cumulative impact of proposed development and to mitigate the local environmental impact of increased travel.

10. There is a need for a significant increase in the proportion of trips to be made by public transport, cycling and walking if the anticipated level of growth is to be accommodated. It is essential to provide high quality access to key locations by walking and cycling and the public transport network to secure business investment and encourage people to make Bicester their home. More details of our cycling strategy across the county can be found in our Active & Healthy Travel Strategy.

11. The Strategy has already seen initiatives implemented in Bicester. A new Railway Station to replace the Bicester Town Station was completed in October 2015, which sees frequent trains between Oxford and London. It makes way for a new East-West rail service which will provide a service east to Milton Keynes and Bletchley. In addition, a new Park and Ride site to the south west of Bicester off the A41 at Vendee Drive opened in November 2015. The site provides 580 spaces and has been built to help tackle congestion. Use of the Park and Ride car park is free of charge and is served daily by the Stagecoach S5 service, offering direct links to Bicester and Oxford.

12. Therefore Oxfordshire County Council will seek to:

- Increase highway capacity on the peripheral routes to make these attractive to employment and longer distance traffic and thereby reduce the strain on the town centre and central corridor.
- Implement a sustainable transport strategy within the town centre, enabling active and healthy travel options – e.g. walking and cycling links to and from residential areas and key destinations.
- Accommodate proposed strategic rail initiatives, including East-West Rail and plans for electrification, and a possible future Rail Freight Interchange, in order to strengthen Bicester's position on the national rail network and maximise access to regional economic centres, such as Milton Keynes, Oxford, Banbury, London and Birmingham.

A detailed delivery plan for future infrastructure programmes to understand the most appropriate phasing given the anticipated growth and resources will be important.

BIC1 – Improve access and connections between key employment and residential sites and the strategic transport system by:

- **Continuing to work with Highways England to improve connectivity to the strategic highway.** We will continue to work in partnership on the A34 and A43 strategies, as well as Junctions 9 and 10 of the M40 to relieve congestion, particularly in the peak periods, and connect Bicester into the Science Transit proposals to emphasise the town's attractiveness as an end destination, as well as accommodating trips to Oxford, Science Vale, Banbury, and other nearby centres (along the A41, A34, M40, A43).

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- **Investigating a new motorway junction as part of the Garden Town work.** This has been identified as a possible long term solution for strategic movements between the motorway network and the A41. Any impact on the area transport strategy will need to be identified, particularly any implications for the South East Perimeter Road (see below).

- **Reviewing key county road links out of Bicester, including those that cross the county boundary**. A review of whether the B4100 between Bicester and A43 is still fit for purpose will be undertaken including whether an upgrade is required from its 'B' road status. Similarly a review of A41 to Aylesbury and A4421 to Buckingham will also be undertaken in the context of Oxford to Cambridge Expressway work. In addition, Upper Heyford has been allocated for significant growth and a Development Framework is currently being produced that will consider improved connectivity with Bicester, whilst reducing impact on sensitive locations such as Middleton Stoney.

- **Investigating options for infrastructure improvements and bus priority** to enable greater reliability on the A41 corridor to/from Junction 9 to A41 Bicester Services roundabout. This will be in addition to the schemes to be implemented by Bicester Village's expansion and by the Graven Hill development, which will provide essential improvements to this corridor.

- **Delivering effective peripheral routes around the town.** This would enable the delivery of the sustainable transport strategy within the central area by providing a local distributor function as well as offering effective connections to strategic corridors for new residential and employment sites. Our overall plans for sustainable travel in the county are outlined in the Active & Healthy Travel Strategy chapter of LTP4. A package of phased improvements will be agreed alongside the introduction of the sustainable transport measures, including:

    - **Western peripheral corridor: realigning A4095 Howes Lane,** as part of improving the strategic western peripheral route for Bicester and to accommodate future growth including North West Bicester. This will include increasing capacity at the Howes Lane / Bucknell Road junction by the provision of a new tunnel under the railway and realignment of the connecting roads and junctions in order to maintain this as part of the strategic peripheral route corridor whilst enabling connectivity between the new development and the existing town. Improvements to the Lord's Lane / B4100 roundabout will also be required.

    - **Eastern peripheral corridor: upgrade to dual carriageway on the A4421 between the Buckingham Road and Gavray Drive** to complement the transport solution at the railway level crossing at Charbridge Lane and facilitate development in the area. This scheme will improve the operation of this section of the eastern perimeter road and enhance the integration of the North East Bicester Business Park site with the rest of the town. This will include improvements to the Buckingham Road / A4221 junction to provide the necessary capacity for the additional trips generated from nearby employment

and residential development, as well as support the heritage tourism development of the neighbouring Former RAF Bicester site.

- **Southern peripheral corridor: provide a South East Perimeter Road** to support the significant housing and employment growth in Bicester. In the longer term, link capacity issues along Boundary Way are assessed as being a major transport issue for the town. Land is safeguarded at Graven Hill for the section of road to the south of this site, joining the A41 at the Pioneer Road junction – this prevents development on the land that would be required, but does not remove the need for full assessment, justification and planning processes to be undertaken. This will need extending westwards to join the A41 north of M40 Junction 9. The preferred alignment for this extension has been approved as a connection from the Little Chesterton junction across to Graven Hill (see Bicester Figure 2). The solution will also include a new link through the South East Bicester development site from the A41 Pioneer Road junction up to Wretchwick Way, providing connectivity through the site, in particular for buses.

- **Investigating solutions to East-West Rail Phase 2 challenges.** More rail traffic means that there is more disruption to the road network where the two cross. A new rail bridge at Charbridge Lane is already being planned, but there are other challenges such as the rail crossing at London Road where options need to be developed further. We are:

  - **Working closely with the rail industry to deliver solutions at the Charbridge Lane level crossing affected by the East-West Rail Project.** A dual carriageway road bridge over the railway at Charbridge Lane is critical for this crucial part of the highway to remain open. We are working with the rail industry to deliver an effective solution that meets the overall transport strategy in terms of the peripheral route corridor and considers the impact on the village of Launton.

  - **Working closely with the rail industry and the Department for Transport to develop a solution to the likely restrictions affecting the London Road as a result of the East-West Rail project and national rail programme.** The increased rail traffic as a result of the significant rail network improvements will significantly restrict access at the London Road level crossing in the future. We are exploring options to identify a preferred solution to retain vehicular and pedestrian access at that crossing. The County Council will work with partners and central government departments to identify funding and establish a delivery programme for this preferred solution.

- **Supporting the proposals to secure a potential freight interchange at Graven Hill and working with the district and developers to achieve this.** This would reinforce Bicester as a distribution hub within the region's economy

and make a significant contribution to the future employment provision in Bicester, especially in the Graven Hill site, which in itself could provide 26 ha of employment land. The south east quadrant of Bicester is viewed to be the most appropriate area for B8 employment uses given the strategic road and rail access. The facility would also assist in removing freight traffic on the M40, A34 and A43, further reducing strain on the strategic road network and benefiting the environment.

13. Providing the above infrastructure and connections will be critical to attracting employment growth in Bicester, especially for the peripheral development sites. Effective transport links between the residential areas, employment sites and other facilities will facilitate economic growth, and provide more opportunities for people to live and work in Bicester, thus reducing the current level of out-commuting. The reduction in the length of people's journeys provides opportunities for them to use non-car modes of travel. Complementary investment in the town's bus, walking and cycling network will have an essential role in accommodating growth, encouraging sustainable travel choices, and raising the quality of the environment. Combining walking or cycling with bus/rail as outlined in the Door to Door section of the Active & Healthy Travel Strategy will be a key element of this.

14. A Sustainable Transport Strategy for Bicester has been developed by Cherwell District Council and has particularly concentrated on the cycle infrastructure improvements and changing travel behaviour towards more sustainable travel. The principles are embedded within this overall transport strategy.

15. Cycle-friendly measures must be incorporated into all new road schemes and new housing developments. It is essential that new developments are planned with cycling in mind and with facilities to make cycling both convenient and safe. This will link in with developing a connected, comprehensive cycle network across the town.

16. We will review walking networks and focus capital improvements on routes with the greatest potential for increasing the numbers of people walking, particularly where improving the pedestrian environment would support economic growth and reduce car use. We will also prioritise strategically important walking routes for maintenance.

17. Bus connectivity improvements may be required at anticipated pinch points within the town as future developments come forward. This will include connections between North West Bicester and the town centre.

BIC2 – We will work to reduce the proportion of journeys made by private car through implementing the Sustainable Transport Strategy by:

- **Significantly improving public transport connectivity with key areas of economic growth within Oxfordshire**, through access to high-quality, high

frequency services on the core network between Bicester, Oxford, Banbury, Witney and Science Vale, operating on a 'turn up and go' basis throughout the day; integrated connections between local bus services and services on the core network; and flexible, cashless payment, with the ability to switch between modes of travel without penalty or the need to make separate payments.

Where possible, we will encourage and support bus operators' proposals to develop innovative bus services and alternative routes, especially more direct and express services; for example a strategic bus link between south-east of Bicester and Oxford Eastern Arc.

- **Improving Bicester's bus services along key routes and providing improved public transport infrastructure** considering requirements for and integrating strategic development sites. Working with Bicester Town Council we will also enhance passenger information at strategic locations. The aim is to connect residential areas and transport hubs with existing and future employment centres including, but not limited to:

    - Graven Hill;
    - North West Bicester;
    - Launton Road Industrial estate;
    - Bicester Business Park;
    - South-East Bicester;
    - North-East Bicester;
    - Town centre; and
    - Bicester Village.

  Growth at Upper Heyford will also need to be considered in terms of improved public transport frequency and connectivity with Bicester.

  Bus connectivity improvements may be required at anticipated pinch points within the town as future developments come forward. This will include connections between North West Bicester and the town centre and consider the need for bus lanes along the A41 to connect with the Park and Ride scheme.

  This will be supported by using funding from development to enhance the quality and frequency of existing services, with the aim of services reaching full commercial viability.

- **Enhancing pedestrian, cycle and public transport links to the Bicester Village Station, Bicester North Station and key employment sites**. Sustainable access between the railway stations and business areas will also be improved and promoted to attract businesses to locate in Bicester. New employment should be located where there are effective, reliable, frequent and well-timed bus and rail services and safe and appropriate cycle access. Accessibility should be considered not only to and from the sites within the town itself, but also to key external destinations.

In particular, making use of the opportunities offered by the redevelopment of Bicester Village Railway Station to create a 'state-of-the-art' multi-modal interchange offering high quality facilities, including a cycle hub incorporating hire and repairs will be considered further. We will also improve the walking route between the station and the town centre, as well as creating a new walking route linking the station with Langford Village, the expanded Bicester Village outlet and the Kingsmere estate.

An essential element of mitigating Bicester Village's impact is to improve connectivity with the local area through walking and cycling route improvements to key destinations. This in combination with Highway and Public Transport Infrastructure improvements, such as the new Bicester Park and Ride, will reduce the local impact in the area.

Securing green links will be considered between proposed development sites on the outskirts of the town and existing Public Rights of Way, providing a series of leisure / health walks. We will also pursue opportunities to join a number of missing links in the Public Rights Of Way network through working with developers.

- **Implementing Bicester town centre highway modifications.** In combination with improvements to the peripheral routes, highway restrictions in Bicester Town Centre will be considered on through routes in order to reduce through traffic in the town centre, constraining it to the peripheral routes and promoting more sustainable travel options in the town. Radial connectors into the town centre will be assessed in terms of their role in the overall transport network and opportunities for providing improvements for sustainable modes of transport.

  A review of the purpose and impact of the Buckingham and Banbury Road chicanes will be undertaken to understand whether they have a positive impact on reducing town centre through traffic movements anymore, particularly for HGVs. If there is no clear benefit, they shall be removed.

  Public realm improvement studies will be progressed for Bicester Market Square and The Causeway to investigate enhancing the quality of the pedestrian environment by creating a sense of 'place'. This will complement the major investment in the town centre redevelopment and will be progressed once other developments impacting on the Market Square are completed.

- **The Bicester Sustainable Transport Strategy has identified a number of new sections of urban pedestrian and cycle routes** to better connect residential developments with the town centre and key employment destinations. This work and other strategy work has included the need for*:

  - Consideration of off road cycle facilities along key cycle routes;
  - Central Corridor pedestrian/cycle improvements along the A41, Oxford Road, Kings End, Queens Avenue;
  - Development of a preferred option for a pedestrian/cycle shared use facility

along Buckingham Road between its junctions with Field Street and Churchill Road. Options such as a shuttle working system under the rail bridge for vehicular traffic will be assessed, as the width of highway is constrained at this point;
- Churchill Road pedestrian/cycle improvements improving connectivity, particularly for Cooper School;
- The provision of an off-road cycle facility along Middleton Stoney Road to be assessed, as this route will become increasingly heavily trafficked in the coming years;
- A direct link from the centre of North West Bicester (Eco Town) to Bicester North Station and onwards to the Launton Road industrial estate;
- Improved cycle provision on the north side of Boundary Way to provide clear connectivity benefits;
- Options for relaxing the cycle ban on Sheep Street will be investigated as this could be a key route for cyclists, particularly between the two railway stations;
- Improved pedestrian connections to Graven Hill including A41 crossing options to reduce severance and increase the accessibility of this site;
- London Road pedestrian/cycle improvements, improving connectivity to Graven Hill;
- Improved provision for cyclists along Manorsfield Road;
- Investigating options for good quality connectivity to Launton Road employment destinations;
- Reviewing potential locations for additional cycle parking at key locations and bus stops, particularly in the town centre.

  * This is not an exhaustive list and other projects may come forward for addition to the Plan.

- **Progressing a Wayfinding Project for Bicester with the aim of improving signage across the town.** The current wayfinding signs in Bicester were introduced over 10 years ago. There is a mix of freestanding signs, map based signs and “finger” signs, both pole and wall mounted. These are often in poor condition, occasionally in the wrong place and expensive to update and maintain. Some are out of date and no longer adequate for their purpose. Inadequate signage creates a poor impression of the town centre, can be frustrating for those trying to navigate the town and does little to support businesses and tourism.

  However, good wayfinding can greatly enhance the visitors’ experience, can facilitate an increased number of visitors to key destinations within the town centre and can support local businesses which are of increasing importance to Bicester’s economy and regeneration. As a result, Bicester requires expansion of and where necessary updating of the existing signage for pedestrians and cyclists.

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18. The strategy supports the achievement of national carbon reduction targets by minimising the need to travel, and getting more people to walk, cycle or use public transport instead of driving, which not only reduces emissions, but also supports growth by helping to meet the overall demand for travel, and reducing congestion. We will also support the uptake of zero and low emission vehicles for both private and public transport.

19. The Eco Bicester Travel Behaviour Demonstration Project showed that working closely with a small number of adults to get them back into cycling was effective. The Bike Loan element of this project has now been taken on by the community through Bicester Green – the Centre for 'Sustainability, Skills and Second Hand Stuff'. It is clear that a combination of behavioural change, as well as physical improvements, is required to really make a difference. The Sustainable Transport Strategy is identifying ways to continue with influencing behaviour.

BIC3 – We will increase people's awareness of the travel choices available in Bicester, which should improve public health and wellbeing, by:

- **Undertaking travel promotions and marketing measures** to complement the wider Bicester Vision place-making initiatives to strengthen the town as a place to live, work and invest in commercial enterprises. With the Park and Ride and significant rail service improvements due to be available over the next few years, there is an opportunity to work collaboratively with others to promote these modes. Developer's Travel Plans will also offer the opportunity to increase the use of walking, cycling and public transport measures by increasing people's awareness of the travel choices available.

- **Developing a coordinated parking strategy in partnership with Cherwell District Council** to identify commuter parking areas and provide an appropriate balance of parking provision in the town and around the railway stations, including the quantity and location of short stay and long stay parking, as well as appropriate parking management and pricing mechanisms. This may require rationalising parking in some areas.

- **Discourage undesirable routeing of traffic by developing a signage strategy**, improving the directional signage on the town's road network by directing strategic traffic away from the town centre. This will alleviate congestion on the central corridor and enhance the quality of the environment in the town centre. It will also support Cherwell District Council's emerging Air Quality Strategy, which aims to tackle air pollution in the Kings End / Queens Avenue Air Quality Management Area.

- **Providing coordinated information and advance notice of construction closures and traffic related issues** will be needed to ensure that the town's transport network operates efficiently during the various improvement and building works. A strategic system of Variable Message Signs for Bicester could support this coordinated approach and so will be investigated. Such a system could also be used on event days in Bicester and coordination of the

use of the Park and Ride with Bicester Village.

- **Providing new approaches to transport through the North-West Bicester development site**, including a heavy emphasis on sustainable modes and travel choice advice, as well as early provision of bus services and cycle routes. This may unlock opportunities for wider travel choice options.

Funding

20. Due to the large scale of growth we will seek central Government funding where possible for the Bicester Area Strategy.

21. Where infrastructure schemes are needed to mitigate one particular development, the developer will be expected either to construct or provide funding for the scheme; where a scheme is required due to the impact of more than one development, each developer will be expected to make a contribution proportional to the scale of their impact, with a limit of five contributions towards any one scheme.

22. Major residential development sites are required to fund and provide new or improved public transport services to key locations agreed with the County Council until they become commercially viable. Other development sites will be required to make a public transport contribution towards improving bus services based on the size of the development and the sustainability of their location.

23. Developments are also required to provide modern bus stop infrastructure, including shelters and Real Time Information, to enhance access to the public transport network. These are usually secured through Section 106 or Section 278 agreements.

24. When the Community Infrastructure Levy (CIL) is introduced by Cherwell District Council contributions will be sought via this new mechanism, as well as via S106 or S278 agreements.

25. This Area Strategy replaces the Bicester Integrated Transport and Land Use Strategy – 2000 (BicTLUS). Planning obligation contributions, secured in order to mitigate the impacts of development, towards BicTLUS will be able to be used to deliver the proposals in this strategy and be in accordance with the planning obligations.

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BIC4 – to mitigate the cumulative impact of development within Bicester and to implement the measures identified in the Bicester Area Transport Strategy we will:

- **Secure strategic transport infrastructure contributions** from all new development

- Secure sustainable transport measures through all major new development. For large new or expanded housing development sites, the following principles for cycle provision apply:

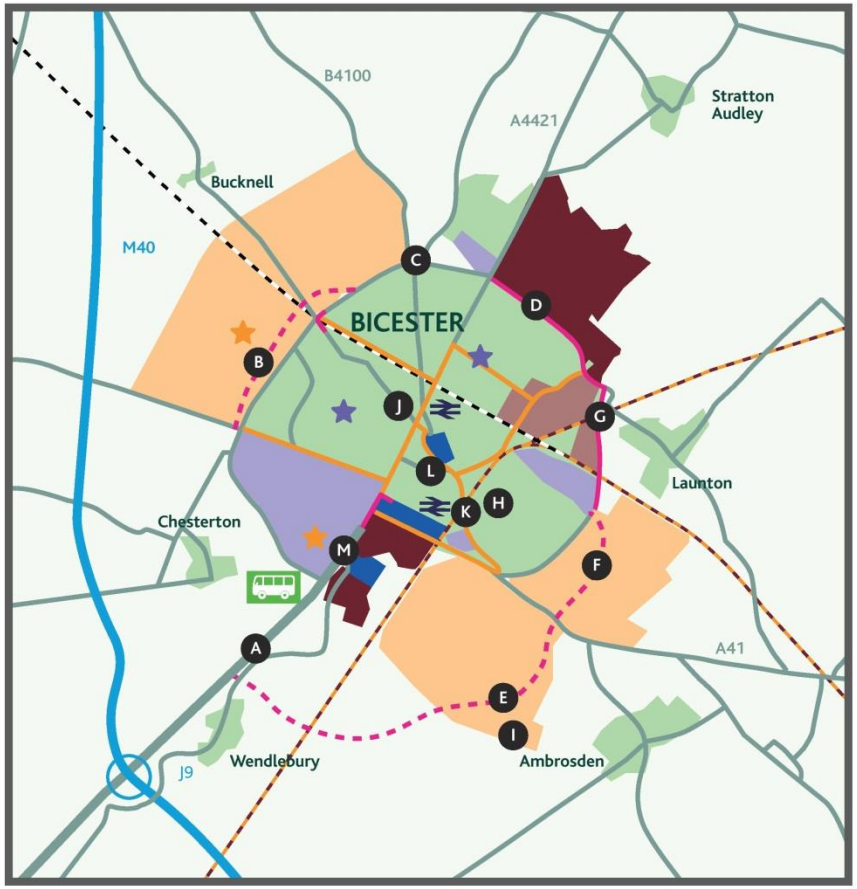
    a. Developers must demonstrate through masterplanning how their site has been planned to make cycling convenient and safe for cyclists travelling to, from, within and through the site
    b. Site road network and junctions must be constructed with cycling in mind, including providing space for cycling on main/spine roads through the provision of, as a minimum, advisory cycle lanes
    c. We will ask developers to fund cyclability audits, so that the local user view is incorporated into new cycle facilities.

For large new or expanded commercial developments, developers should demonstrate how their development has been planned for users cycling to the site. This should be 'to the door' and as a result should show how cycle parking will be located in the most convenient position.

- **Secure strategic public transport service contributions** for new or improved public transport services as well as bus stop infrastructure to support sustainable development.

Maps and Plans

26. The map below shows the key pieces of transport infrastructure required to deliver the proposed growth and investment in the area.

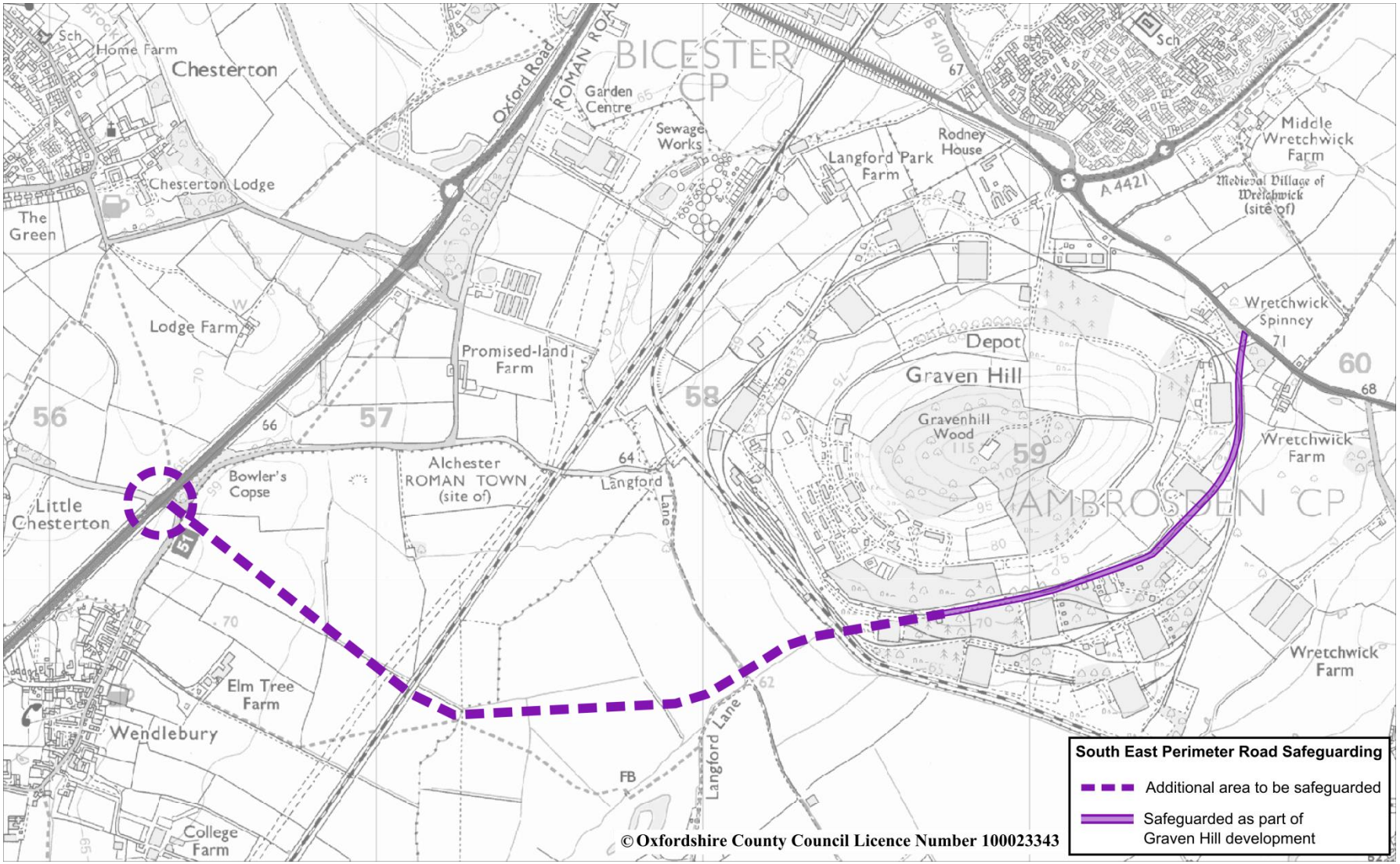


Bicester

Transport Schemes

- A A41 infrastructure improvements and bus priority
- B Western peripheral corridor: realigning the A4095 Howes Lane, including a new tunnel under the railway
- C Western peripheral corridor: improvements to Lord's Lane / B4100 roundabout
- D Eastern peripheral corridor: upgrade the A4421 to dual carriageway, between Buckingham Road and Gavray Drive
- E Southern peripheral corridor: a south east perimeter road
- F Southern peripheral corridor: a link through the SE development site
- G East West Rail phase 2: Charbridge Lane road bridge to replace level crossing
- H East West Rail phase 2: an alternative to the London Road level crossing
- I A potential freight interchange at Graven Hill - support proposals and work with partners to achieve this
- J Investigating bus connectivity improvements between North West Bicester and the town centre
- K Sustainable Transport Strategy (STS): Bicester Village Station multi-modal interchange
- L STS: public realm enhancements in Market Square and The Causeway
- M STS: pedestrian /cycle connectivity over barriers such as the A41

Bicester Figure 1: Indicative map of transport infrastructure and proposed growth in Bicester



Bicester Figure 2: Safeguarded alignment for the South East Perimeter Road

Carterton Area Strategy

1. Carterton, the second largest settlement in West Oxfordshire, is a relatively modern town which has grown, in the main, to serve RAF Brize Norton. It has a small but varied economy, largely focused around the provision of local services, and has been identified as a growth area by West Oxfordshire District Council, and Carterton Town Council with opportunities for both residential and employment growth.
2. The travel to work data from the 2011 Census indicates that 38% of all trips to work by residents of Carterton are to workplaces within Carterton. Of those internal trips, 45% travel by car, 30% by foot, and 20% by bicycle, indicating that Carterton is a small enough settlement for walking and cycling to be attractive travel options. Only 1% travel by bus, which may indicate routes are not serving the areas people live or work; or that other factors make bus use unattractive, such as car ownership, or timetable or cost implications of using the bus.
3. For residents that work outside of Carterton, there are strong trends for travel to employment at Witney and Oxford. For trips to Oxford, 75% are travelling by car (this would include those using Park and Ride facilities), whilst 17% are using the bus services. Travel to work in Witney is also dominated by car use at 73% of trips, compared to 14% using the bus, and 2% cycling.
4. The role of the Ministry of Defence (MOD) within Carterton is very strong with many local people associated with RAF Brize Norton. The MOD seeks to sustain the strategic importance of RAF Brize Norton, as the largest RAF base in the country through Programme Gateway – the RAF's plan for the future as the UK's Global Air Mobility hub. In recent years Air Mobility operations have consolidated at Brize through the transfer of C130 Hercules air transport operations and introduction of Voyager aircraft (undertaking air to air refuelling). This has led to an increase in activity at the base, which is likely to continue in the short term, with the introduction of A400M Atlas aircraft from 2014 to 2019.
5. West Oxfordshire's growth proposals as laid out in the district council's Pre-submission Draft Local Plan 2011-2031 (March 2015) comprise 2,600 new homes by 2031 in the Carterton sub area, including Strategic Development Areas to the east of Carterton (700 homes) and a net increase of about 200 homes REEMA Central (current military personnel housing area). The draft Local Plan also seeks to deliver a more attractive and vibrant town centre.
6. Carterton Town Council's emerging master plan for Carterton will focus on strengthening the employment offering in the town and local area, which will in turn, present greater opportunities to work and live in the Carterton area, thus reducing out commuting and the need to travel. The master plan will seek transport infrastructure and services to support regeneration initiatives, sustain the local economy and attract business investment.
7. The Carterton Area Transport Strategy will be revised following the adoption, by West Oxfordshire District Council, of the Local Plan. This chapter will continue to be reviewed in light of changes to overarching policy, and progress on schemes in the Carterton area.

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Transport Strategy Objectives

8. The key transport objectives for Carterton are to:
   - Establish a transport network that supports residential and employment growth, attracts economic investment and enables the operation of RAF Brize Norton;
   - Encourage people to access jobs and services by sustainable modes of transport by improving opportunities for people to travel on foot, by bike, and public transport;
   - Improve the environment of the town centre, and reduce the impact of traffic accessing the town centre.

9. This strategy divides travel demands at Carterton into three categories, which are discussed in turn:
   - Carterton's Strategic Transport Networks
   - Carterton's Local Transport Networks
   - Beyond Carterton

Carterton's Strategic Transport Networks

10. The routes between Carterton and the A40 are currently only of 'B' road standard. This results in military freight using unsuitable routes, particularly through Carterton town centre and local traffic using a variety of routes, of varying standard, to access Witney and the A40. Improving access to the A40 is therefore a key objective reflected in Proposal CA1 below.

Policy CA1 – To establish a transport network for Carterton that supports residential and employment growth, attracts economic investment and enables operation of RAF Brize Norton. The County Council will work closely with the District Council and key local partners to:

- **Improve the B4477** between Carterton and A40 at Minster Lovell, which includes provision of cycle premium route, and upgrade from B classification road to A classification. Complementary measures in the surrounding rural area may also be sought to support this scheme.
- **Promote west facing slip roads at A40/B4477 Minster Lovell junction**, to serve operations at RAF Brize Norton, and future employment growth.
- **Continue to work with RAF Brize Norton to establish the implications of Programme Gateway** on the existing transport network, to ensure new infrastructure is provided by the Ministry of Defence to enable its intensification of activity.

Carterton's Local Transport Networks

Public Transport

11. There are frequent bus services operating between Carterton, Witney and Oxford, including a service of approximately two buses per hour to Oxford Rail Station. The introduction, in July 2014, of a bus service from Carterton to Headington has improved access to the hospitals and Oxford Brookes University, although the attractiveness of this service to commuters is limited by the timetable. Whilst there is good patronage of bus services to Oxford and Witney, increasing the frequency and journey time will make these more attractive to users, which is essential to reducing reliance on private car, particularly for commuting. Consideration of cycle parking at main premium bus hubs between Carterton and Witney would encourage and enable Door to Door integrated travel for longer distances. See Active & Healthy Travel Strategy for more details of Door to Door travel.

Policy CA2 – To enable people to access jobs and services by public transport we will work with the District Council, bus operators and developers to make improvements to public transport and encourage its use by:

- **Improving the frequency of bus services between Carterton, Witney and Oxford**; including City Centre, Oxford rail station, hospitals and Oxford Brookes University;
- **Providing bus stops close to the RAF Main Gate**;
- **Improving the environment and quality of bus stops** along these routes, pedestrian and cycle paths to them and the facilities available such as cycle parking.

Walking & Cycling

12. Walking and cycling are the most sustainable and non-polluting forms of travel. It is recognised that Carterton already has good levels of walking and cycling for cross town journeys. Maintaining the attractiveness of walking and cycling is a key challenge as Carterton's population grows. In some locations within Carterton, poor quality surfaces, personal safety concerns and lack of directional signage deter walking and cycling. Ensuring high quality walking and cycling routes throughout the town is essential to enabling people to travel sustainably. Cycle networks linking the town to Witney and nearby villages could also be improved to enable cycling to work and for leisure, (also see updated Cycle Strategy within the Active & Healthy Travel Strategy chapter).

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Policy CA3 – the County Council will improve facilities for pedestrians and cyclists focusing on enhancing links between homes, employment and the town centre. Improvements will include:

- **a high quality cycleway from the employment and residential areas in the north and east** of the town to Carterton town centre via Brize Norton Road;
- **high quality cycle links from the west** of the town to the town centre;
- **establishing a network of high quality local cycle routes** throughout Carterton;
- **work with RAF Brize Norton to improve traffic flow for all modes at RAF Brize Norton's Main Gate** including pedestrian and cycle routes;
- **support for the redevelopment of Ministry of Defence housing stock** within Carterton to provide excellent pedestrian access throughout the redeveloped site and clear pedestrian links to facilities across the town, including, where financially practical, the removal of the Upavon Way pedestrian subway;
- **providing a high quality cycle premium route between Carterton and Witney** as part of the B4477 improvement scheme; and
- **seeking funding from new development sites to ensure they are served by high quality walking and cycling routes to off-site amenities**, including cycle parking and improved walking and cycling routes for popular bus hubs

13. Carterton Town Council is working on a masterplan for the town. The main aims are to promote retail and service growth by improving the environment in the town centre including reducing the impact of traffic, whilst maintaining access. On completion of the strategy the County Council will review the transport issues that are highlighted.

Policy CA4 – To improve the environment of the town centre, and reduce the impact of traffic accessing the town centre the County Council will work with the District Council, Town Council, key local partners and developers to secure improvements to:

- **reduce queuing traffic and improve the environment in the town centre**;
- **discourage undesirable routing of traffic** by improving directional signs and traffic calming measures.

Beyond Carterton

14. Congestion on the A40 to the east of Witney causes very lengthy delays for journeys to and from Oxford (and other eastern locations) at peak times. This impacts on the ability of local businesses to achieve growth, and makes Carterton a potentially less desirable place for new businesses to locate. Bus services are vulnerable to delay because of congestion within Witney, through Eynsham and approaching Oxford on the A40.
15. Improving journeys by all modes on the A40 in Oxfordshire is vital to serving the residents and economy of West Oxfordshire as well as operations at RAF Brize Norton. A long term strategy for the A40 is under development which will look at the potential role of public transport improvements, increased highway capacity and/or traffic management improvements.
16. In the short term, there are a number of schemes currently part of the county's delivery plan which will offer some improvements to capacity on the A40. Most recently, the County Council has been successful in a bid to the Local Growth Fund for £35m in funding to deliver public transport improvements in the A40 corridor. This is discussed further in the A40 Route Strategy chapter.

Funding

17. Funding for the Carterton area strategy will be largely secured from developer contributions using the strategic transport infrastructure contribution rate.
18. The Carterton area strategy identifies a package of transport measures (excluding public transport) that are required to mitigate the cumulative impact of development across the Carterton area, where the impact of development is not attributable to a single development.
19. The level of contributions has been calculated based on the scale of funding required for the identified transport infrastructure necessary to support growth at Carterton and the quantum of planned growth. This approach has been taken to ensure contributions are directly related to the development; and fairly and reasonably related in scale and kind to the development. The contribution rate will be reviewed as the planned housing growth or infrastructure requirements change. Funding will be sought from both allocated development sites and speculative or windfall development sites.
20. The Strategic Transport Contribution does not include direct mitigation measures, which will be sought separately.

Policy CA5 – To mitigate the cumulative impact of development across the Carterton area and implement the transport measures identified in the Carterton area strategy we will:

- **Secure strategic transport infrastructure contributions** from all new development based on the contribution rate per dwelling or per m2 for non-residential developments.

21. Every development site will be required to fund improvements to public transport services and infrastructure serving Carterton in order to mitigate the cumulative impact of development, including development sites that are not allocated in the Local Plan and sites that are considered speculative.

Policy CA6 – To mitigate the cumulative impact of development across the Carterton area and implement the public transport measures identified in the Carterton area strategy we will:

- **Secure strategic public transport service and infrastructure contributions** based on the contribution rate per dwelling or per m2 for non-residential developments.

22. In addition to developer funding, funding may also be sought via the Local Enterprise Partnership and the Local Transport Board to the Local Growth Fund and other sources.

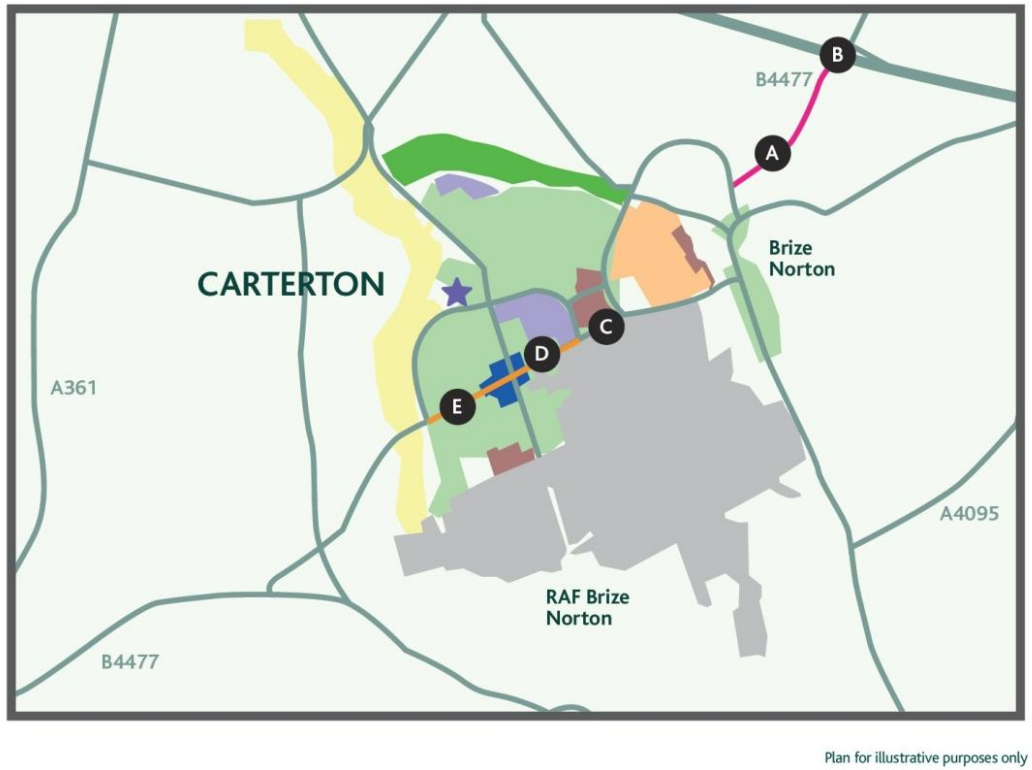
References

RAF Brize Norton Programme Gateway

http://www.raf.mod.uk/rafbrizenorton/organisation/proggateway.cfm

WODC Local Plan 2031 (March 2015)

http://www.westoxon.gov.uk/residents/planning-building/planning-policy/local-development-framework/local-plan-2031-examination



Carterton

Transport Schemes

- **A** Improve the B4477 between Carterton and A40 at Minster Lovell, which includes provision of cycle premium route, and upgrade from B classification road to A classification
- **B** Promote west facing slip roads at A40/ B4477 Minster Lovell junction
- **C** Providing bus stops close to the RAF Main Gate
- **D** A high quality cycleway from the employment and residential areas in the north and east
- **E** High quality cycle links from the west

Key

- Local Plan residential areas
- Local Plan mixed use areas comprising residential and employment
- Existing commercial/employment areas
- Existing settlement
- RAF Brize Norton
- Shill Brook Valley conservation target area
- Country park
- Town centre
- Capacity improvement scheme
- Cycle Improvement
- Existing Secondary School

Carterton Figure 1: Indicative map of transport infrastructure and proposed growth in Carterton

Science Vale Transport Strategy

Local Context

1. The Science Vale area strategy is focused around the UK's leading centres for science, technology and innovation at Harwell Campus, Milton Park and Culham Science Centre and includes the fast growing settlements of Didcot, Wantage and Grove. Figure 1 shows the Science Vale area.

2. Although Science Vale does not include Abingdon and Wallingford, this strategy does contain some schemes to recognise the interaction of Science Vale with these towns, with many trips being made into Science Vale for work and leisure.

3. Science Vale is already one of the most successful areas of science-based industry in the country. The area has a high concentration of employment in industries such as research and development, publishing, education and hi-tech manufacturing activities such as motor vehicles and IT, reflecting the presence of some large and prestigious employers in these industries.

Employment and Housing Growth

4. South Oxfordshire Core Strategy 2027 (adopted December 2012) and the Vale of White Horse Local Plan 2031 Part 1: Strategic Sites and Policies (published November 2014) outline the need to deliver up to 20,000 new jobs, principally at the main employment centres of Harwell Campus, Culham Science Centre and Milton Park.

5. Employment growth is also supported by the Oxfordshire Local Enterprise Partnership Strategic Economic Plan, which recognises Science Vale as being part of the 'Oxfordshire knowledge spine.' In particular it notes that the area provides high value research infrastructure, particularly at Harwell Campus and Culham Science Centre, supporting high-tech and science related job growth. This growth is facilitated by the Science Vale Enterprise Zone covering 64 hectares (ha) within Harwell Campus and 28ha within Milton Park. Development within the Enterprise Zone will generate income for the Local Enterprise Partnership (LEP) for investment in infrastructure to support wider economic growth in Oxfordshire. We are working with partners to

implement the projects and workstreams identified to support the enterprise zone. Our role is predominately leading projects around transport, skills, inward investment, and broadband.

6. In late November 2015 the Chancellor announced that the Science Vale area will get a second Enterprise Zone – called the Didcot Growth Accelerator. The area covered is 95ha and covers sites around northwest Didcot including Didcot A and Milton Gate service area. The district councils will be able to keep the business rates from the second Enterprise Zone; this means there will be more money available to spend on infrastructure across the whole of the Science Vale area around Didcot, and extending out to Grove and Wantage.

7. Concerning future housing growth, the Oxfordshire Strategic Housing Market Assessment (SHMA) was published in April 2014. The aim of the SHMA is to help local planning authorities understand how many homes will be needed in the period 2011 – 2031. It identified that between 725 and 825 homes are needed per year in South Oxfordshire and 1,028 homes per year are needed in the Vale of White Horse District. Each District Council is planning for the provision of additional homes as part of updating their Local Plans, however this roughly equates to 20,000 new homes across the Science Vale area.

8. In early December 2015 the Housing and Planning minister announced that Didcot is to become a Garden Town, which will help with the delivery of 15,000 houses and 20,000 high-tech jobs.

9. Transport modelling work has been undertaken to assess the impact future developments have on the Science Vale transport network. With the amount of growth proposed a number of schemes are required, working as a package, to collectively mitigate the cumulative impact of that growth and support the continued success in delivery of high value jobs growth within the Enterprise Zone.

10. Our main focus is to create the conditions to facilitate residential and employment growth, ensure that the transport network can continue to operate efficiently, promote sustainable travel and create a thriving, attractive place in which to live and work. Expansion of the science and technology business and creation of attractive town centres that offer good local services and amenities are essential to achieving this.

11. Effective partnership working with the public and private sector including Highways England, bus and rail operators, Network Rail, North Wessex Downs Area of Outstanding Natural Beauty, District, Town and Parish Councils, and businesses, will be essential to deliver the vision and transport aims for the area.

12. In particular, we are working closely with the District Councils to agree a shared vision for growth set out in their Local Plans and supporting documents such as the Science Vale Area Action Plan and supplementary planning documents. This includes working with them to evaluate the transport impacts of the additional housing growth identified by the SHMA. A number of transport infrastructure improvements are likely to be needed to support additional housing allocations. This will also include collecting S106 contributions/CIL from developments to ensure they mitigate their impact on the strategic transport network.

Connecting Science Vale to wider Oxfordshire and beyond

13. To support planned growth it is vital that new and improved transport infrastructure is provided as well as measures to encourage and facilitate sustainable travel. Movement within Science Vale and connections with the rest of Oxfordshire's transport network also need to be efficient and reliable. High quality, efficient transport links along what is known as the Knowledge Spine which connects Oxford, Science Vale and Bicester are also essential. This is where existing science and technology industries are focussed and where there is the greatest development potential for both employment and housing growth. Connectivity along this corridor will also be supported through development of technology and innovation, with new measures supported by the Science Transit Strategy.

14. Excellent access to international gateways is also vital. Fast, reliable access to Heathrow Airport, Gatwick Airport and international rail at London St Pancras is a critical factor in attracting investment and growing the knowledge sector business in Science Vale. Didcot Parkway station, as the main transport hub for the area, has a key role in achieving this.

Transport Aims

15. The transport priorities for Science Vale are to improve access to Culham Science Centre and the Enterprise Zone sites at Milton Park, Didcot and Harwell Campus for international, national and local travel, to enable

economic growth at other key employment sites in the area, to plan ahead to manage the impact of future housing growth on the transport network, and to improve connectivity between employment, services and areas of housing growth.

To achieve this we will improve:

- access to strategic road and rail networks;
- opportunities for sustainable travel, on foot, by bike and using public transport (including combinations such as cycling to a bus stop to catch a bus) to help to deliver a real step-change in the provision of alternative modes of travel to the car;
- journeys across Science Vale;
- the capacity, resilience and reliability of the transport network for all modes of travel;
- connectivity between employment, services and housing;
- journeys between Didcot and the Enterprise Zone locations; and
- trips within Didcot to town centre facilities and amenities;

16. The proposals described in this chapter will be implemented at different stages of the Local Transport Plan period 2015 – 2031. These timescales are influenced by a number of different factors and may be subject to change.

Strategic Transport

The Highway Network

17. Reliable access to and along key routes such as the A34 is crucial to support the global nature of businesses within Science Vale. The A34 provides essential access to Birmingham, Heathrow, and the ports at Southampton. We are working closely with Highways England in the development of their route-based strategy covering the full length of the A34, to ensure that it provides the capacity improvements needed to deliver growth in Oxfordshire.

18. In Science Vale, significant investment has already been made to improve key junctions of the A34 to enhance access to the area and connect businesses to the trunk road network includes schemes at Milton Interchange and Chilton Interchange.

19. In addition, a scheme to provide south-facing slip roads at Lodge Hill Interchange, in Abingdon, is being pursued. The Vale of White Horse District Council's emerging Local Plan 2031 proposes 1,000 new homes to the north of Abingdon. The transformation of Lodge Hill into a full movement interchange will help to accommodate additional traffic generated through housing growth, improve accessibility and connections to the trunk road network, and help to alleviate congestion in Abingdon town centre.

20. As part of the Oxford Transport Strategy we are also evaluating the feasibility of providing new Park and Ride sites on routes approaching Oxford, to enable more people to travel into the city by bus and reduce congestion on key routes. Lodge Hill Interchange is a potential location for a new Park and Ride site. Measures to improve public transport access to Oxford are described in more detail in the Oxford Transport Strategy chapter of LTP4.

21. With economic growth, particularly in and around Didcot, there will also be increased freight traffic on certain roads. We will seek to ensure that freight uses the most appropriate routes as outlined in Oxfordshire's *Freight Strategy* and Oxfordshire Lorry Routes map, and that development plans leading to increased freight movements are appropriately mitigated. We will also ensure that recommended freight routes are clearly sign posted.

Public Transport

22. Strengthening the public transport networks between Science Vale, Oxford and other important centres of employment is essential to enable the vision for Science Vale to be achieved.

23. At Didcot Parkway station a new transport interchange has created a modern transport hub for Didcot and Science Vale. The new interchange has additional pedestrian space, a larger bus station, two-tier cycle parking, Brompton Dock cycle hire, a taxi rank, drop-off zone and disabled parking.

24. Our ambition is for Didcot Parkway station to be further transformed into a 'state of the art' multi-modal interchange and gateway to the area.The masterplan for the station envisages a new pedestrian / cycle entrance north of the railway, additional platforms, a larger station building, and increased car parking, including a multi-storey car park. This will support the plans for regeneration of Didcot town centre, including the adjacent Gateway development site.

25. Improved rail services are key to improving journeys to connect to rail services from London and airports at Heathrow, Birmingham and Gatwick as well as the growth areas of Oxford, Milton Keynes and Reading.

26. Partners in Science Vale are keen to improve the first impression that people have of Didcot when arriving by train. There are plans to redevelop the area opposite Didcot Parkway station so that a welcoming gateway to Didcot and Science Vale is created. Proposals include a public square and a mixed use development including a hotel, serviced apartments, office, retail, restaurant, nursery and residential units.

27. Culham Science Centre benefits from Culham Station being close to the site. Full utilisation of this by Culham Science Centre and the rail operators is key to support and enable economic growth. Improved services with better station integration will achieve this.

28. As part of our Science Vale and Science Transit strategies, our ambition is to provide a new railway station / interchange at Grove. This will help to serve and meet the needs of new development across the western Vale area, and ensure the future ambition of connecting Wantage and Grove with Didcot, Swindon and beyond.

29. These ambitions are also reflected in the county's Bus Strategy and Rail Strategy documents.

Proposal SV 1 – We will work with partners to improve access to the strategic road, rail and bus network by:

Timescale	Proposal	
2015 - 2020	**SV 1.1**	**Delivering access and journey reliability improvements at Milton Interchange.** To improve capacity, relieve congestion and accommodate additional traffic from planned development.
	SV 1.2	**Delivering north-facing slips at Chilton Interchange to provide a full movement junction.** To enable more direct access to and from Harwell Campus from the A34, helping to attract investment.
	SV 1.3	**Delivering south-facing slips and investigating the provision of a new Park & Ride and bus priority measures at Lodge Hill Interchange, Abingdon.** The provision of a full movement interchange will improve capacity and accommodate additional traffic from potential future development. A new Park & Ride will enable more trips into

		Oxford to be made by bus and alleviate congestion on Oxford's approach roads.
	SV 1.4	**Developing Didcot Parkway station into a 'state-of-the-art' multi-modal interchange,** to meet demand from new development and improved rail services. This includes a multi-storey car park, station access from the north, grade separation and a new station building.
	SV 1.5	**Working with Network Rail and other partners to support the overhead electrification of the Great Western Mainline.**
	SV 1.6	**Providing clear signage across Science Vale** and establishing a clear hierarchy of routes to assist with way finding for all modes of transport.
Beyond 2020	**SV 1.7**	**Promoting the provision of a station at Grove**, working with partners as part of a wider proposal to improve rail connectivity with Didcot and neighbouring areas, such as Swindon and Bristol, and in the longer term with East-West Rail to Milton Keynes.
On-going throughout the plan period 2015 – 2031	**SV 1.8**	**Promoting an improved level of rail service at Didcot Parkway,** seeking a minimum of four trains per hour to Oxford and Bicester, and securing future direct services to Birmingham and Heathrow airports as new rail infrastructure comes forward.
	SV 1.9	**Promoting greater presence, accessibility and an improved level of rail service at Culham Station.** To improve accessibility for the local area and Culham Science Centre and to encourage further business investment.
	SV 1.10	**Promoting an improved and fully integrated public transport system with bus priority measures,** linking Science Vale with innovation hubs and research locations in Oxford, in accordance with Science Transit and the Oxfordshire Bus Strategy.
	SV 1.11	**Promoting the efficient transport of freight,** using the most suitable routes as outlined in Oxfordshire's Freight Strategy and Oxfordshire Lorry Routes map.

Supporting growth across the Science Vale area

30. People need to be given a real choice about how they travel so that additional travel demand associated with growth can be met across a range of modes of

transport. We will promote and enable active, healthy and sustainable travel and provide more opportunities to enable people to walk, cycle and use public transport.

31. As part of this, a substantial upgrade and expansion of the cycle network is required to provide an attractive and safe alternative to driving within Science Vale. We have therefore produced the Science Vale cycle strategy (see Annex 1) in accordance with the Oxfordshire Cycling Strategy (an element of the Active & Healthy Travel Strategy), setting out the vision for improvements to the cycle network. This network is based around strategic corridors linking the main towns, housing developments and Didcot Parkway station to key employment sites. Schemes will include improvements to existing cycle routes, as well as developing new high quality cycle routes. Strategic cycle corridors in Science Vale are outlined in figure 2. More details of the specific proposals are in the Science Vale Cycling strategy.

32. The Oxfordshire Bus Strategy outlines the overall vision for the bus network county-wide. Bus service and infrastructure improvements discussed in this chapter are part of this wider strategy for Oxfordshire. Public transport will be significantly improved and bus priority measures implemented. This will provide high quality, high frequency bus services linking Didcot Parkway station with major Science Vale residential and employment sites, as well as connecting to other towns outside of Science Vale. The indicative strategic public transport routes and proposed bus priority routes required to support development in the Science Vale area can be found in the Bus Strategy.

33. In addition, highways schemes to provide extra capacity and accessibility on key routes to Harwell Campus, Milton Park and Culham Science Centre will offer route choice and travel options between homes and workplaces, helping to spread the impact of increased traffic on the roads.

34. The Science Vale transport strategy contains a key new scheme, involving a proposed new road from north Didcot to Culham Science Centre; this will require the implementation of an additional Thames river crossing. It will provide improved access to Culham Science Centre and a direct link to the B4015 (north of Clifton Hampden). This scheme will also better connect Science Vale and the major employment areas of Oxford in the Eastern Arc. This route will also provide some relief to the A34 for local movements as well as network resilience. Improvements to access to Culham Science Centre through increased connectivity by bus and cycle and improved capacity at Culham station are also important.

35. The following additional schemes are seen as a priority to improve connectivity between new growth areas, key employment sites and residential growth areas.

Proposal SV 2 – We will work with partners to improve journeys across the Science Vale area, connecting new homes with jobs and service centres, by better connecting Didcot, Wantage & Grove, Abingdon, and Wallingford with Milton Park, Harwell Campus and Culham Science Centre through:

Timescale	Proposal	
2015 - 2020	**SV 2.1**	**Delivering cycle route upgrades and maintenance on the existing network**. This includes the provision of new routes, new substantial infrastructure (including bridges), branded signs and marketing measures to provide a high quality, safe and attractive network.
	SV 2.2	**Securing new strategic bus services and associated infrastructure** between major residential sites at Didcot, Wantage & Grove, Wallingford, Abingdon, town centres / retail and the employment sites at Milton Park, Harwell Campus, Culham Science Centre, and Oxford. A minimum of two buses per hour during the morning/evening peak travel periods is required to provide a credible level of service.
	SV 2.3	**Securing improvements to existing bus services and associated infrastructure** between Oxford, Didcot, Wantage & Grove, Abingdon, Wallingford and employment sites in Science Vale.
	SV 2.4	**Strengthening public transport links from Didcot Parkway** through improved bus connections, including segregated priority sections of route, to improve bus reliability and journey times. Bus priority measures will be investigated on the A4130 from Science Bridge into Didcot, through the Valley Park development site located to the west of Didcot; and between Wantage & Grove, Milton Park and Didcot via Steventon.
	SV 2.5	**Delivering the Wantage Eastern Link Road** to support developments in Wantage and Grove and provide relief to central Wantage.
	SV 2.6	**Delivering Science Bridge and widening of A4130** to provide relief to Manor Bridge and support/enable development in the area including Didcot A, NE Didcot, Valley Park and NW Valley Park..

	SV 2.7	**Completing the A4130 Didcot Northern Perimeter Road part 3** (NPR3), to relieve congestion on local roads, and to improve access to Didcot from the east. Supports and enables Ladygrove East development.
	SV 2.8	**Delivering Harwell Link Road section 1 (B4493 to A417) and Harwell Link Road section 2 (Hagbourne Hill)** to improve access and connections to Harwell Campus and Didcot, reduce congestion on the local network, and protect villages from unnecessary through traffic. Supports and enables Valley Park development.
	SV 2.9	**Improving Harwell Campus entrance** to facilitate additional trips into/out of the site (at the three main entrances on the A4185) and supplement the improved Chilton Interchange.
	SV 2.10	**Delivering improvements along the A417 corridor** to address congestion, safety and the conflict between the volume of traffic, east-west travel, and access to the villages along this route. Elements of the strategy include junction improvements, bus stop infrastructure, footpath and cycleway improvements and speed limit reviews.
	SV 2.11	**Delivering improvements at Steventon traffic lights at the A4130 / B4017 junction and improvements to Featherbed Lane.** To remove the 'bottle-neck' and improve journey times to the A34, Milton Park, other Didcot employment sites and to Wantage & Grove.
	SV 2.12	**Reducing congestion at Rowstock roundabout** through measures to increase capacity of the junction.
	SV 2.13	**Delivering improved Access to Culham Science Centre (CSC) Phase 1 (new road from CSC entrance to the B4015 north of Clifton Hampden)** to improve connectivity between Science Vale and the Eastern Arc of Oxford and direct access to CSC.
	SV 2.14	**Promoting schemes to provide relief to villages** within Science Vale which are affected by high levels of through traffic.
2021 - 2025	**SV 2.15**	**Providing improvements to the A4130 between Didcot and Wallingford** to reflect the volume of trips between the two towns. The ability to move reliably and safely along this corridor is important, particularly in helping to support planned employment growth in Science Vale.

2026 - 2031	**SV 2.16**	**Delivering improved Access to Culham Science Centre (CSC) Phase 2 - new river crossing (between Didcot and CSC)** to improve connectivity between Science Vale and the Eastern Arc of Oxford and direct access to CSC. This scheme also increases capacity for north/south movements across southern Oxfordshire and reduces pressure on the A34, whilst increasing network resilience across the Thames floodplain.
	SV 2.17	**Delivering capacity improvements on the B4015 between Access to Culham Phase 1 and the A4074** to improve connectivity between Science Vale and the Eastern Arc of Oxford.
	SV 2.18	**Delivering capacity improvements at the Golden Balls Roundabout** (junction of A4074 and B4015) to improve connectivity between Science Vale and the Eastern Arc of Oxford.
	SV 2.19	**Delivering capacity improvements on the A4047 north of Golden Balls roundabout** to improve connectivity between Science Vale and the Eastern Arc of Oxford.
	SV 2.20	**Promoting capacity improvements to the A338 /A415 Frilford lights junction** to improve accessibility between Wantage, Grove and Oxford.
On-going throughout the plan period 2015 – 2031	**SV 2.21**	**Promoting the use of sustainable transport by providing strategic cycle routes (see paragraph below)** and reducing single occupancy car use for the journey to work through undertaking travel promotions and marketing measures, particularly with partners at Milton Park, Culham Science Centre and Harwell Campus.
	SV 2.22	**Providing new and substantially upgraded strategic cycle routes** to Milton Park, Harwell Campus and Culham Science Centre through the Science Vale cycle strategy
	SV 2.23	**Securing safe and attractive walking and cycling routes as part of planning for new developments.**
	SV 2.24	**Establishing links from new development to Public Rights of Way.**
	SV 2.25	**Establishing a bus route between Grove, Wantage, Milton Park and Didcot.**

	SV 2.26	**Promoting improved sustainable access to Culham Science Centre** through enhanced bus connections and improved cycle routes to Abingdon and Didcot.

Trips within Didcot to town centre facilities and amenities

36. To attract new residents to the area, Science Vale needs to provide a high quality of life by being an attractive place to live, with good access to vibrant town centres providing a wide range of facilities and services.

37. This section focuses on Didcot to reflect the significant scale of the changes that will be happening in Didcot in the coming years. This includes the regeneration of the town centre, extensive housing and employment growth, and the redevelopment of Didcot Parkway station and the Gateway area.

38. Good transport links to access the town centre, as well as provision for active travel and sustainable travel options will enable Didcot to grow. This will be achieved through the following schemes:

Proposal SV 3 – To improve local connectivity across and to Didcot facilities and amenities by:

Timescale	Proposal	
2015 - 2020	**SV 3.1**	**Ensuring appropriate bus access, infrastructure and service patterns to complement plans for new development and suitably serve key destinations in Didcot town centre** including Didcot Parkway station, the Orchard Centre and Broadway.
On-going throughout the plan period 2015 – 2031	**SV 3.2**	**Securing the delivery of capacity improvements at Jubilee Way roundabout,** to improve access to the town centre and support the on-going vitality of the Orchard Centre.
	SV3.3	**Central Didcot Transport Corridors (Jubilee Way to Science Bridge and the Broadway**) to transform the transport corridors through central Didcot, prioritising space for public transport, cyclists and pedestrians, address pinch point junctions and improve linkages between new development sites, the rail station and the town centre.
	SV 3.4	**Pedestrian and cycle network enhancements**

		providing improved routes with better signage to the town centre and Didcot Parkway together with better facilities at employment and residential sites, to encourage the use of sustainable, active modes of travel.
	SV 3.5	**Promoting and delivering the Didcot Garden Town Green Corridors**, we will work with the District councils to deliver green corridor routes for pedestrians and cyclists between the urban areas of Didcot and the surrounding countryside.
	SV 3.6	**Promoting a strategic approach to planning for parking in Didcot** to identify an appropriate balance of parking provision in the town and at the rail station to support town centre vitality.

39. Greater accessibility from Ladygrove to Didcot Parkway and Didcot town centre is recognised as important, and the creation of a new northern entrance to Didcot Parkway is promoted as a way to achieve this. The widening of Cow Lane is not an identified scheme within the Science Vale area strategy due to the significant cost and implications of such a scheme.

Safeguarding

40. We will support South Oxfordshire and the Vale of the White Horse District Councils in safeguarding land for schemes in areas where it is possible that significant development may occur in the future.

Proposal SV4 – to support safeguarding of land through the local plan process to enable delivery of strategic pieces of infrastructure considered likely to be required in the future, and beyond this plan period:

Timescale	Proposal	
On-going	**SV 4.1**	**Safeguarding and protecting the ability to provide a Southern Didcot road** to relieve the B4493, southern residential roads and the town centre if significant additional development is allocated to the south of the town in the future.
	SV 4.2	**Safeguarding and protecting the ability to provide a South Abingdon road** if significant additional development is allocated to the south of the town in the future. This will provide a direct link from west Abingdon to the A415 to the east and relieve congestion in Abingdon town centre.
	SV 4.3	**Safeguarding and protecting the ability to**

		provide a Wantage Western Link Road if there is substantial additional development in west Wantage. This would complete the perimeter route for Wantage and provide relief to key roads within the town.
	SV 4.4	**Safeguarding and protecting the ability to provide a station at Grove**
	SV 4.5	**Safeguarding and protecting the ability to provide A34 - Milton Park north facing slips** if additional significant development comes forward in the Didcot area. This will provide a direct link between the A34 and Milton Park for traffic travelling to/from the north.
	SV 4.6	**Safeguarding and protecting the ability to provide a Marcham bypass** this may be required to help mitigate the Air Quality Management Area declared in Marcham village.

A number of other schemes described in this chapter are safeguarded within the Vale of White Horse Local Plan 2031 Part 1: Strategic Sites and Policies (published November 2014).

Funding

41. Funding for the Science Vale area strategy will be from a variety of sources. Due to the large scale of growth we will seek central Government funding where possible and work with the Local Enterprise Partnership, District Council's and Local Transport Board to secure income from the Enterprise Zone business rate retention to fund infrastructure.

42. The County Council has successfully been awarded Government funding towards transport schemes from a number of sources including the Local Growth Deal, Local Growth Fund, City Deal, Local Sustainable Transport Funding, and Growing Places Funding through support from the Oxfordshire Local Enterprise Partnership. We will actively seek and bid for future funding as and when it is announced.

43. Developer funding is also vital. The Science Vale area strategy identifies a package of transport measures that are required to mitigate the cumulative impact of development across the Science Vale area where the impact of development is not attributable to a single development. Developer contributions will be sought for specific schemes within the Science Vale package using the strategic transport infrastructure contribution rate to mitigate the cumulative

impact of development and to contribute to facilities for active and healthy modes of travel (cycling, walking and Door to Door travel).

44. The level of contribution has been calculated by dividing the funding required to deliver the package of transport measures by the amount of planned growth. This calculation will be reviewed and updated following changes in planned housing growth and infrastructure requirements within Science Vale as part of the Local Plan process.

45. When the Community Infrastructure Levy (CIL) is introduced by the Vale of the White Horse District Council and South Oxfordshire District Council, contributions towards the strategic schemes will be sought via this new mechanism, as well as via S106 or S278 agreements as agreed.

46. Major residential development sites are required to fund new or improved public transport services to key locations agreed with the County Council until they become commercially viable. Other residential sites should make a contribution based on the estimated cost of an improved commercially viable service across Science Vale, divided proportionally by the amount of planned growth to give a cost per development site. These will be via a S106 agreement.

47. Developments are also required to provide modern bus stop infrastructure, including shelters, Real Time Information and cycle parking, to enhance access to the public transport network. These are usually secured through Section 106 or Section 278 agreements.

Proposal SV 5 – To mitigate the cumulative impact of development across the Science Vale area and implement the transport measures identified in the Science Vale area strategy we will:

Timescale	Proposal	
On-going throughout the plan period 2015 – 2031	**SV 5.1**	Secure strategic transport infrastructure contributions (including cycle schemes) from all new development based on the contribution rate per dwelling or per m2 for non-residential developments.
	SV 5.2	Secure strategic public transport service contributions for new or improved public transport services as well as bus stop infrastructure to support sustainable development.

48. The Strategic Transport Contribution does not include direct mitigation measures, which will be sought separately.

49. This Area Strategy replaces the Didcot Integrated Transport Strategy -2004/2005 (DidITS). The new Area Strategy accommodates the measures of the DidITS.

Planning obligation contributions, secured in order to mitigate the impacts of development, towards DidITS will be able to be used on the LTP4 Science Vale Area Strategy and be in accordance with the planning obligations.

Maps and Plans

50. Figures 1 & 2 summarise the key pieces of transport infrastructure required to support the proposed growth and investment in the Science Vale area. Figure 1 shows the main employment sites, future housing developments, and required strategic highways infrastructure. Figure 2 shows the cycle network required to support the proposed growth in the Science Vale area. These include both existing routes and future routes. The proposed public transport network can be found in the Bus Strategy.

References

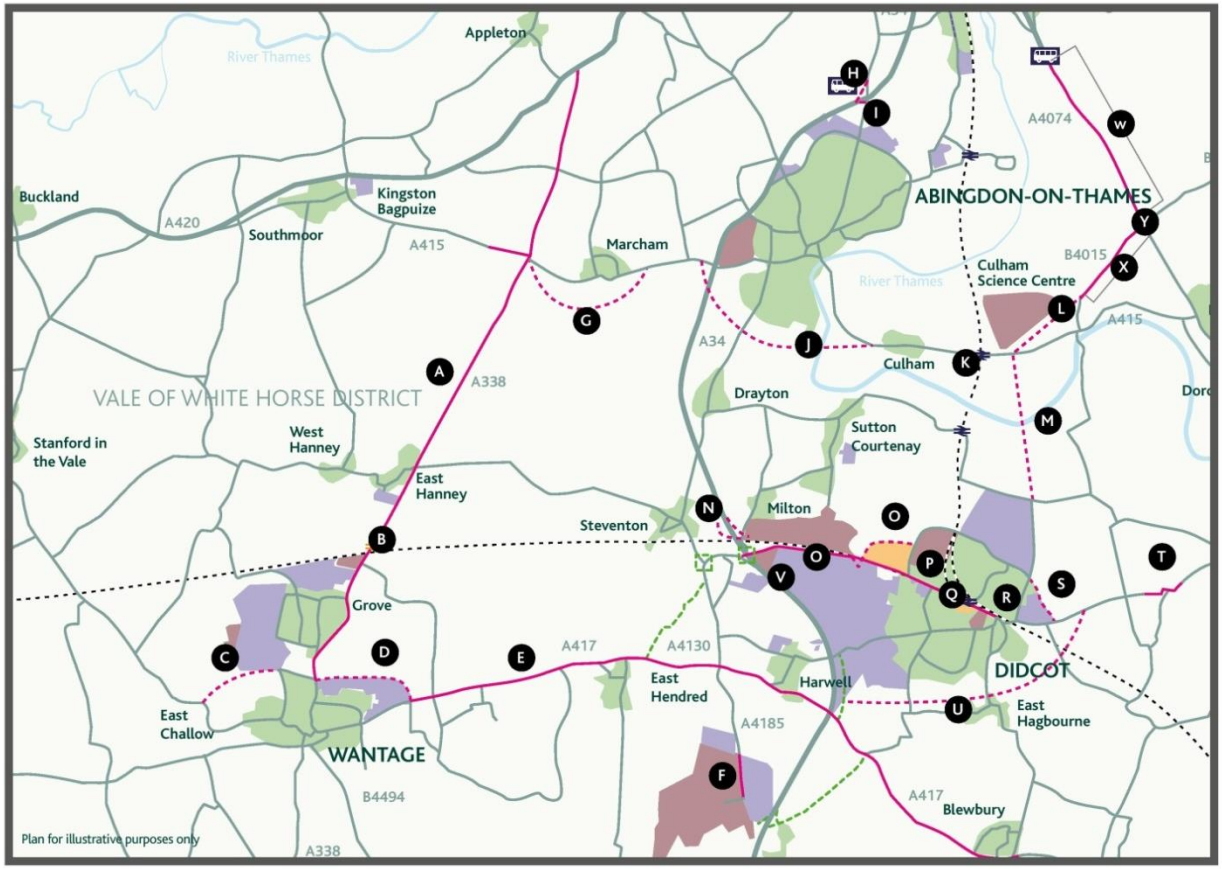
Science Vale Enterprise Zone - http://www.sciencevale.com/

Oxfordshire Local Enterprise Partnership http://www.oxfordshirelep.org.uk/cms/

Vale of White Horse Local Plan 2031 Part 1: Strategic Sites and Policies (published November 2014) http://www.whitehorsedc.gov.uk/services-and-advice/planning-and-building/planning-policy/new-local-plan-2031

South Oxfordshire Core Strategy 2027 (adopted December 2012) http://www.southoxon.gov.uk/services-and-advice/planning-and-building/planning-policy

Oxfordshire Local Transport Board - http://www.oxfordshire.gov.uk/cms/content/oxfordshire-local-transport-board-0



Science Vale Figure 1:

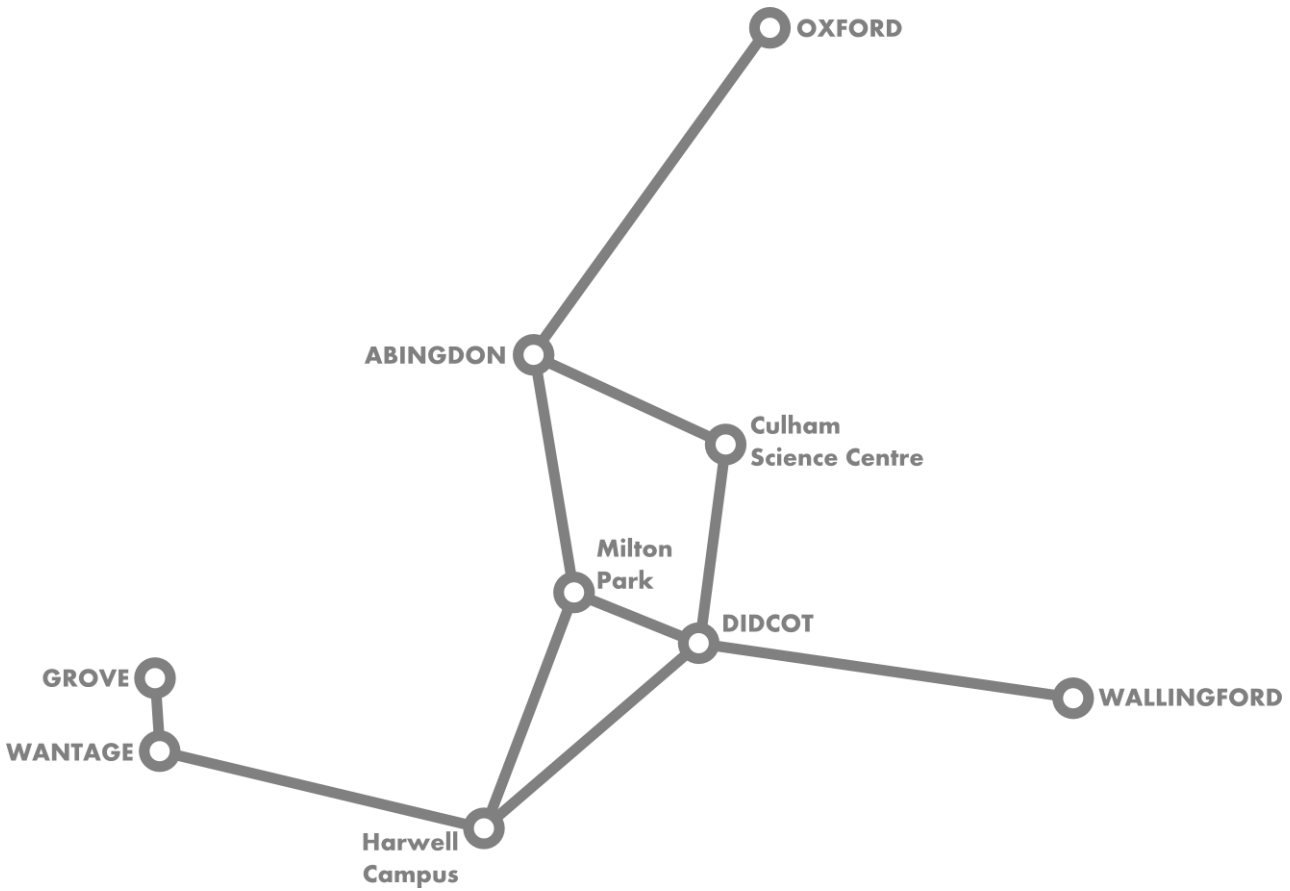
Indicative plan of transport infrastructure required to support development in Science Vale

Key

- Local Plan residential areas
- Local Plan mixed use areas comprising residential and employment
- Existing commercial/employment areas
- Existing settlement
- Proposed Park and Ride
- Capacity improvement scheme
- New road scheme (alignments are indicative)
- Funded scheme being delivered
- Existing Rail station
- Railway

Transport Schemes

- A A338 capacity improvements including Frilford Lights
- B Grove Station
- C Wantage Western Link Road
- D Wantage Eastern Link Road (WELR)
- E A417 Improvements -Wantage to Blewbury including Rowstock Roundabout
- F Harwell Campus access improvements
- G Marcham Bypass
- H Lodge Hill Phase 1 - south facing slips
- I Lodge Hill Phase 2 - Park & Ride & Freight Park
- J South Abingdon Bypass
- K Culham Railway Station
- L Access to Culham Science Centre - Phase 1
- M Access to Culham Science Centre - Phase 2 (River Crossing)
- N Milton Interchange - Milton Park - north facing slips
- O Didcot Science Bridge & A4130 Capacity Improvements
- P Central Didcot Transport Corridor (Jubilee Way to Science Bridge)
- Q Didcot Parkway Station Package +Didcot East Grade Separation
- R Jubilee Way junction
- S Northern Perimeter Road Stage 3
- T A4130 capacity improvements (between Didcot and Wallingford)
- U Didcot Southern Bypass
- V Milton Enterprise Bridge (pedestrian/cycle)
- W A4074 Capacity Improvements
- X B4015 Clifton Hampden to A4074 Capacity Improvements
- Y A4074/B4015 Junction Improvements



Science Vale Figure 2: Indicative cycle routes required to support development in the Science Vale area

Annex 1: Science Vale Cycling Strategy

Our vision for cycling in Science Vale

SCIENCE VALE CYCLING STRATEGY

CONTENTS

PART TWO: Routes and schemes

The corridors

Connector routes and other schemes

PART ONE: Our vision

“Our vision is for a world-class cycle network enabling users to make safe, efficient, connected journeys by bike.”

“Our ambition is to raise the status of cycling in the Science Vale area through the provision of innovative and high quality cycling facilities comparable with those found in the cycling countries of continental Europe, supporting the growth and investment being made in Science Vale”

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Introduction

Science Vale is receiving unprecedented levels of economic investment and associated growth. This investment is creating new jobs, and these new jobs are being supported through new housing in the nearby towns. In the order of 20,000 new jobs and 20,000 new homes by 2031 are being planned for.

Science Vale is an economic growth area that includes three nationally and internationally recognised science and research centres at Harwell Campus, Milton Park and Culham Science Centre. It also includes the settlements of Wantage & Grove and Didcot. Science Vale is home to Oxfordshire's Enterprise Zone and the focus for significant growth and infrastructure investment.

The transport network needs to be upgraded and strengthened to facilitate the investment by ensuring people can move efficiently around the area and easily reach jobs and services. Significant investment is needed to achieve this in the road network together with cycling and public transport. A multimodal approach is needed to provide choice and ensure resilience, sustainability and efficiency. The first schemes are already in progress. This document sets out our vision for cycling in Science Vale and details where investment in cycling will be directed.

With European companies investing and desire to provide good usable alternatives to car travel increasing, cycling is enjoying a renaissance: The profile of cycling is continually being raised at both national and local levels and more people are choosing to cycle. In Oxfordshire, we now have a refreshed Cycling Strategy which can be found in the Active & Healthy Travel Strategy which also covers walking and Door to Door integrated journeys. The Cycling Strategy sets out our policies and targets for cycling in Oxfordshire. The Science Vale Cycling Strategy sets out how we will implement these policies in the Science Vale area and help to deliver the transport strategy set out in the Science Vale Area Strategy.

The government has announced hundreds of millions of pounds of investment in science based industries in Science Vale, which is attracting multi-national companies to consider locating in the area. These companies are looking to locate where infrastructure is good, and this includes cycling infrastructure. It's essential we take the opportunity to ensure our cycling infrastructure meets the expectations of these companies so that they choose to locate in Science Vale, this will in turn support our aims to increase levels of cycling in Oxfordshire.

There are significant challenges; the dispersed nature of the Science Vale area does not naturally encourage high levels of cycling, unlike cities such as Oxford where short distances between destinations make cycling an attractive option. The greater distances involved also means larger investment is required.

Cycling investment benefits everyone, whether or not they cycle. More people cycling means fewer people driving, which reduces congestion and makes a contribution to the reduction of air pollution. No single form of transport alone can provide the means to ensure the transport network remains functional. Cycling will

be a central part of the transport system for Science Vale, supporting our aims set out in the Oxfordshire Cycling Strategy, the Science Transit Strategy and the new Local Transport Plan.

We have already started. Cycling schemes are in progress and we have secured a further £5million from the Oxfordshire Local Growth Fund to implement the highest priority schemes as the first phase of realising our vision. Future phases will follow once funding has been secured and this strategy will be an important tool in securing that funding.

There are already above average levels of cycling in Science Vale. For example, at the last census (2011), 4.1% of journeys to work were made by bike in Science Vale. This is higher than the average across England and Wales of 2.8%, or within Oxfordshire (excluding Oxford), where the average rate is 3.16%.

We aim to increase the proportion of journeys to work made by cycling in Science Vale by 50% by 2021, as part of the wider Oxfordshire target of increasing cycling to 10% of all journeys by 2031.

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Science Vale cycling network: The Premium Routes approach

The Oxfordshire Cycling Strategy introduced our concept of Cycle Premium Routes and Connector Routes. This will focus investment on those routes already popular, building upon their success to raise levels of cycling in the most efficient manner.

The Premium routes concept has been successfully applied to bus routes in Oxfordshire over the past decade. The foundation of a successful route and proven demand can be nurtured through investment into an even more successful route. By focussing on these routes – the core links – investment is concentrated to where it can be used most efficiently, and this has allowed a step change in service delivery for bus passengers on these routes. These routes form the backbone of the commercial bus network in Oxfordshire and are used by the majority of bus passengers.

Cycle Premium Routes takes this concept and applies it to cycling. We have identified a series of strategic corridors across Science Vale where we will establish the Cycle Premium Routes which will become the focus of our future investment. The greatest investment potential lies in those corridors which connect together the areas of growth, and so our corridors are based around connecting the areas of employment growth to transport hubs and areas of housing growth. Many of these corridors already have good levels of cycling. We will build on this to create the Science Vale cycle network.

Our chosen corridors are defined and discussed in detail in part two. A system of prioritisation for investment is also included based on current demand and current route conditions.

A series of discrete schemes will be programmed for each Cycle Premium Route, once defined for each corridor, which when complete will form a continuous direct route providing a high quality cycling experience.

Connector routes

Whilst investment will be focussed on the Premium Routes, additional Connector Routes will also be developed and promoted. These routes will provide important links into the network to ensure the Premium routes network is as easy to access as possible. Further details of these routes are discussed in part two.

National Cycle Network

The National Cycle Network is a network of routes largely established by cycling charity Sustrans, using millennium funding in the late 1990s and early 2000s. The routes consist of a mix of traffic-free paths and quiet roads linking together large

towns. Continued investment since 2000 has established complimentary regional routes of a similar standard feeding into the national routes.

There are two National Cycle Network routes in the Science Vale area. National route 5 runs through the area from Oxford, via Abingdon, Didcot and onwards towards Reading via Long Wittenham. Regional route 544 feeds into this route at Didcot from Wantage via the Harwell Campus.

These routes will continue to form an integral part of the cycling network and we will work closely with Sustrans to build on this.

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Complementary measures

Investment in cycling is not just about infrastructure. In Science Vale we will actively promote and raise awareness of the cycling network. We have initially secured revenue funding for this through the Department for Transport's Local Sustainable Transport Fund. We will make available a series of maps covering the area in both printed and electronic form. The maps will be supported by new, clear signage to destinations and map display boards at key locations and junctions.

Didcot Interchange

Didcot Parkway railway station is at the heart of the Science Vale transport network. It is the gateway into the area for many journeys and recently has had an £8million upgrade with further investment planned for this purpose. It is a significant destination for cycling journeys, and cycle facilities have been substantially improved as part of the upgrade work. We shall continue to look for opportunities for further development of the cycling facilities at the station to reflect its key role in the network. This could take the form of upgraded information points, secure cycle parking, improved local cycle routes, a bicycle repair service or even a fully featured cycle hub. We shall work with partners to achieve this while recognising the station's space constraints and other future development.

Cycle Hire

Cycle hire schemes are currently enjoying significant popularity across the country, with new schemes coming online in different locations each month. In Oxfordshire we have the OxonBike cycle hire scheme in Headington and Brompton Dock points at Oxford and Didcot complementing traditional cycle hire companies operating in Oxford.

The OxonBike scheme has been introduced in Headington with funding from the DfT's Local Sustainable Transport Fund (LSTF). The type of hire scheme is similar to the popular Barclays Cycle Hire scheme in London, which is designed to maximise use of the hire bikes through short hires between hire points. Oxonbike has proved popular and its expansion to other areas is being investigated, including the Science Vale area. More details of the Oxonbike scheme can be found in the Active &Healthy Travel Strategy element of LTP4

Science Vale is substantially more rural and dispersed than most other areas operating Oxonbike type hire schemes; these tend to be urban areas. This will present challenges to operating a scheme in Science Vale.

Our long term vision is for a commercially sustainable, innovative cycle hire scheme covering all of Science Vale, fully integrated into the Science Transit network. This could see the availability of e-bikes to assist with the longer journeys required in Science Vale.

Publicity

Getting the message out about good cycle routes is a key part of encouraging more people to cycle. This will become more important as the network is upgraded. We will communicate through a series of measures including:

- A set of cycling maps covering the Science Vale area in detail and highlighting quieter roads and off-road paths. These will be available both online and in printed form from local information points
- Map boards at key locations and junction points showing the local routes and points of interest. These will be similar to the boards that exist at some points on the National Cycle Network routes 5 and 544, which will be updated where needed
- An occasional cycling newsletter covering the latest route upgrades and events
- Promotion of cycling through the Oxfordshire Travel Choices brand including at events organised as part of the Access to Science Vale Enterprise Zone programme
- Close relationships with large employment sites and cycling user groups

Funding to start some of this work has been secured from the DfT's LSTF.

Signage

Good consistent route signage is important as it helps to ensure the cycling network is easy to use. The National Cycle Network routes within Science Vale are well signed, but other routes are often lacking good clear cycling specific signage. Good signage, particularly when including journey times, is also a good way of raising awareness of the network.

We have secured funding from the DfT's LSTF to create a set of signage guidelines which will be applied to routes in Science Vale to ensure quality and consistency.

Network identity

To complement our work on signage and publicity, we propose to give the Cycle Premium Routes in Science Vale a name or theme that will help to raise awareness of the network. We will then name each of the routes within the theme to help users understand the network better and to find out route destinations.

Our thinking is based on work elsewhere such as in Aylesbury, where cycle routes have been colour coded and named after gemstones.

New Developments

The significant amount of planned development in Science Vale offers the opportunity to make a real difference for cycling. It is essential that new developments are planned with cycling in mind and with facilities to make cycling both convenient and safe. Designing new developments so that cycling or walking is

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the most convenient transport method for the majority of trips will naturally increase the proportion of journeys made in this way.

For large new housing development sites, we propose establishing the following principles, which we intend to incorporate into our guidance for developers:

- Developers to demonstrate through masterplanning how their site has been planned to make cycling convenient and safe, for cyclists travelling to, from, within and through the site
- We will ask developers to fund cyclability audits, so that the local user view is incorporated into new cycle facilities.
- Sites to be connected to at least one of the Cycle Premium Routes defined in this strategy, including creating feeder routes where needed
- Site road network and junctions to be constructed with cycling in mind, including providing space for cycling on main/spine roads through the provision of, as a minimum, modern hybrid style cycle lanes

For large new commercial developments, developers should demonstrate how their development has been planned for users cycling to the site. This should be 'to the door' and as a result should show how cycle parking will be located in the most convenient position.

Until we produce an Oxfordshire-specific guidance document, developers should refer to the new Sustrans Design Manual Chapter 10 (Cycling in New Developments) for guidance on what cycle-friendly design measures should be incorporated in and around new or expanded developments. Our cycling requirements will also be integrated into forthcoming editions of the Oxfordshire Developer Guidance.

Our forthcoming updated Design Standards for cycling, which draws from best practice, will be used for guidance on what cycle-friendly design measures should be incorporated in and around new and expanded developments.

For new highway improvement schemes, we will outline where we propose to make improvements for cyclists and engage with cycling user groups, shortly after project inception, so that schemes are developed with improvements built in from the outset.

Where are we now?

The latest census, 2011, shows there are already above average levels of cycling in Science Vale for journeys to work. For 4.1% of journeys to work across Science Vale, the majority of the journey was made by bike. This is higher than the average across England and Wales of 2.8%, or within Oxfordshire (excluding Oxford), where the average rate is 3.16%.

It is difficult to reliably and consistently measure the proportion of journeys overall made by bike. The census only covers journeys to work, and this data only records the main mode of travel used. A journey by train that involves cycling to the station is most likely to be recorded as a train journey, for example.

Where do people cycle to work?

Cyclists from…

Wantage

…work in	**% of cyclists**
Wantage	45.39
Harwell	21.71
Watchfield	14.47
Grove	12.50
Milton	5.92

Grove

…work in	**% of cyclists**
Wantage	46.15
Grove	30.77
Watchfield	13.99
Harwell	9.09

Didcot

…work in	**% of cyclists**
Didcot	62.83
Harwell	20.49
Milton	13.55
Abingdon	1.44
Wallingford	1.23

How do people get to work in Harwell Campus?

Mode	**%**
Car - drive	77.18
Bus/Coach	4.81
Car - passenger	4.70
Bicycle	3.49
Foot	2.05
Train	1.15

How do people get to work in Milton Park?

Mode	%
Car - drive	75.80
Car - passenger	4.66
Bicycle	4.52
Bus/Coach	3.47
Foot	2.67

How do people get to work in Culham Science Centre?

Mode	%
Car - drive	79.0
Car - passenger	5.9
Bicycle	6.4
Motorbike	1.3
Bus	1.1
Train / Foot	6.3

Monitoring our progress

We aim to increase the proportion of journeys for all purposes made by bike, where the journey is of a length suited to cycling. This is very difficult to accurately measure and monitor without conducting costly surveys. We therefore aim to monitor and analyse existing sources of data in addition to the census to identify trends. These additional sources will include:

- Travel to work surveys conducted by the main employment sites
- Automatic cycle counters (these already exist on a number of routes)
- General traffic surveys

We will set up a monitoring programme, working with partners, to assess our impact and report on this annually.

The central part of our monitoring will utilise information from travel to work surveys that will be regularly completed on the three main employment sites: Milton Park, Harwell Campus and Culham Science Centre.

This will be complemented by analysis of automatic cycle counters positioned at strategic points on the network. These counters are permanent and count all bicycles that pass over them. We will review the current locations and supplement where necessary to ensure there is good coverage.

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PART TWO: Routes and schemes

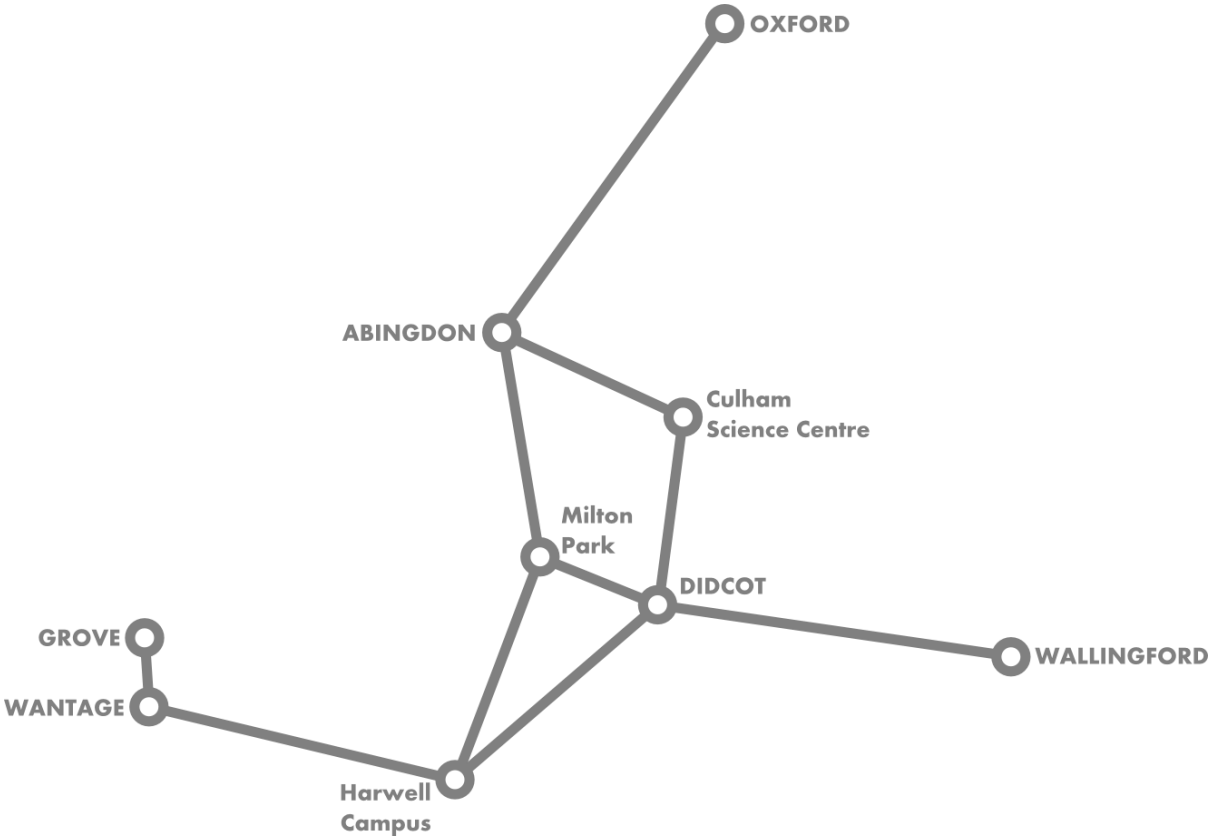
The network of Cycle Premium Routes in Science Vale will be based on connecting the large employment sites: Milton Park, Harwell Campus and Culham Science Centre to the towns; Didcot, Abingdon, Wantage and Grove. This enables us to maximise our opportunities for funding and investment by focussing the network on the employment and housing growth areas. There are already good cycling levels in and between these points, which will help us to build on existing success and achieve our vision in the most efficient way.

We have identified a series of corridors for which a future study will determine where best to direct investment to create one Cycle Premium Route along each corridor. The study will review existing routes and previous studies, and recommend a series of schemes required to provide a continuous Cycle Premium Route along each corridor.

The resulting route along each corridor will be high quality, direct, well signed and is likely to be a mix of predominantly segregated and off-road paths. The study for each corridor will assess the possible individual scheme options and consider the benefits and feasibility for each. We will consult on the choice of schemes that are to make up each route.

Our aim for each of these routes is to achieve a quality of infrastructure comparable to that found in the European cycling countries. We may have to be pragmatic about how to achieve this and a staged approach may be required in places if full funding is not immediately available.

Science Vale Figure 2 shows the corridors that will make up the Cycle Premium Routes in Science Vale. Forthcoming studies will determine the exact routes and required schemes for each corridor. The routes of some corridors may overlap one another.



Science Vale Figure 2: Indicative cycle routes required to support development in the Science Vale area

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The corridors

Wantage to Harwell Campus

National Cycle Network route 544 currently connects Wantage to Harwell Campus via an indirect route. A shorter route will make cycling more attractive on this corridor. This promoted Premium Route will most likely make use of the existing route 544 at either end where the route is of a high standard already or is about to be upgraded. There are a considerable number of possible route permutations when considering the possible upgrade of sections of existing rights of way to create this more direct route.

Wantage to Milton Park

The strategy for this route is to create a link route between the Wantage to Harwell Campus and Abingdon to Harwell Campus corridors. Longer term, a separate route possibly running in the shadow of the railway line between Grove and Steventon could be created.

Abingdon to Milton Park

National Cycle Network route 5 already links Abingdon to Milton Park via Sutton Courtenay. Our strategy is to supplement this route and create a shorter distance route from Abingdon to the central and western parts of Milton Park, and to also upgrade the Peep-o-Day Lane section of route 5.

The shorter distance route could be created by upgrading and converting footpaths running north from Milton Park, or use Milton Road and the rights of way east of Drayton to connect with the Drayton to Abingdon roadside shared use path.

Abingdon to Harwell Campus

Our strategy for this corridor will be to either utilise the Abingdon to Milton Park route or make improvements to the B4017 road route through Steventon. Continuing towards the Harwell Campus our strategy will be to either make upgrades for cyclists to the A4130 or to the Hungerford Road restricted byway.

Didcot to Harwell Campus

A substantial investment has been made to upgrade a footpath between the north of Harwell Campus and Harwell village. This path, The Winnaway, has been widened and resurfaced during 2015. Our strategy is for this to form the southern section of the Didcot to Harwell Cycle Premium Route, which will then continue through Harwell village and utilise the B4493 into Didcot.

Didcot to Milton Park

Our strategy for this corridor will focus on upgrades to the existing routes. To the south of the power station site a shared use path runs along the south side of Milton Road. This path is very popular but suffers from seasonal vegetation incursion and conflict between cyclists and pedestrians, exacerbated by a lack of lighting which is a particular issue during the winter months. We will investigate enhancements to this route including lighting and, as the existing path is constrained between the carriageway and adjacent railway line, either constructing another path on the other side of the carriageway, or moving the carriageway to allow widening of the existing path.

To the north of the power station site is National Cycle Network route 5, which provides an alternative but less direct route to Milton Park. We will look at making this route more attractive by providing lighting, together with new sections of path at either end to create a more direct route.

Abingdon to Culham Science Centre

Our strategy will be to create a new northerly route from Culham Science Centre, possibly crossing the Thames and linking with route 5 into Abingdon and Oxford or staying south of the Thames and entering Abingdon at Bridge Street.

In addition, an existing shared use roadside path follows the A415 but stops short of Abingdon near to Culham village, where the pavement becomes raised into Abingdon; the path known as The Causeway. We will investigate the feasibility of continuing the cycle route along or by the side of The Causeway.

Didcot to Culham Science Centre

Our strategy will be to link the existing Sustrans route 5, which on leaving Didcot heads to Long Wittenham on off road paths and then onwards to Wallingford on quiet roads, to the A415 roadside cycle path which serves Culham Science Centre.

This will enable routes from both Didcot and Wallingford to Culham Science Centre, and from Berinsfield to Didcot and beyond. Additional benefits will include a better route for cyclists and pedestrians between Long Wittenham and Clifton Hampden.

The route passes through an area of forthcoming housing north of Didcot's Ladygrove estate. The route will need to be integrated into the layout of the development while being aware of its importance as a through route, with suitable high specification connections made into the existing network of cycle paths in Ladygrove.

Grove to Wantage

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Our strategy will be to create (or upgrade) a route to link Grove and Wantage. This will be essential to ensure cycling is an attractive option for residents of the existing settlements and the new housing developments. In addition this route will ensure that both Grove and Wantage are linked into the network of other Science Vale Premium Routes.

Didcot to Wallingford

There is currently a National Cycle Network signed route (5) between Didcot and Wallingford, which is fairly lengthy compared to the most direct road route, the A4130, which is not ideal for cycling. Another route is via South Moreton. Our strategy will be to consider all these routes and identify what improvements that can be made to them.

Connector routes and other schemes

Connector routes are an important part of the cycle network, however, investment in creating or improving these routes varies significantly in value for money and contributing towards increasing cycling targets within the area. These identified below assume the Vale of White Horse District Council's emerging Growth Strategy comes to fruition and that South Oxfordshire District Council plans growth within the Culham/Berinsfield area.

Steventon to Milton Park

This scheme will provide a link between Steventon and Milton Park avoiding Milton Interchange. The scheme could consist of a new cycle path running alongside the existing footpath which runs next to the railway line, passing under the A34 and connecting Steventon to Milton Park.

Chilton to West Ilsley A34 junction

This scheme will provide a link between the West Ilsley A34 junction and the Chilton A34 junction. Currently cyclists heading north/south have to make use of a section of A34 dual carriageway. Alternative roads add several miles to a journey.

This scheme would create a path between these points suitable for all weather cycling and helping to make cycling a more attractive option between West Berkshire and Harwell Campus and beyond. This route will also improve sustainable access to more of the North Wessex Area of Outstanding Natural Beauty.

Backhill Lane tunnel

This scheme will see a currently disused underpass under the railway at Milton Park reopened for cyclists and pedestrians. It will be of particular benefit for cyclists travelling from Didcot Great Western Park to the west of Milton Park. The £1.4million scheme is being delivered by Milton Park as part of a larger scheme including a new junction on the A4130, and is funded from the Oxfordshire LEP's Growing Places Fund.

In order to connect the proposed new housing development at Milton Heights with the services and jobs at Milton Gateway, Valley Park and Milton Park, a cycle pedestrian bridge will need to be provided over the A34. This will reduce the need for active modes to negotiate the unattractive, slow and circuitous Milton Interchange whilst at the same time relieving one of the most congested parts of the road network. This piece of infrastructure will complement the scheme to reopen Backhill Lane tunnel, joining up housing with enterprise zones.

Berinsfield to Oxford

This scheme is centred on making upgrades to a series of bridleways that connect Berinsfield to Oxford via Marsh Baldon, which largely follow the course of an old Roman Road. The route will provide a direct alternative for cyclists to the busy A4074.

The route joins existing cycling facilities at the Oxford end at Grenoble Road which will enable connections to Oxford Science Park, Greater Leys, Blackbird Leys, Cowley and the wider Oxford Eastern Arc area. At the Berinsfield end the route joins the existing roadside route from Berinsfield to Culham Science Centre and onwards to Abingdon.

Culham village to Abingdon

Our strategy for a route between Culham Science Centre and Abingdon will investigate potential solutions to improving The Causeway for cyclists. To complement this work, the provision of improved cycle and pedestrian facilities between Culham Village and Abingdon will be investigated as well.

A417 cycle path

Study work looking at the A417 corridor has identified possible demand for a cycle path alongside the A417. The study has a wide remit covering all aspects of the road between Wantage and Blewbury. Further investigative work on the possibility of a cycle path alongside the road for all or part of this section will be progressed through the A417 study programme.

Didcot Station to Power Station Roundabout area

Cycling user groups have stated that the Power Station Roundabout (at the end of Basil Hill Road) is a major issue for cyclists travelling between Didcot and Milton Park, and have suggested a solution based on the Hovenring in Eindhoven, the Netherlands, which is a separate junction for cyclists elevated about the road junction, connected by a network of elevated cycle paths.

In addition, railway bridges on Basil Hill Road and Foxhall Road, together with busy roads and roundabouts on Manor Bridge and Foxhall road create a less than ideal cycling environment and a barrier in an area which many cyclists need to travel through.

Future work will look at this area as a whole and at solutions both short and long term and will consider innovative landmark infrastructure to recognise this area's gateway status within Science Vale.

Cow Lane underpass, Didcot

The Cow Lane underpass at Didcot represents a major barrier for cyclists. The underpass, which carries Cow Lane under the railway, lies on National Cycle Network route 5 and is a key link between the north and south of Didcot. It was built prior to the expansion of Didcot to the north, but has not been upgraded. It currently

consists of a narrow southbound vehicle carriageway and a narrow pavement, separated from the carriageway with a barrier. Cyclists heading southbound can use the carriageway but heading north have no choice but to dismount and use the narrow pavement.

Several options have been looked at in the past to address the problem, including widening the existing underpass or constructing a new underpass, and funding has been sought unsuccessfully. The age of the underpass, its length and having an operational main line railway running over it contribute to any solution having a very substantial price tag of several million pounds.

A decision to spend several million pounds on one very small part of the network would need to be carefully considered in terms of value for money and compared to what that funding could achieve for the rest of the network if spent elsewhere.

A potentially less costly solution would be to remove the vehicle traffic lane and make the underpass for the exclusive use of pedestrians and cyclists. However, this solution would require widespread support locally and politically among all concerned before it could be considered.

Longer term, a solution may be found through the possible creation of a northern entrance to Didcot station, utilising its associated subway or footbridge.

Wantage Town Network

Wantage Town Council is currently working on a Neighbourhood Plan which will detail plans for several improvements that could be made to cycling facilities within Wantage. Improvements to cycling facilities to encourage more cycling in Wantage will be essential as the area grows. Once the Neighbourhood Plan is adopted, schemes can be considered as funding opportunities arise, and when developer funding opportunities arise.

Other towns and other local schemes

There are many other potential schemes within the other towns and villages that make up Science Vale. Neighbourhood Plans are an excellent way of documenting these and getting local support through the plan preparation and adoption process. A number of schemes have been submitted through the LTP4 consultation process and these shall be reviewed and implemented when funding and resources permit.

Didcot – a mini-Holland?

London's 'Mini-Hollands' programme is providing £100m to three London boroughs to transform local cycling facilities and encourage people to take up cycling. It is hoped that this will help make them as cycle-friendly as their Dutch equivalents.

The Oxfordshire Cycling Network, representing the views of many cycling user groups in Oxfordshire, has suggested that Didcot would make an ideal place to test the mini-Holland approach in Oxfordshire.

Although there is no funding for such schemes outside of London at present, in the future there could be, particularly if the schemes in London are successful.

Future work for Didcot could look at how suitable it is for a mini-Holland type programme and what this might consist of, how successful it might be and what the impact could be.

Witney Area Strategy

1. Witney is the largest town in West Oxfordshire, containing the main commercial, leisure, health and other services for the district. It has a diverse economy and is home to some of Oxfordshire's most successful high technology manufacturing and engineering firms. The historic Market Square, High Street, Woolgate Centre and Marriott's Walk make Witney an outstanding retail and leisure attraction.

2. The travel to work data from the 2011 Census indicates that 32% of all trips to work by residents of Witney are to workplaces within Witney. Of those internal trips, 47% travel by car, 34% by foot, and 11% by bicycle. Only 2% travel by bus, indicating that existing bus routes may not be providing attractive travel between residential areas and employment areas. The level of walking at 34% may mean the size, and character of Witney makes walking a convenient travel option. There are some good cycling routes in and around the town, and many opportunities for improving the network and enable more journeys to be undertaken by cycle.

3. For residents that work outside of Witney, there are strong trends for travel to employment at Oxford and locally in West Oxfordshire. For trips to Oxford 71% are travelling by car (this would include those using Park and Ride), whilst 19% are using the bus services, and 2% cycling.

4. This Area Strategy is being developed alongside the emerging West Oxfordshire Local Plan. Growth proposals from the WODC Pre-submission Draft Local Plan 2011-2031 (March 2015) comprise 3,700 new homes in the Witney sub area by 2031. Three Strategic Development Areas are identified: 1,000 homes at West Witney, 400 at East Witney and 1000 homes at North Witney. Twenty hectares of land has been identified for employment to enable Witney to attract inward investment and new jobs. The draft Local Plan also contains policies to maintain and enhance Witney's town centre shopping, leisure and cultural attractions.

5. The Witney Area transport Strategy will be revised following the adoption, by West Oxfordshire District Council, of the Local Plan.

Transport Strategy Objectives

6. The key transport objectives for Witney are to:

- Establish a transport network that supports future growth and attracts economic investment by improving access to the strategic transport networks and managing through traffic;
- Mitigate the local environmental impact of increased travel by addressing congestion, and poor air quality through improving opportunities for people to travel on foot, by cycle, and/or public transport, including Door to Door integrated travel (e.g. walking or cycling with bus/rail). More details of Door to Door travel can be found in the Active & Healthy Travel Strategy
- Support town centre vitality, by providing a local transport network that enables easy access to services by sustainable means.

7. This strategy divides travel demands at Witney into three categories, which are discussed in turn:
   - Witney's Strategic Transport Networks
   - Witney's Local Transport Networks
   - Beyond Witney

Witney's Strategic Transport Networks

8. The A40 is the main strategic route through West Oxfordshire. However there is limited access to the A40 at Witney. The A415 Ducklington Lane junction acts as the main all movement junction with the A40; this was upgraded to improve capacity in 2014. To the east of Witney the B4022 Shores Green A40 junction provides west facing slip roads only for trips to and from Oxford. This restricted movement junction, coupled with Bridge Street providing the only river crossing which links central and east Witney, results in considerable congestion and journey time delay. Housing and employment growth at Witney will place increasing demand on the existing junctions with the A40.

9. Access to the A40 from West Witney will be enhanced by an all movement junction at Downs Road, which has been secured through the Strategic Development Area at West Witney. The A40 Downs Road junction will relieve some pressure on Witney's roads and reduce levels of through traffic by providing direct access from the A40 to both the West Witney housing and employment sites. Better access from east Witney is planned by upgrading the A40/B4022 Shores Green junction to an all movement junction. This will allow the A40 to be used for trips from east Witney to employment areas at West Witney, as well as for a wide range of trips.

10. Witney's main bottleneck is at Bridge Street. With an average of 29,000 vehicles a day, it is the only vehicular crossing of the River Windrush for local journeys and through traffic from the northeast. The constraint of the river

combined with the level of demand for vehicular travel, results in severe congestion, delays to buses and air pollution (it is an Air Quality Management Area). The environment deters cyclists and pedestrians from using the route. Proposals WIT1 and WIT2 identify a sequence of schemes to overcome these issues by enabling traffic to use peripheral routes, thus freeing up routes within Witney for walking, cycling and bus use.

POLICY WIT1 – To establish a transport network that supports future growth and attracts economic investment at Witney we will work closely with the District Council, developers and local partners to improve access to the strategic transport networks and manage through traffic by securing:

- **An all-movement at-grade junction on the A40 at Downs Road, related to the West Witney strategic housing and employment site** to provide a new access to the A40 for businesses and residents to the west of the town;
- **West-facing slip roads at A40 Shores Green junction and improvements to the B4022 Oxford Hill junction with Jubilee Way and Cogges Hill Road to be delivered by housing development at East Witney.** This will provide an all-movement junction east of Witney, and a second river crossing for local journeys. Complementary measures in the surrounding rural area may also be sought to support this scheme.
- **A feasibility and viability assessment of West End Link Road 2 (WEL2), a new road bridge crossing the River Windrush,** to be provided by housing development at North Witney and assuming West-facing slip roads at A40 Shores Green has been delivered.

11. Following the opening of the Shores Green slip roads, a series of further improvements can be realised to initiate greater opportunity for travel by sustainable transport:

POLICY WIT2 – We will work with the District Council, Town Council, bus operators, local businesses and residents as well as local transport interest groups and developers to manage through traffic and improve the environment of Witney's central areas by:

- **Re-designating the A4095 via Jubilee Way, Oxford Hill, A40, Ducklington Lane and Thorney Leys** so through traffic travels around the edge of the town rather than through it;
- **Implementing schemes to deter through traffic from using Bridge Street and the Woodstock Road** to improve the environment and safety and encourage through traffic to use the re-designated A4095
- **Improving the environment in the town** centre by reducing congestion, and enhancing the Air Quality Management and Conservation Areas.
- **Discouraging undesirable routing of traffic** by improving directional signs.

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POLICY WIT3 – We will work with West Oxfordshire District Council to safeguard land for future transport infrastructure, to support Local Plan growth, by:

- **Protecting the line of the Shores Green Slip Roads and promoting its safeguarding in the Local Plan.**
- Continuing to **safeguard land for the proposed West End Link stage 2** pending adoption of the WODC Local Plan.
- **Ensuring development at North Witney is served by a Northern Distributor Road** running from Woodstock Road to Hailey Road, (in the event North Witney is allocated in the Local Plan).

Witney's Local Transport Networks

12. The proposed Local Plan presents a significant transport challenge, particularly to accommodate trips within Witney. Whilst proposals for increased road capacity, such as A40 Shores Green, will be brought forward by strategic developments sites, road schemes alone will not mitigate nor reduce the levels of congestion experienced now, and predicted to persist in the future. There needs to be a significant shift away from dependence on private cars, towards more people walking, cycling, and/or using public transport (e.g. Door to Door sustainable travel) . Improving opportunities for people to travel on foot, by cycle, and public transport, for trips within Witney and for commuting Oxford, is essential to reduce the proportion of journeys made by private car, improve air quality, and improve journey times for trips by all modes.

Public Transport

13. Congestion currently delays buses on the key Oxford-Witney routes via Newland and Bridge Street. Buses are significantly delayed in the morning peak due to the way the double-mini roundabouts favour traffic from West End and Woodgreen, despite Newland being the more important route for buses.

14. Witney benefits from high quality, high capacity frequent bus services to Oxford, including Oxford rail station. Whilst development will place increased pressure on bus services, it also offers the opportunity to improve services and make bus travel more attractive and practical for journeys to work. There is an existing off road long distance cycling route between Witney and Hanborough station which would benefit from improved signage in order to reduce car journeys and encourage Door to Door integrated travel.

15. Proposal WIT4 identifies how access to public transport and service enhancements will be achieved:

POLICY WIT4 – We will work with the District Council, bus operators and developers to make improvements to public transport and encourage its use by:

- **Improving the frequency of bus services** by using pump priming funding from new developments:
    i. Between Witney to Oxford; including City Centre, Oxford rail station, hospitals and Oxford Brookes University;
    ii. Between Woodstock and Burford via Hanborough rail station and Witney;
    iii. Between Witney's main residential and employment areas;

- **Implementing measures to reduce delays to bus services**
    i. through Witney particularly along Corn Street, Market Place, Bridge Street and Newland;
    ii. joining the A40 eastbound at B4044 Shores Green

- **Improving the environment and quality of bus stops** along these routes, pedestrian and cycle paths to them and the facilities available such as cycle parking.

Walking & Cycling

16. Walking and cycling are the most sustainable and non-polluting forms of travel. It is recognised that Witney already has good levels of walking and cycling for some journeys, particular via the Cogges/Church Lane path. However, in some locations high levels of traffic, poor quality surfaces and on-street parking deter walking and cycling. Improving and maintaining the attractiveness of walking and cycling is a key challenge as the population grows. Providing high quality walking and cycling routes will enable people to seriously consider walking or cycling for some trips within Witney as an alternative to travel by car. Witney has some good foot and cycle paths, but signing to and along them could be improved and there are many gaps in the provision of cross town cycle routes. There is scope to join up existing foot and cycle paths to improve the overall network and to link through to Rights of Way in the countryside.

17. Developing the Cycle Premium Route networks between Witney and nearby settlements, specifically Carterton, will enable greater levels of commuting by cycle between the two towns, as highlighted in Proposal WIT5 (Our overall policies on cycling can be located in the refreshed county cycling strategy which is an element of the Active & Healthy Travel Strategy Strategy.

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POLICY WIT5 – the County Council will improve facilities for pedestrians and cyclists focusing on enhancing links between homes, schools, employment and the town centre by:

- Providing a cycle premium route between Witney and Carterton, as part of the B4477 improvement scheme.
- Seeking funding from new development sites to ensure they are served by high quality walking and cycling routes to access off-site amenities.
- Conducting walking and cycling network assessment studies/Cyclability Audits to:
  a) Develop a network of high quality, continuous cross town cycle routes linking residential and employment areas;
  b) Improving local cycle routes from residential areas to schools;
  c) Improving conditions and infrastructure for pedestrians and cyclists in Bridge Street, the town centre and Station Lane areas.

18. Once the Local Plan is adopted the County Council will work with West Oxfordshire District Council to develop proposals for a Witney Town Centre Transport Strategy, to address the cumulative impact of transport needs arising from new housing and employment sites. Initial modelling has indicated that even with the Shores Green and potential West End Link 2 the highway demand exceeds capacity at several junctions and links across Witney.

Beyond Witney

19. Although the A40 Witney by-pass is generally free flowing, congestion on the A40 to the east of the town causes very lengthy delays for journeys to and from Oxford, especially at peak times. This impacts on the ability of local businesses to achieve growth, and makes Witney a potentially less desirable place for new businesses to locate.
20. A long term strategy for the A40 corridor is under development and will consider the potential role of public transport improvements, additional highway capacity and/or traffic management measures.
21. In the short term, there are a number of schemes currently part of the county's delivery plan which will offer some improvements to capacity on the A40. Most recently, the County Council has been successful in a bid to the Local Growth Fund for £35m in funding to deliver public transport improvements in the A40 corridor. This is discussed further in the A40 Route Strategy chapter.

Delivery and Funding

22. Providing transport services and infrastructure in a timely manner is essential to support and enable growth. The proposed Local Plan Strategic Development Areas (SDA) will be required to mitigate the transport impact arising from the development. Where schemes are needed to mitigate one particular development, the developer will be expected to either construct or provide full funding for the scheme. Schemes identified as direct delivery by the developer are:

- A40 Downs Road by West Witney SDA
- A40 Shores Green by East Witney SDA
- West End Link 2 and Northern Distributor Road by North Witney SDA

23. The package of investment in Witney's transport infrastructure be undertaken in four phases:

Witney Transport Infrastructure Package		
Phase	**Scheme**	**Estimated Delivery**
Phase 1	Ducklington Lane/Station Lane junction improvement	Completed 2014/15
Phase 2	A40 Downs Road junction	Revised – delivery linked to West Witney SDA timescales.
Phase 3	A40 Shores Green slip roads	Revised – delivery linked to East Witney SDA timescales.
Phase 4	Bridge Street	Linked to A40 Shores Green slip roads

24. The Witney area strategy identifies a package of transport measures that are required to mitigate the cumulative impact of development across Witney where the impact of development is not attributable to a single development. Developer contributions will be sought for specific schemes within the Witney package using a strategic transport infrastructure contribution rate to mitigate the cumulative impact of development.

25. The level of contribution will be calculated by dividing the funding required to deliver the package of transport measures by the amount of planned growth. This calculation will be reviewed and updated following changes in planned housing growth and infrastructure requirements within Witney as part of the Local Plan process.

26. When the Community Infrastructure Levy (CIL) is introduced by West Oxfordshire District Council, contributions will be sought via this new mechanism, as well as via S106 or S278 agreements.

27. In addition to developer funding, funding may also be sought via the Local Enterprise Partnership and the Local Transport Board to the Local Growth Fund and other sources.

Policy WIT 7 – To mitigate the cumulative impact of development across the Witney area and implement the transport measures identified in the Witney area strategy we will:

Secure strategic transport infrastructure contributions from all new development based on the contribution rate per dwelling or per m2 for non-residential developments.

28. The Strategic Transport Contribution does not include direct mitigation measures, which will be sought separately.

29. Every development site will be required to fund improvements to public transport services and infrastructure serving Witney in order to mitigate the cumulative impact of development, including development sites that are not allocated in the Local Plan and sites that are considered speculative.

POLICY WIT 8 – To mitigate the cumulative impact of development across the Witney area and implement the public transport measures identified in the Witney area strategy we will:

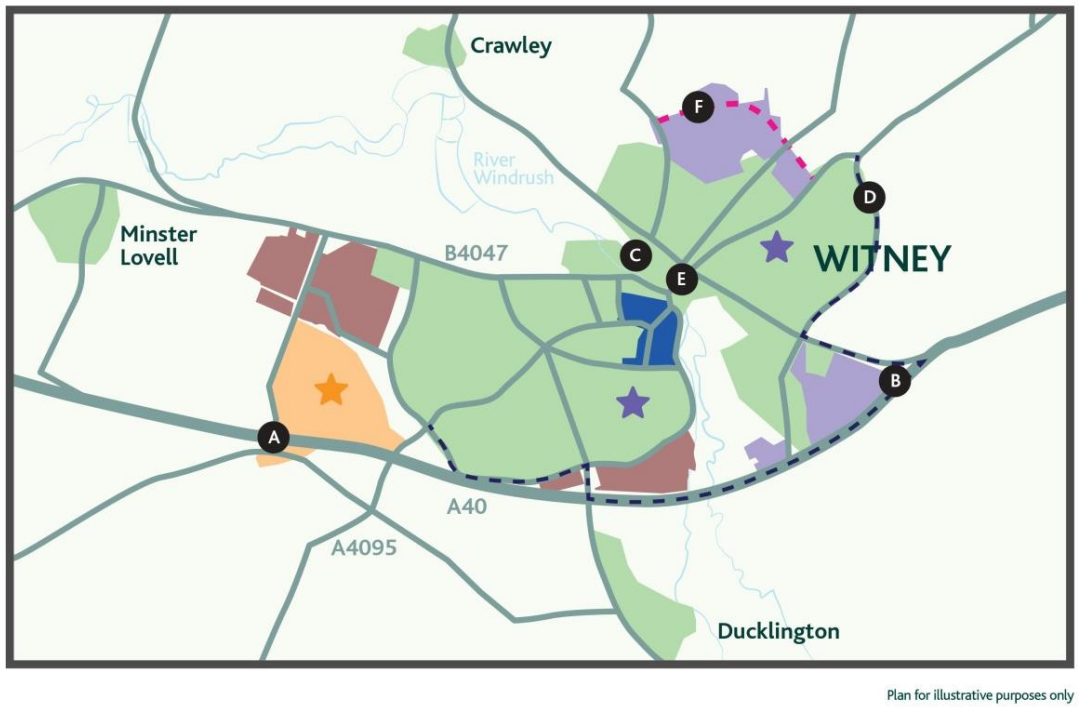
Secure strategic public transport service and infrastructure contributions based on the contribution rate per dwelling or per m2 for non-residential developments

30. This Transport Strategy replaces previous strategies. Planning obligation contributions, secured in order to mitigate the impacts of development, towards previous strategies will be able to be used on the updated LTP4 Witney Strategy and be in accordance with the planning obligations.

References

WODC Local Plan 2031 (March 2015)

http://www.westoxon.gov.uk/residents/planning-building/planning-policy/local-development-framework/local-plan-2031-examination/



Witney

Transport Schemes

- **A** An all-movement at-grade junction on the A40 at Downs Road, related to the West Witney strategic housing and employment site
- **B** West-facing slip roads at A40 Shores Green junction and improvements to the B4022 Oxford Hill junction with Jubilee Way and Cogges Hill Road to be delivered by housing development at East Witney
- **C** A feasibility and viability assessment of West End Link Road 2 (WEL2), a new road bridge crossing the River Windrush
- **D** Re-designating the A4095 via Jubilee Way, Oxford Hill, A40, Ducklington Lane and Thorney Leys
- **E** Implementing schemes to deter through traffic from using Bridge Street and the Woodstock Road to manage air quality
- **F** Ensuring development at North Witney is served by a Northern Distributor Road

Key

- Local Plan residential areas
- Local Plan mixed use areas comprising residential and employment
- Existing commercial/employment areas
- Existing settlement
- Town centre
- New Road Scheme
- Re-designation of the A4095
- Proposed Secondary School
- Existing Secondary School

Witney Figure 1: Indicative map of transport infrastructure and proposed growth in Witney

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Service and Community Impact Assessment (SCIA)

Front Sheet:

Directorate and Service Area:

E&E Strategy and Policy

What is being assessed?

Local Transport Plan (LTP) 4

Responsible owner / senior officer:

John Disley

Date of assessment:

24 June 2015

Summary of judgement:

LTP4 policies have been assessed as mainly positive in terms of their impacts on protected characteristics. The strongest positive impact is in terms of age and disability, where transport and accessibility are critical areas and where engagement with disability groups during the development of LTP4 and the previous LTP3 is reflected in the various policies that have been developed. The same is true of a smaller but still significant number of policies in respect of sex/marriage/pregnancy/maternity where again transport and accessibility are important. Transport policies are largely irrelevant in respect of ethnicity,

religion/belief/sexuality/gender reassignment, which is to be expected. There are significant and mainly positive impacts on rural and deprived communities although each has one policy having a negative impact. There are also significant and mainly positive impacts on council services.

LTP4 strategies have also been assessed as mainly positive in terms of their impacts on protected characteristics. This is particularly the case with the cycling strategy which has a strong and wide ranging emphasis on inclusion. The freight and bus strategies are also mainly positive, albeit to a lesser extent. The Science Transit strategy is balanced between one positive and one negative but this is still a very high level strategy and this may change when more detailed proposals emerge.

Turning to the area strategies, the Oxford Transport Strategy is the most strongly positive reflecting a strong emphasis on inclusion and deprivation as set out in the “tale of two cities” section. Banbury and to a lesser extent Science Vale take account of deprivation, while Witney, Carterton and Bicester have little impact at all.

Detail of Assessment:

Purpose of assessment:
This assessment has been carried out in parallel with the development of LTP4 policies, area strategies and mode strategies

Statement of reasons and context for undertaking the assessment:

Section 149 of the Equalities Act 2010 ("the 2010 Act") imposes a duty on the Council to give due regard to three needs in exercising its functions. This proposal is such a function. The three needs are:

- Eliminate unlawful discrimination, harassment and victimisation and other conduct prohibited by the Equality Act.
- Advance equality of opportunity between people who share a protected characteristic and those who do not.
- Foster good relations between people who share a protected characteristic, and those who do not.

These protected characteristics are:

- age
- disability
- gender reassignment
- pregnancy and maternity
- race – this includes ethnic or national origins, colour or nationality
- religion or belief – this includes lack of belief
- sex
- sexual orientation
- marriage and civil partnership

Complying with section 149 may involve treating some people more favourably than others, but only to the extent that that does not amount to conduct which is otherwise unlawful under the new Act. The need to advance equality of opportunity involves having due regard to the need to:

- remove or minimise disadvantages which are connected to a relevant protected characteristic and which are suffered by persons who share that characteristic,
- take steps to meet the needs of persons who share a relevant protected characteristic and which are different from the needs other people, and
- encourage those who share a relevant characteristic to take part in public life or in any other activity in which participation by such people is disproportionately low.
- take steps to meet the needs of disabled people which are different from the needs of people who are not disabled and include steps to take account of a person's disabilities.

The need to foster good relations between different groups involves having due regard to the need to tackle prejudice and promote understanding.

Context / Background:
LTP4 is updating the previous LTP3 to reflect the national and local growth agenda.

Proposals:
LTP4 sets out revised policies followed by a number of area transport strategies covering major growth areas (Oxford, Science Vale, Bicester, Banbury, Witney, Carterton), an A420 corridor strategy and mode/subject specific strategies covering cycling, freight and buses.

Evidence / Intelligence and Alternatives considered / rejected:
This is set out in the retrospective process evidence document.

Impact Assessment:

The impacts of LTP4 policies on these various groups have been considered in detail and are set out in the Policy Impact and Strategy Impact tables.

Action plan:		
Action	**By When**	**Person responsible**
Update SCIA post-consultation	30 April 2015	Owen South

Monitoring and review:		
Version	Date	Notes (eg Initial draft, amended following consultation)

Consultation process

STRATEGY	INFORMATION/ EVIDENCE
LTP general (Joy White and Richard Jeremy)	<u>Process:</u> • Pre-consultation meetings were held with OXTRAG (which our key consultation group for people with physical disabilities and visual impairment) and Oxfordshire Age UK. • Pre-formal consultation meeting was held with Banbury group of '*My Life My Choice'*, which represents people with learning disabilities led by their facilitator to learn about the sorts of transport -related problems experienced by people with this type of condition. • The above mentioned groups and others were specifically alerted to the first stage public consultation and invited to respond. • Local communities – both rural and urban – were consulted through parish and town councils and district and county councillors. Information on the profile of respondents was sought, collected, analysed and reported to members. • A full written report and summary of all the consultation feedback was produced and submitted to members and senior officers through interallia CCMT and the LTP members advisory group. • Some key equality-related themes emerged e.g. concern about a possible geographical imbalance in the LTP due to the focus on the knowledge economy spine; and very strong support for investment in cycling and public transport especially buses. <u>Influence:</u> • Involved and informed organisations representing 'protected' and disadvantaged groups and communities about the LTP process and provided the platform for them to influence more detailed areas of transport policy if they wished. • OXTRAG brought our attention to the fact that 'Vulnerable road user audits' are not being carried out as per Council policy. There has been some ongoing correspondence with them about this issue. • Consultation had a major influence on amending the draft goals , objectives and some existing policies –for example:

	(i) the goal and objective relating to the economy were amended to reflect the intention that the LTP should continue to be a broad-based strategy for the whole of Oxfordshire and all social groups and communities; (ii) we introduced a high level equality-related goal and supporting objectives; (iii) it confirmed and reinforced our commitment to boosting cycling and bus services – modes which are most accessible to some 'protected' groups and disadvantaged communities – and led to a more explicit commitment to the goal of achieving modal shift from single occupancy car use (iv) it increased the importance attached to public health and the global and local environment resulting in these being given a clearer and more high profile importance in the strategic goals and objectives. OXTRAG has been briefed on the draft LTP and has been invited to feedback detailed comments as part of the formal consultation.
Freight (Owen South)	<u>Process:</u> Previous knowledge and awareness of the impact of freight traffic on vulnerable road users, and subsequent need – where feasible - to prevent or discourage through-traffic from using residential streets. Consulted with several town/parish councils and individuals in "rural communities". Consulted with the Road Haulage and Freight Transport associations. <u>Influence</u>: Informed and shaped policies/strategies regarding weight limits and lorry routeing advisory systems which will benefit vulnerable road users and local environmental quality in many affected rural communities. Influenced policy regarding lorry rest areas and lorry routeing advisory systems. The former will help improve the safety and employment conditions of long-distance freight drivers.
Oxford Transport Strategy (Martin Kraftl)	<u>Process:</u> • 'Connecting Oxfordshire' roadshow events in Oxford and the 1st stage LTP public consultation • Stakeholder workshops in July and November 2014. OXTRAG were invited and attended both sessions.

	<u>Influence:</u> • The OTS recognises the changing demography of the county, including the ageing population. The strategy includes proposals for major improvements to the city's public transport, walking and cycling networks, which will improve the mobility of those without access to a car, or those unable to drive due to disability. • The strategy also includes proposals to improve transport connections to some of the city's most deprived areas, including parts of east and south east Oxford. This will help improve access to jobs and services for these sections of the community. • The proposed expansion of P&R, including the new links to destinations in Oxford not currently served by P&R, will help ensure people living in rural areas have access to the jobs and services in the city.
Cycling strategy (David Early)	<u>Process:</u> One-to-one consultation with the Oxfordshire Cycle Network (OCN) - a recently formed umbrella group of cycling clubs and campaigning groups throughout the county – an initial contact meeting, followed by a workshop at County Hall. • We had concerns that OCN members and other cyclists responding to the public consultation would be mostly – or all - highly experienced cyclists and overwhelmingly male, so we sent out a request via the OCC intranet for people who either did not cycle or only rarely to attend one of two focus groups. This led to some participation by women and occasional cyclists. • After the workshop, and as the strategy was being developed and written, there was ongoing liaison with the chair of OCN to brief him on progress and hear his views and further ideas. <u>Influence:</u> • Directly involved cycling representatives in developing a vision of cycling, identifying the strategic impediments to cycling growth, where the main problems and needs are, and possible solutions and measures. The cycling strategy in other words was developed to a large extent *with* cycling groups. • OCN participants and other cyclists who responded to the consultation raised the issue of 'inclusive cycling'.

	This had two aspects – firstly, the needs of people, some of them with disabilities, who use non-standard types of cycling vehicles e.g. electric bicycles, tricycles, trailers etc) and may have difficulty using standard infrastructure such as cycle paths and cycle parking, and secondly those individuals who may be discouraged or excluded from cycling because of gender-related or other issues. We learnt a lot more about these barriers from these groups, and where possible the strategy undertakes to design infrastructure and policies to meet these users, and potential users, specific needs, subject to limitations of space and affordability and relevant legal requirements such as DDA.
Bus strategy (Neil Comley)	<u>Process:</u> • In spring 2014 we undertook pre-formal consultation with reps from Age UK who raised issues to do with public transport e.g. support for community transport, support for people making the transition when they stop driving, concessionary fare scheme, and encouraging active travel amongst this demographic (walking and cycling). • At around the same time a series of 'roadshow' events were held across the County led by senior members to publicise various high profile transport proposals and the imminent development of a new LTP and public consultation on it. • In summer 2014 we held the first stage public consultation 'Connecting Oxfordshire' – a written 6 week consultation - prior to developing our strategies - this was open to members of the general public and, in addition, specific stakeholders and democratic representatives from all tiers of local government, representing 'protected' groups and geographical 'communities and communities of interest, were specifically encouraged to participate. • In the major growth areas i.e. Banbury, Bicester, Science Vale, Witney & Carterton, and Oxford, detailed consultation was held with a wide range of stakeholders in the process of developing area transport strategies which included detailed bus proposals (see evidence under area strategies). These have fed in to the overall county bus strategy. • Proposals for supported bus services are currently out to consultation and will be going through their own SCIA.

	<u>Influence:</u> • As mentioned above the first stage consultation led to the amendment of some goals, strategies and policies which gives greater weight to modal shift to public transport and active travel esp. cycling. It also reinforced the importance of concentrating on the whole of the county bus network not only narrowly on the growth areas. • As a result of the consultation the bus strategy has tried to maximise the potential benefits from development-related funding to improve bus services not only for residents and employees in new developments but also existing populations, particularly in those areas where there are high proportions of residents who work locally and have a greater propensity to use bus services for utility journeys. • It also reinforced our awareness of the importance of not only bus-car and bus-rail interchange (i.e. park and ride and train stations) but also the need to improve and enable interchange with walking and cycling and the importance of high quality appropriate PT interchange facilities on all types of bus route across the whole network. • All the above have been given greater prominence in the bus strategy to the greater benefit of certain 'protected groups' that rely on public transport, especially buses, and other sections of society that rely on public transport.
Banbury Transport Strategy	<u>Process:</u> • Banbury faces some challenging community and social issues with many of these issues related, but not confined, to the complex problems of deprivation. According to the Index of Multiple Deprivation 2010, in Banbury, areas of Ruscote ward and Banbury Grimsbury and Castle Ward, are amongst the 20 per cent most deprived areas nationally *(Source: Cherwell Local Plan Proposed Modifications, February 2015)*. • In developing the LTP4 Area Strategy for Banbury, 2011 Journey to Work Census Data has been analysed. The data indicated significant demand for travel from the residential areas in the west of Banbury (including some of the deprived areas) to employment areas in the east of the town.

	Influence: • The emerging Bus Strategy was informed by these findings and comprises a short/medium term focus on improving west-east links in the town, with wards served including Ruscote and Grimsbury. • The Area Strategy for Banbury will therefore bring improved access to services, facilities and employment for those residents living in some of the most deprived areas of the town, particularly those who may not have access to a car, whilst at the same time managing traffic associated with growth of the town.
Science Vale Transport Strategy	Process: • Consultation with rural communities as part of the on-going development of the A420 strategy, A417 strategy and schemes such as Chilton slips. • Consultation as part of the development of the cycle strategy including cycle audits, consultation with the business parks, BUGs, Parish Councils, etc. Influence: • The recent LSTF bid included Wheels to Work scheme which focuses on helping NEETS get access to work.

SCIA Table of LTP4 Policy Impacts

Policy number	Policy Description	SCIA IMPACT (+ or -) P = potential, L = likely, D = definite							Policy Impact Description
		Disability/age	Sex/marriage/pregnancy/maternity	Ethnicity/religion	Sexuality/gender reassignment	Rural communities	Areas of deprivation	Council services and staff	
1	Ensure transport network supports sustainable economic and housing growth while protecting environment and heritage and supporting health and wellbeing	P+	P+				P+	P+	Sustainable should mean catering inclusively for these groups. The emphasis on health and wellbeing is positive for these groups who can face challenges with these.
2	Manage and, where appropriate, develop and extend road network to reduce congestion and minimise disruption and delays, prioritising strategic routes					P+		P+	Should reduce rat running through rural communities and benefit rural residents who rely on road transport (car or bus) as well as councils and their staff who need to get to work or visit clients by road.
3	Make more efficient use of transport network capacity by reducing share of single occupancy car trips and increasing share of journeys on foot, by bicycle and public transport	P+				P-	P+	P+	Benefits older, younger and disabled people who depend on non-car modes. Can reduce cost of infrastructure investment for councils. May be negative for car dependent rural residents.
4	Prioritise the needs of different types of user in developing transport schemes or considering development proposals, taking account of road classification/function and the need to make efficient use of transport network capacity	P+							Needs of disabled people and elderly people could be taken into account on the base of this.

5	Classify and number the roads in our control to direct traffic, particularly lorry traffic, onto the most suitable roads as far as is practicable	P+	P+			D+	P+		
6	Support measures to reduce the number of HGVs travelling through the county, by promoting freight by rail and working to improve strategic roads	P+	P+			D+	P+	P+	Fewer lorries benefit vulnerable road users in these groups, rural communities who often raise this issue, and potentially also council road maintenance costs
7	Work with operators and others to enhance network of high quality, integrated public transport services, interchanges and other infrastructure, and support the development of appropriate quality bus and rail partnerships	P+	P+			P+	P+	P+	Higher quality public transport services and interchanges will be more accessible and inclusive, benefitting rural and deprived communities and others who depend on public transport
8	Work with partners towards the introduction and use of smart, integrated payment solutions for a range of transport	P+						P+	Can be easier to use for people with some disabilities, can help council services such as concessionary fares
9	Work with the rail industry to enhance the rail network in Oxfordshire and connections to it, where this supports OCC objectives for economic growth	P+					P-	P+	Better rail network can benefit those who enjoy discounted travel and help meet council economic objectives but can push up housing costs
10	Support the development of air services and facilities that OCC considers necessary to support OCC objectives for economic growth								Not likely to affect these groups specifically
11	Manage parking under OCC control and work with district councils to ensure that overall parking provision and controls, including the potential for further decriminalised parking in Oxfordshire, are financially viable and support the objectives of local communities and this Plan	P+	P+				P+	P+	Parking restraint can benefit those without access to a car and if pavement parking is tackled can benefit disabled, elderly, child and parent pedestrians
12	Work in partnership to identify how access to employment, education, training and services can be improved, particularly for those with disabilities or special needs, or who have difficulties walking/cycling/using public transport or are without access to a car	P+					P+	P+	Specifically targets these groups and improves access to council services
13	Support the development and use of locally-organised community transport to meet local accessibility needs	P+				P+	P+	P+	Community transport is important to those without cars particularly in remote rural areas

14	Support the research, development and use of new technologies and initiatives that improve access to jobs and services taking into account their environmental impact and fit with other Plan objectives	P+				P+	P+		Improved access to jobs and services can benefit these groups
15	Target new investment and maintain transport infrastructure to minimise long term costs							P+	Helps councils with financial constraints
16	Publish and keep updated OCC policy on prioritisation of maintenance activity in the Highways Asset Management Plan								Not applicable
17	Ensure through cooperation with the districts and city councils, that the location of development makes the best use of existing and planned infrastructure, provides new or improved infrastructure and reduces the need to travel and supports walking, cycling and public transport	P+	P+				P+	P+	Enables active travel and public transport to bring health and wellbeing benefits – this is positive for these groups who can face challenges with these, and helps those without access to a car. Councils reap healthcare savings.
18	Help reduce the need to travel through improving internet and mobile connectivity and other initiatives that enable to people to work at or close to home	P+	P+			P+		P+	Helps older, younger, disabled, parent/carer people, particularly in rural areas to access work and services and helps councils with service delivery.
19	Encourage use of modes of transport associated with healthy and active lifestyles	P+	P+				P+	P+	Enables active travel to bring health and wellbeing benefits – this is positive for these groups who can face challenges with these, and helps those without access to a car. Councils reap healthcare savings.
20	Carry out targeted safety improvements on walking and cycling routes to schools to encourage active travel and reduce pressure on school bus transport	P+						P+	Health and safety benefits to children and financial savings to councils.
21	Support the use of a wide range of data and information technology to manage the network and influence travel behaviour, working with partners to ensure that travel information is timely, accurate and easily accessible in appropriate formats for different user groups	P+		P+					This is designed to benefit those with disabilities and who speak different languages
22	Promote the use of low carbon forms of transport, including electric vehicles and	P+							Contributes to tackling climate change which will impact most on younger

	associated infrastructure where appropriate								generation
23	Work to reduce the emissions footprint of transport assets and operation where economically viable, taking into account energy consumption and the use of recycled materials	P+							Contributes to tackling climate change which will impact most on younger generation
24	Avoid negative environmental impacts of transport and where possible provide environmental improvements, particularly in Areas of Outstanding Natural Beauty, Conservation Areas, etc.					P+	P+		Negative impacts of transport can be particularly acute in deprived areas and in rural communities
25	Work with partners to improve public spaces and de-clutter the street environment	P+	P+						Improved public spaces can be more accessible for older and disabled people and parents with pushchairs
26	Record, protect, maintain and improve the public rights of way network so that all users are able to understand and enjoy their rights in a safe and responsible way	P+	P+						Improved rights of way can be more accessible for older and disabled people and parents with pushchairs
27	Support appropriate opportunities for improving towpaths along the waterways network, where it would not harm the ecological value of the area or waterway network	P+	P+						Improved towpaths can be more accessible for older and disabled people and parents with pushchairs
28	Consult from an early stage in the development of schemes and initiatives so that the needs of individuals, communities and all groups sharing a protected characteristic under the Equalities Act 2010 are considered and, where appropriate, acted upon	P+	P+	P+	P+				Helps these specific groups
29	Work with district and city councils to develop and implement transport interventions to support Air Quality Action Plans, giving priority to measures which also contribute to other transport objectives	P+	P+			P+	P+		These groups can suffer poor health from poor air quality and deprived areas as well as rural market towns can experience some of the poorest air quality

30	Identify those parts of the highways network where significant numbers of accidents occur and propose solutions to prevent accidents	P+	P+				P+		Men and children in deprived areas experience higher road casualty rates. Older and disabled people can suffer more serious injuries
31	Work with partners to support road safety campaigns and educational programmes aimed at encouraging responsible road use and reducing road accident casualties, keeping speed limits under review, including consideration of new lower speed limits and zones	P+	P+				P+		Men and children in deprived areas experience higher road casualty rates. Older and disabled people can suffer more serious injuries
32	Support the development of Neighbourhood Plans. Where a Neighbourhood Plan has been adopted and providing it is consistent with LTP4, the Council will seek funding to secure the Plan's transport improvements from local developments and the CIL as appropriate.					P+	P-		May benefit more assertive communities such as in rural areas but less so in deprived areas with less involved citizens
33	Work in partnership with the Growth Board and developers to meet the objectives of LTP4 and seek external funding to support the delivery of transport infrastructure priorities as set out in the Strategic Economic Plan and forthcoming Oxfordshire Infrastructure Strategy								No clear impacts, and LEPs may prioritise business needs over these groups' needs
34	Oxfordshire County Council will require the layout and design of new developments to proactively encourage walking and cycling, especially for local trips, and allow developments to be served by frequent, reliable and efficient public transport. To do this, we will: • secure transport improvements to mitigate the cumulative adverse transport impacts from new developments in the locality and/or wider area, through effective travel plans, financial contributions from developers or direct works carried out by developers; • identify the requirement for passenger transport services to serve the development,	P+	P+			D+	P+	P+	Fewer lorries benefit vulnerable road users in these groups, rural communities who often raise this issue, and potentially also council road maintenance costs. Enables active travel and public transport to bring health and wellbeing benefits – this is positive for these groups who can face challenges with these, and helps those without access to a car. Councils reap healthcare savings.

	seek developer funding for these to be provided until they become commercially viable and provide standing advice for developers on the level of Section 106 contributions towards public transport expected for different locations and scales of development; • ensure that developers promote cycling and walking for journeys associated with the new development, including through the provision of effective travel plans; • require that all infrastructure associated with the developments is provided to appropriate design standards and to appropriate timescales; • set local routeing agreements where appropriate to protect environmentally sensitive locations from traffic generated by new developments; • seek support towards the long term operation and maintenance of facilities, services and selected highway infrastructure from appropriate developments, normally through the payment of commuted sums; • secure works to achieve suitable access to and mitigate against the impact of new developments in the immediate area, generally through direct works carried out by the developer.								

SCIA Table of LTP4 Strategy Impacts

Strategy	SCIA IMPACT (+ or -) P = potential, L = likely, D = definite							Strategy Impact Description
	Disability/age	Sex/marriage/pregnancy/maternity	Ethnicity/religion	Sexuality/gender reassignment	Rural communities	Areas of deprivation	Council services and staff	
Freight	P+				L+	P+		Main benefits of lorry route management, mapping and weight limits will be to rural and some deprived communities and to vulnerable road users
Cycling	P+	P+	P+			P+	P+	An inclusive strategy that seeks to extend the appeal of cycling to women, less confident cyclists and people with disabilities
Bus	L+				P-	P+		Reflects close working with age/disability groups e.g. on accessible bus stops and minimising walking distances to them, disability awareness training for staff, accessibility of mainstream buses to allow specially adapted vehicles to be used by those with severest disabilities. Proposals for supported bus services are currently out to consultation and will be going through their own SCIA.
Science Transit	P+				P-			This is a high level strategy with many details yet to be determined. It is likely to

								open up access to high level employment by people without access to a car but may divert resources away from social inclusion objectives of traditionally supported bus services
Banbury						P+		Strong emphasis on new bus links between areas of deprivation and employment sites
Bicester								No strong SCIA implications
Oxford	L+	P+				P+		Strong emphasis on inclusion and equality issues. WPL should balance income tax system that favours car users. Cycle network and Science Transit will benefit deprived areas and less confident cyclists.
Science Vale						P+		Cycle route network should help inclusive access to employment and services
Witney								No strong SCIA implications
Carterton								No strong SCIA implications

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