

Oxfordshire County Council

A40 Science Transit Stage 2

Option Assessment Report (OAR)

February 2017

Version	Author	Comment
1.0	RO'N	First draft, sent to DfT 07/16
2.0	RO'N	Revised following comments from DfT, supplied to SDG 11/16
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3.2	RO'N	Revised following Gate 2 assessment 01/17
4.0	RO'N	Final draft

Note: For traffic data in this report, the 2013 information is still used because the data for 2014 and 2015 (and 2016) will have been affected by the works first at London Rd, Headington and Green Road roundabout in 2014 and then Wolvercote & Cutteslowe Rbts since mid 2015. Given that these works have had a considerable effect on travel times on A40 and seem to have had a big impact on the flows, these have been discounted as being used as a representative base case against which to judge the scheme. A footnote has been added at the appropriate pages.

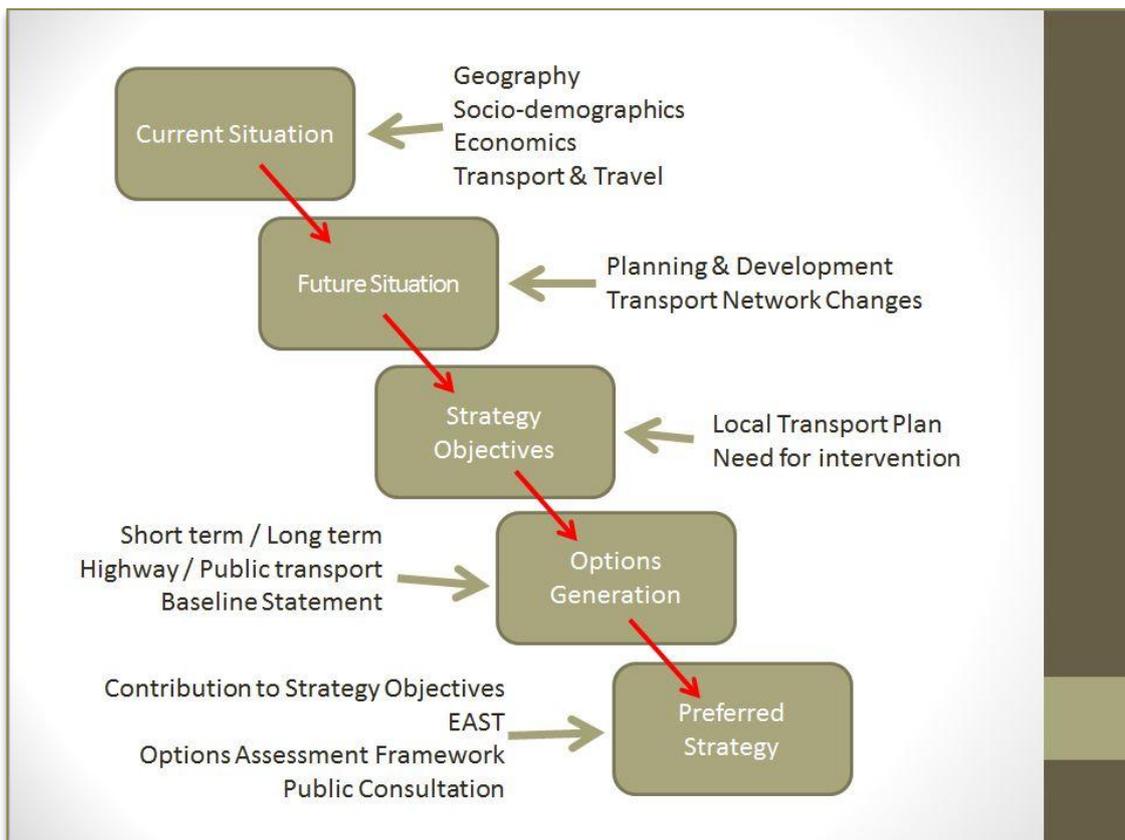
A40 Science Transit Stage 2 Option Assessment Report (OAR)

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1. Introduction

- 1.1. The section of A40 between Witney and north Oxford is subject to heavy congestion for long periods of most weekdays, as well as during some parts of the weekend. This congestion manifests itself as stationary or rolling queues which can extend for the whole 11km length of the road between the two settlements westbound in the morning peak and for traffic on large lengths of the road in both directions in the evening peak periods.
- 1.2. This report outlines the development of strategy options which were investigated in order to select a preferred long term strategy option for the A40. This strategy development has been undertaken according to the following process:



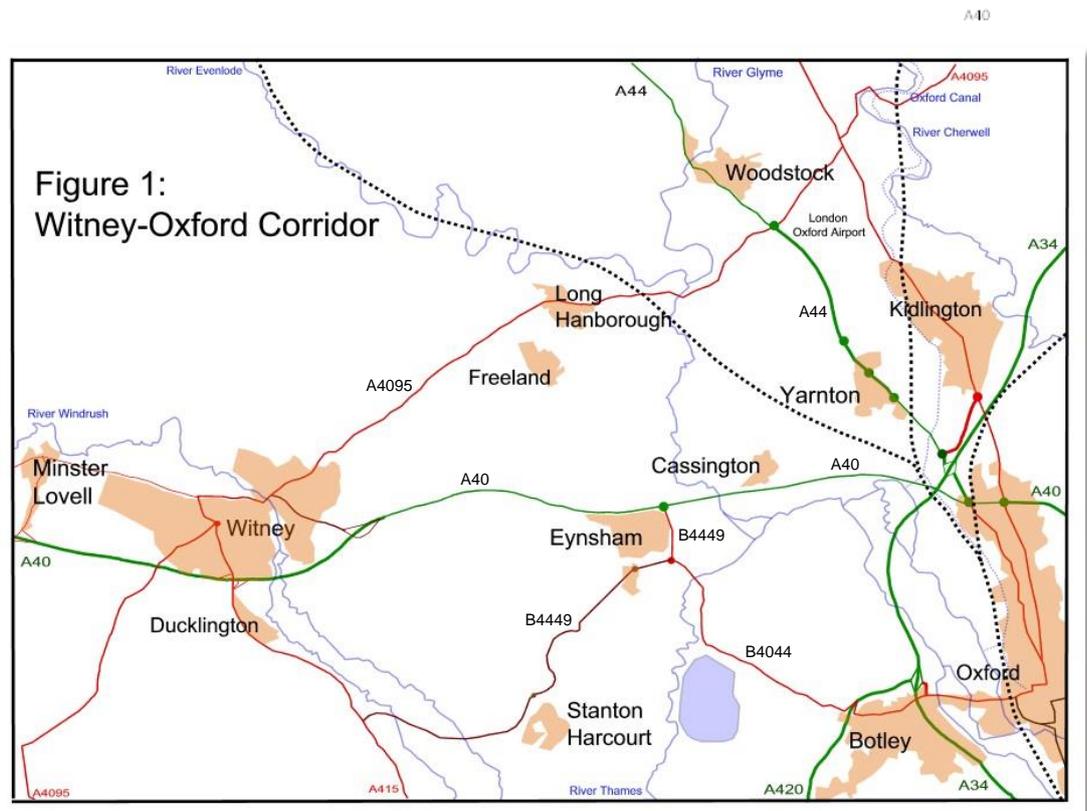
The Options Assessment Process

- 1.3. The first element of the preferred strategy, the A40 Science Transit Phase 2 project, has been further developed as a stand-alone scheme for implementation as a Local Major Scheme.

2. Current Situation

2.1. Geographic Context

2.1.1. West Oxfordshire is one of the five districts which comprise the county of Oxfordshire. Its largest settlement is Witney but other significant centres in the district include Carterton and Chipping Norton. The district spans the area between the Oxford Green Belt and the Cotswolds Area of Outstanding Natural Beauty. Its southern boundary is marked by the River Thames and a number of the Thames' major tributaries (e.g. the Glyme, Windrush and Evenlode) flow through the district.



2.1.2. The A40 forms a major east-west route across the south of the district. It forms the Primary Route between Oxford and Cheltenham as well as being part of the long distance route between London and south-west Wales. The road passes close to Witney and Carterton as well as the smaller settlements of Eynsham and Burford, although it does not pass through any of these. The A40 is also signed as the advisory route for lorry traffic between Oxford and Evesham to encourage these vehicles to avoid the Air Quality Management Area in Chipping Norton.

- 2.1.3. The A40 forms the most direct transport link between Oxford and Witney although there are less suitable alternatives using A4095/A44 and B4449/B4044; the A4095/A44 also forms an informal route for bypassing the A40 and Oxford and accessing the M40 for longer distance traffic. The B4044 passes over the Swinford Toll Bridge which severely restricts its capacity and is also subject to queues at peak hours; the A4095 passes through the centre of Witney where there are long-standing capacity and environmental issues. Currently nearly all public transport connections between Oxford and Witney also use the A40, at least on the section between Witney and Eynsham. Some vehicle traffic between Carterton and Oxford travels via Bampton (B4449/A415) to the A420 to avoid the A40.
- 2.1.4. Witney is an historic market town which has had traditional links to the wool trade and, especially with blanket weaving. This trade has been lost in the last few decades and Witney has developed into a service centre although it retains some light engineering. It has also become an important dormitory centre for people working in Oxford.
- 2.1.5. Carterton was founded in the 19th century as a homestead plantation which was favoured by retired soldiers and made a name for itself as a centre for market gardening. The development of RAF Brize Norton from the 1930s has played a major part in the town's history and it now forms a major part of the local economy both directly and through local servicing of the base.
- 2.1.6. Eynsham is a large and expanding village which originally grew up around a medieval monastery and became an important coaching stop on the London-Fishguard road and wharfage on the River Thames.

2.2. Socio-demographic Context

2.2.1. West Oxfordshire is one of the most rural districts in south-east England. In 2015 its population was estimated to be 108,600; in the 2011 census it was estimated that there were 43,241 households in the district. This included an economically active population of 60,700 – at 88% of the 16-64 population significantly higher than the proportion for the region or for Great Britain as a whole.

Table 1: Total population (2015)

	West Oxfordshire (numbers)	South East (numbers)	Great Britain (numbers)
All people	108,600	8,947,900	63,258,400
Males	53,600	4,404,400	31,165,300
Females	55,100	4,543,500	32,093,100

Source: ONS Population estimates - local authority based by five year age band

Table 2: Employment and unemployment (Jul 2015-Jun 2016)

	West Oxfordshire (numbers)	West Oxfordshire (%)	South East (%)	Great Britain (%)
All people				
Economically active†	60,700	88.2	80.8	77.9
In employment†	59,900	86.9	77.3	73.8
Employees†	48,000	70.8	65.5	63.1
Self employed†	11,900	16.1	11.6	10.3
Unemployed§	1,600	2.6	4.1	5.1

Source: ONS annual population survey

† - numbers are for those aged 16 and over, % are for those aged 16-64

§ - numbers and % are for those aged 16 and over. % is a proportion of economically active

2.2.2. The qualification levels of the population of West Oxfordshire are polarised with higher than regional and national proportions of people with NVQ2 level qualifications or above but also a higher proportion of the population with no qualifications. Average earnings in the district are higher than the national average, but lower than the average for South East England. Unemployment is low at 0.5% (October 2016) compared to 1.1% in South East England and 1.8% for Great Britain as a whole.

Table 3: Qualifications (Jan 2015-Dec 2015)

	West Oxfordshire	South East	Great Britain
	(%)	(%)	(%)
NVQ4 and above	50.1	39.8	37.1
NVQ3 and above	63.8	58.8	55.8
NVQ2 and above	78.2	76.8	73.6
NVQ1 and above	85.3	88.5	84.9
Other qualifications	#	5.2	6.5
No qualifications	9.6	6.3	8.6

Source: ONS annual population survey

Sample size too small for reliable estimate Note: % is a proportion of resident population of area aged 16-64

Table 4: Earnings by residence (2016)

	West Oxfordshire	South East	Great Britain
	(£)	(£)	(£)
Gross weekly pay			
Full-time workers	575	582	541
Male full-time workers	674.8	634.5	581.2
Female full-time workers	504.1	512.3	481.1
Hourly pay - excluding overtime			
Full-time workers	14.51	14.85	13.66
Male full-time workers	15.24	15.76	14.25
Female full-time workers	13.52	13.59	12.84

Source: ONS annual survey of hours and earnings - resident analysis

Note: Median earnings in pounds for employees living in the area.

2.2.3. In the 2011 Census it was estimated that there were 65,824 cars registered to households in West Oxfordshire, an average of 1.5 cars per household. This car ownership level is higher than the figure for South East England (1.35 cars per household). There were 5,164 households (12%) in West Oxfordshire without a car, lower than the regional figure of 18.6%. These figures suggest that West Oxfordshire does currently display a high level of perceived car dependency.

Table 5: Car or van availability

	total
All categories: Car or van availability	43,241
No cars or vans in household	12%
1 car or van in household	41%
2 cars or vans in household	35%
3 cars or vans in household	9%
4 or more cars or vans in household	3%
sum of all cars or vans in the area	65,824

Source: 2011 census

2.3. Economic Context

- 2.3.1. According to the UK Competitive Index 2013 Oxfordshire, at £24,900 per person, had a GVA per capita which was well above the national (England, £21,937) and regional (£22,639) averages. West Oxfordshire, though, lags behind the rest of the county with a GVA per capita of £19,274, below the regional and national level, and is ranked 134 of the 379 UK local authorities.
- 2.3.2. In overall competitiveness the UKCI 2013 ranked West Oxfordshire as 78th out of the 379 local authority areas, again the lowest district in Oxfordshire. In the 2016 UKCI West Oxfordshire was ranked as the 84th most competitive local authority area.
- 2.3.3. West Oxfordshire has a higher proportion of senior managers, technical professions and skilled trades than either the South East or Great Britain while it has a lower proportion of workers in most other types of occupation.

Table 6: Employment by occupation (Jul 2015-Jun 2016)

	West Oxfordshire (%)	South East (%)	Great Britain (%)
Soc 2010 major group 1-3	47.2	49.1	44.9
1 Managers, directors and senior officials	15	11.9	10.5
2 Professional occupations	16.2	21.8	20
3 Associate professional & technical	16	15.2	14.2
Soc 2010 major group 4-5	24	20.9	21.2
4 Administrative & secretarial	10.3	10.7	10.5
5 Skilled trades occupations	13.7	10.2	10.5
Soc 2010 major group 6-7	15.2	16.1	16.8
6 Caring, leisure and other service occupations	7.8	9	9.2
7 Sales and customer service occupations	#	7.1	7.5
Soc 2010 major group 8-9	13.7	13.9	17.2
8 Process plant & machine operatives	#	4.9	6.4
9 Elementary occupations	9	8.9	10.7

Source: ONS annual population survey

Sample size too small for reliable estimate

Notes: Numbers and % are for those of 16+; % is a proportion of all persons in employment

2.3.4. The district has a high proportion of manufacturing jobs (11.9%) compared to the national and regional level, as shown in Table 7, and also higher levels of jobs in education (10.7%), arts and entertainment (4.2%) and accommodation and food services (9.5%). It has lower than the national and regional levels of jobs in health and social care, administrative and support services.¹

Table 7: Employment jobs by industry

	West Oxfordshire (employee jobs)	West Oxfordshire (%)	South East (%)	Great Britain (%)
G : Wholesale and retail trade; repair of motor vehicles and motorcycles	7,000	16	17	16
C : Manufacturing	5,000	12	6	8
P : Education	4,500	11	10	9
I : Accommodation and food service activities	4,000	10	7	7
Q : Human health and social work activities	4,000	10	13	13
M : Professional, scientific and technical activities	3,500	8	9	8
F : Construction	2,250	5	5	5
H : Transportation and storage	2,000	5	5	5
J : Information and communication	2,000	5	6	4
N : Administrative and support service activities	2,000	5	8	9
R : Arts, entertainment and recreation	1,750	4	3	2
S : Other service activities	1,250	3	2	2
L : Real estate activities	1,000	2	2	2
O : Public administration and defence; compulsory social security	1,000	2	3	4
K : Financial and insurance activities	700	2	3	4
E : Water supply; sewerage, waste management and remediation activities	300	1	1	1
D : Electricity, gas, steam and air conditioning supply	75	0	0	0
B : Mining and quarrying	20	0	0	0
	42345	100	100	100

Source: ONS Business Register and Employment Survey

¹ (n.b. these figures from 2015 ONS Business Register and Employment Survey exclude agricultural employment and also jobs within the UK armed forces, both of which are substantial employers within the district.)

- 2.3.5. The district therefore has a resident workforce which has a high level of highly qualified and more senior workers but an employment base more skewed toward middle and low status jobs.

2.4. Planning and Development Context

- 2.4.1. Witney and Carterton are the two largest towns within West Oxfordshire. They have both seen considerable growth over the last 30 years: Witney grew from 15,000 inhabitants to 28,000 between 1981 and 2011 while Carterton grew from 11,000 to 16,000. This has been accompanied by a growth in trips made by residents of the two towns. This is particularly the case for trips to and from Oxford, which acts as a major attractor for employment commuting as well as shopping and leisure activities trips.
- 2.4.2. Population growth in West Oxfordshire is expected to continue to grow in the future; the Draft Local Plan 2031 (July 2015) included provision for 10,500 houses in West Oxfordshire up to 2031, the equivalent of 525 homes per year, with “the majority of new homes will be provided in the Witney, Carterton and Chipping Norton”; the Oxfordshire Strategic Housing Market Assessment (SHMA) (March 2014) gave a Housing Need per Year (2011-31) for West Oxfordshire of 635-685 which substantially increases the required provision.
- 2.4.3. The Draft Local Plan stated that, based on past take up rates, the evidence suggests a need for around 60ha of business development land over the plan period focussed on the main towns where it can be best served by transport and communications infrastructure, and support a range of businesses including larger scale businesses and high technology sectors. About 25ha of this additional land is already identified within existing planning permissions and 51 remaining adopted local plan allocations particularly at Witney, Carterton and Chipping Norton, and with development of 10ha on land west of Downs Road as part of the West Witney Strategic Development Area.

- 2.4.4. West Oxfordshire District Council published proposed amendments to the draft Local Plan in December 2016 to take into account the need to allow for the SHMA and the requirement to cater for an element of the housing need for Oxford which could not be met within the city. This increased the housing target for the district from 10,500 homes from 10,500 to 15,950 and includes increasing the capacity of strategic site allocations at North Witney (1,400 homes) and East Witney (450 homes) and making two new strategic site allocations at West Eynsham (1,000 homes) and West Oxfordshire Garden Village (2,200 homes). A new 40 acre “science park” north of the A40 near Eynsham is also proposed to provide increased job opportunities and capitalise on the area’s proximity to the Oxfordshire “Knowledge Spine”. The strategic site allocations in the A40 corridor are shown in Appendix 1. Additional non-strategic allocations have been proposed along the A40 corridor at REEMA North and Central Carterton (300 homes), Milestone Road, Carterton (200 homes), Swinbrook Road, Carterton (70 homes), East of Burford (85 homes), West of Minster Lovell (85 homes) and Woodford Way, Witney (50 homes).
- 2.4.5. The revised draft Local Plan includes a commitment for contributions to be sought from appropriate new developments towards solutions to the congestion problems on the A40.
- 2.4.6. The Oxfordshire Local Enterprise Partnership’s Strategic Economic Plan (SEP) focuses on providing homes, developing skills and improving connectivity and is the basis upon which the majority of central government funding for transport improvements will be awarded, through the Local Growth Fund. The SEP’s focus on high tech economic activity means that transport investment is likely to be concentrated on links connecting Bicester, Oxford and Science Vale, known as the Knowledge Spine, as well as improving access to it from important centres elsewhere in the county.

2.5. Transport Context

2.5.1. *Connecting Oxfordshire*, the 4th Oxfordshire Local Transport Plan, has been developed around the following over-arching 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, wherever possible enhance Oxfordshire’s environment and improve quality of health
- To improve public health, safety and individual well being

2.5.2. To achieve these goals a series of ten objectives was developed, as shown in Table 8.

Goal	Objective
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
To support the transition to a low carbon future	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.
To support social inclusion and equality of opportunity	Mitigate and wherever possible enhance the impacts of transport on the local built, historic and natural environment
To protect and, wherever possible enhance Oxfordshire’s environment and improve quality of health	
To improve public health, safety and individual well being	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 8: Connecting Oxfordshire Goals and Objectives

2.5.3. The overall strategy in the Local Transport Plan 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 considered vital that journeys made by sole-occupancy private vehicles make up a smaller proportion of transport mileage in the 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 considered necessary simply to accommodate all the journeys that people and goods need to make. Although the Plan does include road schemes to connect new developments, this is in the context of making best use of existing capacity, including taking advantage of smarter methods of travel, and being mindful of the potential of any additional capacity to generate additional car traffic.

2.5.4. In Connecting Oxfordshire the policy for the A40 is included as part of the area strategy for Carterton:

“Congestion on the A40 to the east of Witney causes very lengthy delays for journeys to and from Oxford 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.

“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.”

2.5.5. This is echoed in the area strategy for Witney which notes that:

“Although the A40 Witney Bypass is generally free flowing, congestion on the A40 to the east of the town causes very lengthy delays to 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.”

- 2.5.6. The LTP also includes the County’s Science Transit Strategy which seeks to realise a next-generation mobility and information system for the Knowledge Spine across all modes of travel. Science Transit will link together the innovation hubs and connect them to locations of identified housing and economic growth across the county. It 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.
- 2.5.7. The Science Transit Strategy has been designed to be implemented through a nine-part programme with each part being developed incrementally until it can be incorporated into an integrated whole. This is shown in the Figure 2.
- 2.5.8. The first element putting the Science Transit Strategy into practice was the award of funding through the Oxfordshire City Deal to improve bus priority between A34 and Oxford Ring Road on the southern approaches to the city. A scheme has now been developed and will be implemented from 2017.

Figure 2: 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
	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
High Quality Services	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
	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
Seamless Interchange	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
	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
Easy to use mobility 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
	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.
Smart mobility in formation	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

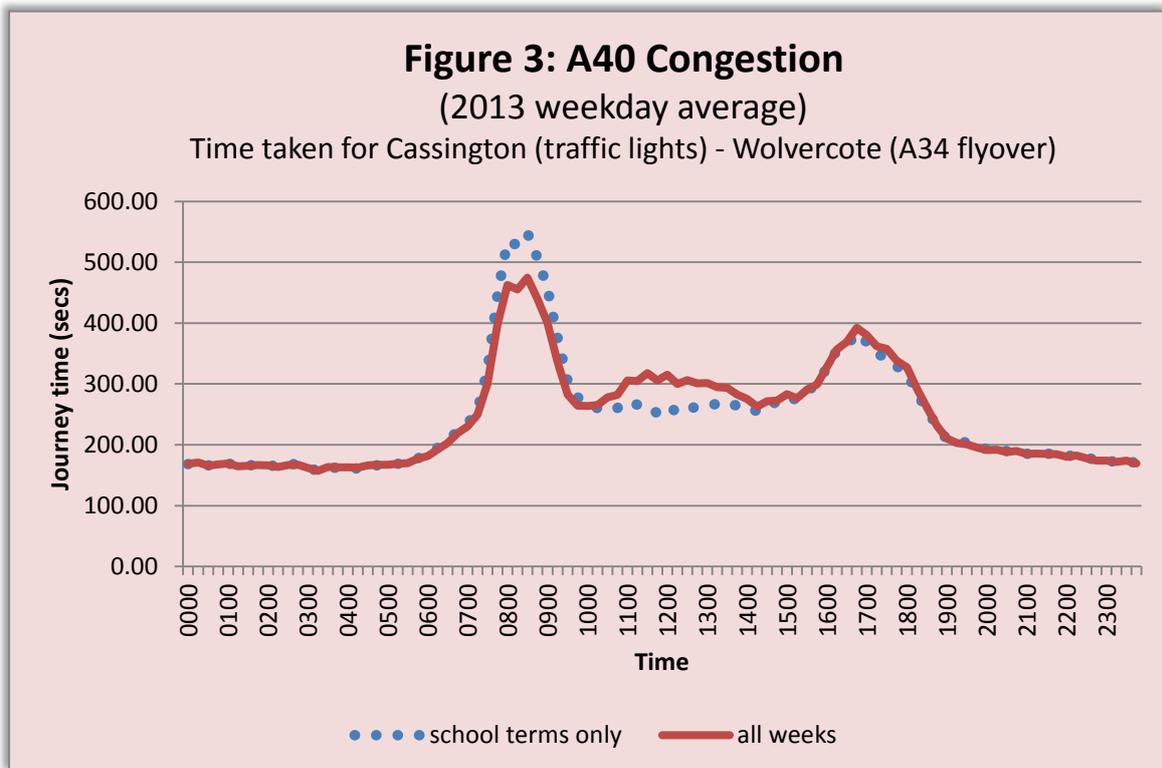
2.6. Travel Demand

Capacity

- 2.6.1. The traffic flow along the A40 exceeds the capacity of the road. This causes severe congestion with low journey speeds and high journey time unpredictability. This problem has been longstanding and was the cause for previous unsuccessful schemes to improve the route in the 1970s and 1990s.
- 2.6.2. Analysis of the flows and link capacities of the route suggests that the section to the west of Eynsham is already well above link capacity, whilst the flow to the east is at or just above its capacity. This conforms with the observation of flow breakdown for westbound traffic in the evening peak west of Barnard Gate, while the impact of the limited capacity on the approaches to Oxford are masked by even greater capacity issues in North Oxford.
- 2.6.3. The problems on the A40 are caused by a combination of:
- Junction capacity limits which mean that the demand for travel cannot be met – currently experienced at Wolvercote Roundabout, Eynsham Roundabout, Cassington traffic signals, Witney Road traffic signals – and queueing back from these junctions can occur throughout the day.
 - Underlying link capacity issues which mean that even if these junction capacity issues were resolved there would still be problems with the road coping with the throughput. At present these are masked to a great extent by the junction capacity issues but are witnessed in the pm peak for westbound traffic between Eynsham and Shores Green.
- 2.6.4. This means that if the problems on the A40 are to be resolved then both the capacity issues at the junctions and the issues on the road itself would have to be addressed. The Wolvercote and Cassington roundabouts were the subject of a major improvement in 2015/2016. The capacity issues on the A40 can be dealt with either directly by increasing the carrying capacity of the road, or indirectly by providing an attractive alternative which can reduce the demand on the road to below its capacity level.

Congestion Monitoring

2.6.5. Congestion monitoring for 2013² showed that the time taken for the 4.1 km journey between Cassington traffic lights and the A34 flyover was just under 3 minutes in off peak conditions. This equates to an average speed of 93 km/h or 58 mph. From about 6:00 am this time begins to rise and at its peak between 8:00 am and 9:00 am the time taken rises to almost 8.0 minutes. At its maximum this gives an average journey speed of 31 km/h or 19 mph. (If school holidays are excluded then the maximum average journey time for trips in school term time is over 9 minutes and the average journey speed is further reduced to 27 km/h or 17 mph.)



2.6.6. After 9:00 am the journey time begins to fall but remains at about 5 minutes until 4:00 pm when it rises to a peak of over 6 minutes for journeys at around 5:00 pm. There is a minor peak during the late morning/mid-day period (i.e. journey speeds are reduced), but this is eliminated if only school term-time data

² Monitoring for 2015 has been discounted as unrepresentative due to improvement works taking place on A40 (at Green Road Roundabout and Wolvercote/Cuttleslowe Roundabouts respectively). Data for 2015 are available and can be produced if required.

is used suggesting this is a non-term time phenomenon. Journey times remain elevated until 7:00 pm after which they fall back to off-peak conditions.

2.6.7. It should be noted that these are average figures and mask the variability that is experienced by regular users of the route. Time series surveys conducted in 2004 suggest that, during the peak period, the worst days can have a journey time up to 50% higher than the average: a journey speed on this section of as low as 16 km/h or 10 mph may be experienced.

2.6.8. A more detailed analysis of journey time data for 2014 has been conducted using Automatic Number Plate Recognition (ANPR) camera data. There are four ANPR camera sites along the section of A40 between Witney and Oxford. These are shown in Figure 4.

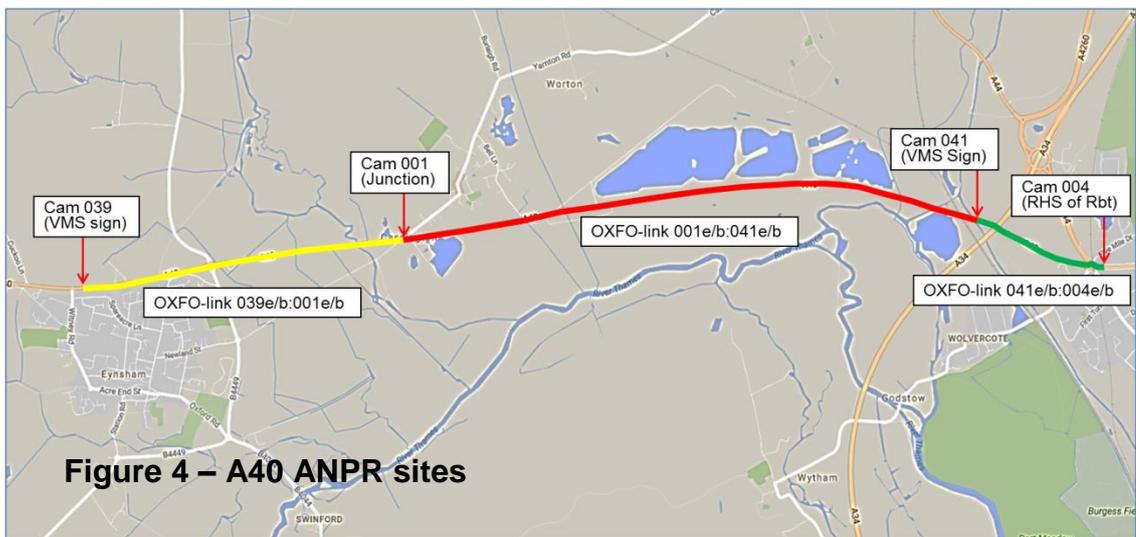
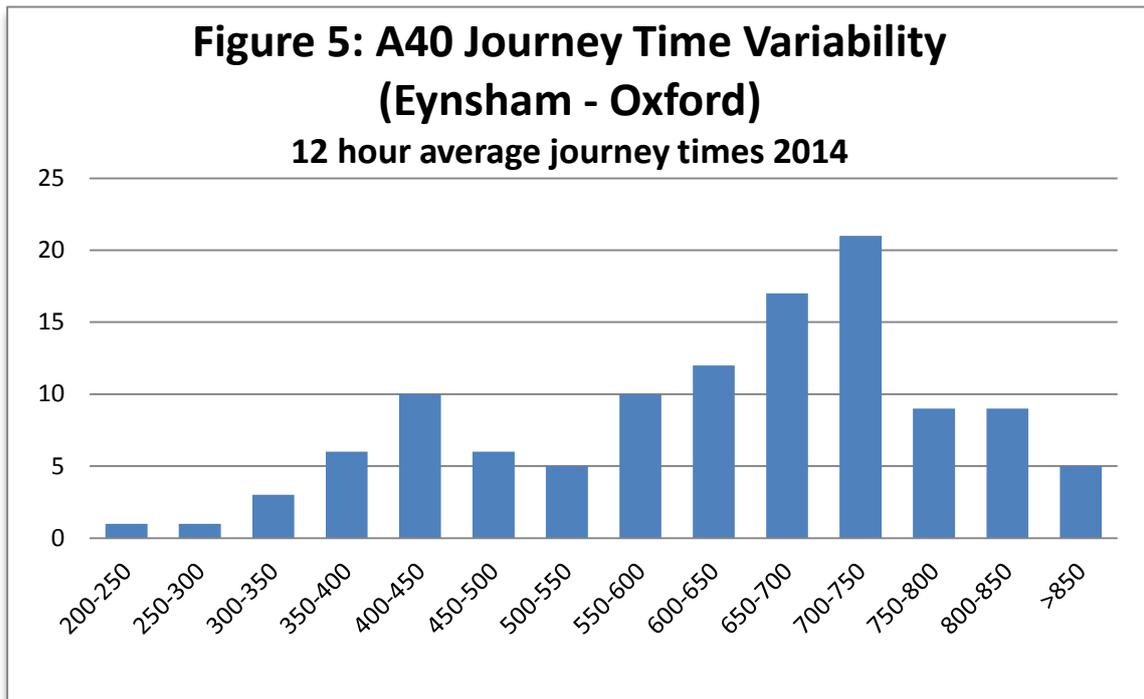


Figure 4 – A40 ANPR sites

2.6.9. This gives three sections where matching can be made and journey times calculated (039-001, 001-041, 041-004). The ANPR data are available for eastbound (i.e. Oxford-bound) traffic only.

2.6.10. Journey time data for 2014 were available the whole journey from Witney Road, Eynsham to Wolvercote roundabout (i.e. all four cameras were operating) on 115 days in 2014. Figure 5 shows the frequency distribution of the 12 hour average journey times in 2014 on this route.

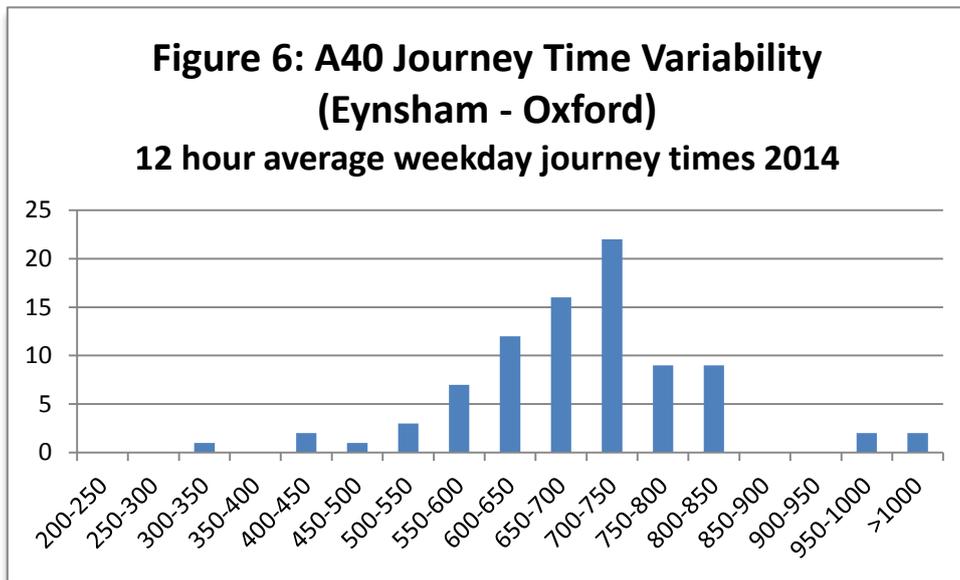


2.6.11. The average journey time was 641 secs but the chart shows that there was wide variation around this. The fastest average journey time was 222 secs, which can be taken as the journey time in free-flow conditions while the slowest was 1695 secs, nearly 8 times slower. A journey time of 641 seconds equates to an average journey speed through the day of 40km/h or 25 mph.

2.6.12. The distribution can be roughly split into 4 groups:

- 200-300 secs – no delays throughout day (2% of days) – generally bank holidays
- 300-550 secs – peak period delays only (26% of days) – generally weekends
- 550-750 secs – delays throughout day (52% of days) - normal weekday conditions
- 750+ secs - extraordinary delays throughout weekday (20% of days) - e.g. incidents or roadworks which result in extended periods of stationary or very slow traffic, these do not have to have their cause on A40 but can be blocks back from incidents on other roads.

2.6.13. If non-bank holiday weekdays only are looked at in more detail then the distribution is as shown in Figure 6.



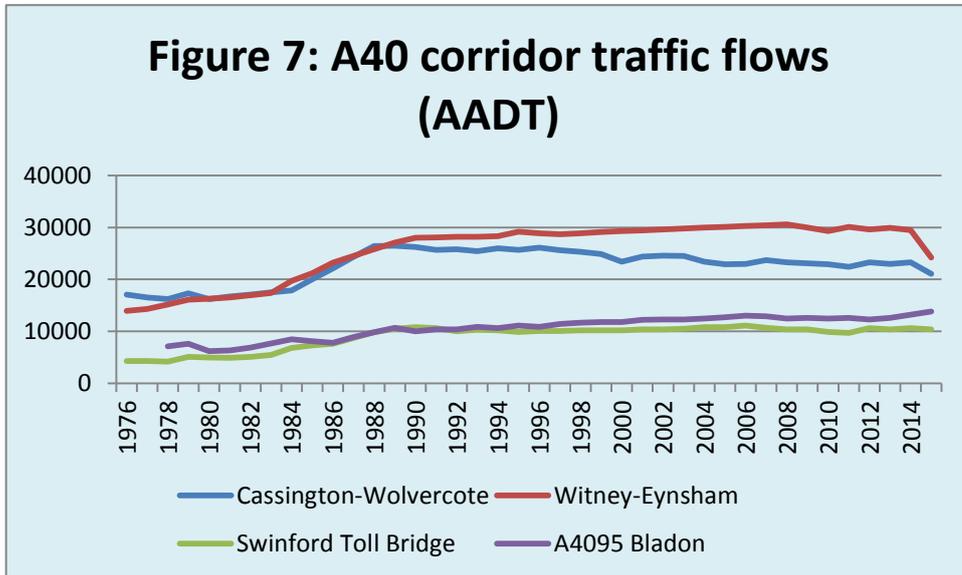
2.6.14. The average journey time for these trips is 719 seconds (11 minutes, 59 seconds), an average journey speed through the day of 36 km/h or 23 mph.

2.6.15. If school holiday weekdays are looked at then these are spread through the distribution of all weekdays having both one of the shortest average times (349 secs) and one of the longest (967). The average journey time is little different than for all weekdays at 715 seconds (11 minutes, 55 seconds) with the most common journey time being around 730 seconds.

Traffic monitoring

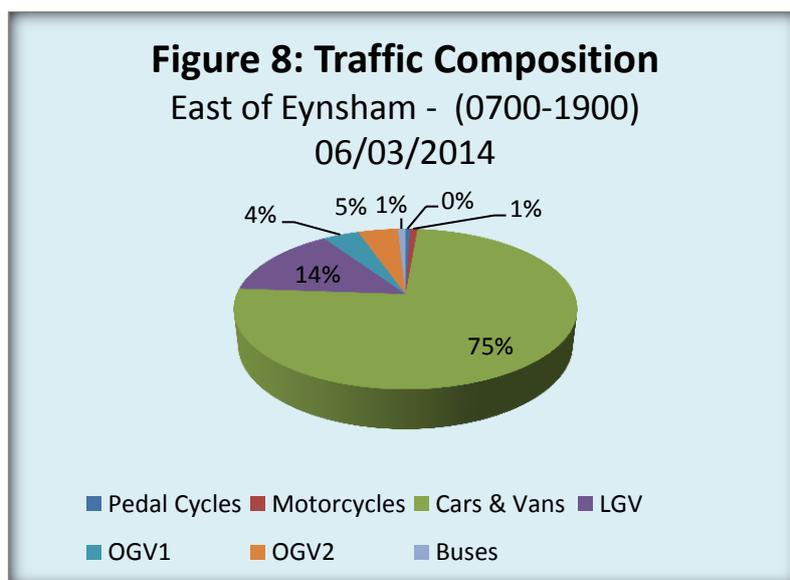
2.6.16. Traffic monitoring since the 1970s (Figure 7) shows a fast increase in traffic levels that was experienced in the 1980s – mirroring the acceleration in population growth in that decade – but that change has become much slower on all routes since around 1990. Traffic on the A40 between Witney and Eynsham has continued to grow, albeit at a slower rate, but between Cassington and Wolvercote it has reduced. This could be related to the continued rise in flow on the A4095 through Bladon suggesting that traffic may be transferring onto that route to avoid the worst congestion on A40. Traffic

using the B4044 over Swinford Toll Bridge has remained fairly steady over the last 20 years.



n.b. the 2015 flows have been affected by the traffic works on A40 in North Oxford to implement the Wolvercote and Cutteslowe Roundabouts Improvement.

2.6.17. The flow on the A40 is predominantly made up of cars and light vans which comprise three quarters of the daytime flow. Goods vehicles make up most of the remainder with buses only making up 1% of the flow.



2.6.18. Figure 9 shows the distribution of origins and destinations of trips on the A40 in the am peak, as given in the 2013 base year matrix of the Oxfordshire Strategic Traffic Model. The flows are dominated by movements between West Oxfordshire and Oxford. It is considered likely that congestion in the Oxford area means that longer distance movements are discouraged from attempting to pass through this part of the network in peak hours and either choose other routes or make their journeys at other times of the day.



Figure 9: Origins and destinations of A40 Traffic

2.6.19. From the 2011 census, 41% of car commuters (about 9,000 people) from the southern wards of West Oxfordshire are going to destinations which will or could use the section of A40 between Witney and Oxford. Commuting to Oxford makes up 16% of all car commutes from these wards (3,600 people), as shown in Figure 10.

THE WORKPLACE DESTINATION OF COMMUTERS (TRAVELLING BY CAR/VAN) FROM WARDS IN THE SOUTH OF WEST OXFORDSHIRE ACCORDING TO THE 2011 CENSUS*

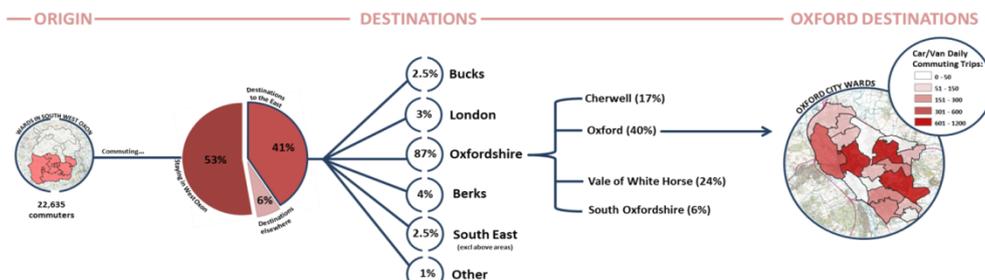


Figure 10

*The data in this table was sourced from the 2011 Census Travel to Work dataset (WU03EW)
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2.6.20. Bus and coach commuters from south West Oxfordshire, as shown in Figure 11, are more locally focused with 56% (980 people) travelling to other parts of Oxfordshire and 60% (1050 people) in total travelling to destinations which could involve travel along the A40 between Witney and Oxford. Commuting to Oxford makes up 52% of all bus commuting from these wards (900 people).

THE WORKPLACE DESTINATION OF COMMUTERS (TRAVELLING BY BUS/COACH) FROM WARDS IN THE SOUTH OF WEST OXFORDSHIRE ACCORDING TO THE 2011 CENSUS*

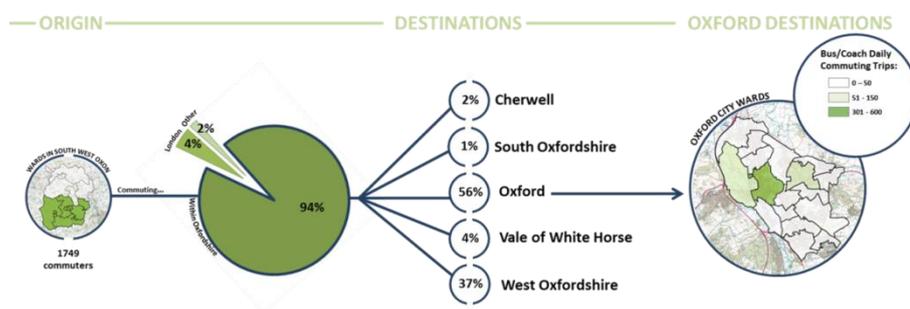


Figure11

*The data in this table was sourced from the 2011 Census Travel to Work dataset (WU03EW)
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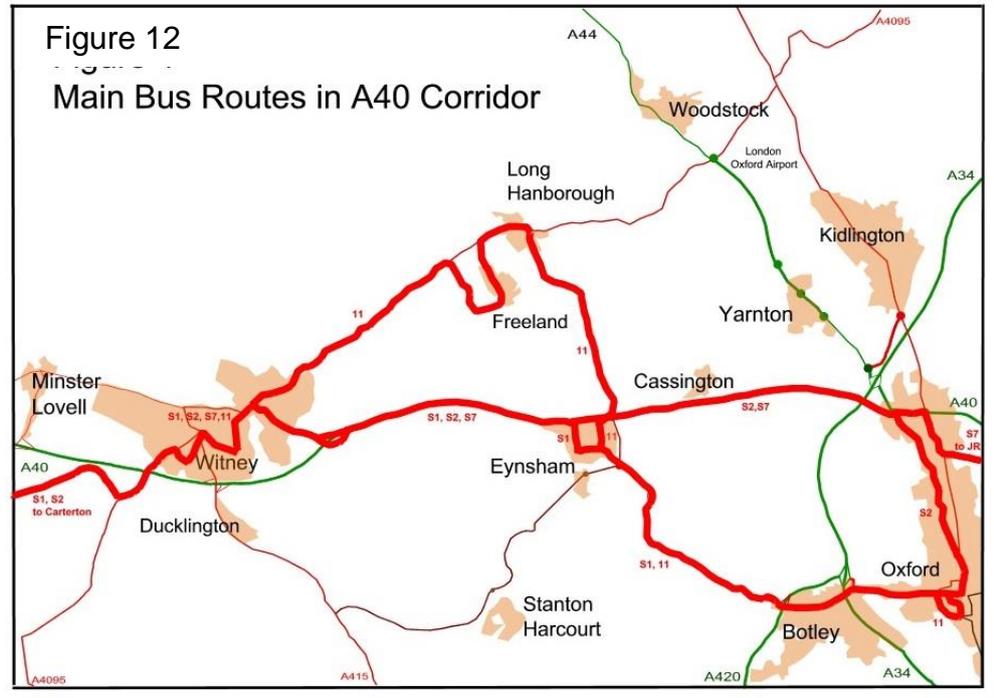
2.6.21. Car commuters from West Oxfordshire to Oxford have destinations across the city, reflecting the city’s employment patterns, with concentrations in the city centre, Headington and Cowley areas. Bus commuters are concentrated to a much greater extent in the city centre with lesser numbers in West Oxford and Headington, reflecting the destinations of the direct bus services.

Bus services

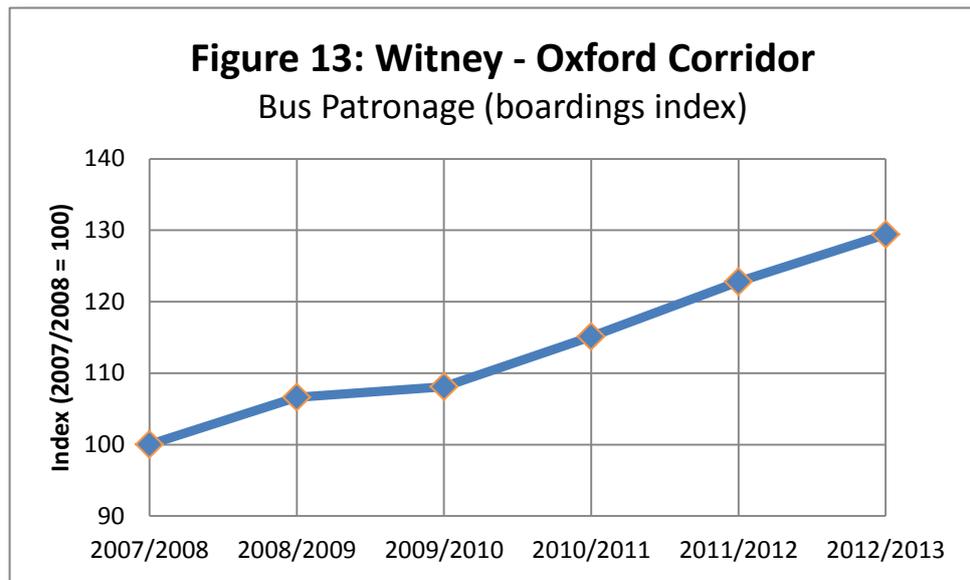
2.6.22. The Witney – Oxford corridor is served by three main bus services as shown in Figure 12:

- S1/NS1 - which runs between Oxford and Witney & Carterton via Botley, Farmoor, Eynsham (village) and Curbridge (4 buses per hour through the day with additional services running in peak hours plus out of peak and night services);
- S2/NS2 which runs between Oxford and Witney & Carterton via Wolvercote, Cassington, Eynsham (A40) and Minster Lovell (2 buses per hour through the day plus out of peak and night services);

- 11 which runs between Oxford and Witney via Botley, Farmoor, Eynsham (village), Long Hanborough, Freeland and North Leigh (1 bus per hour between 0600 and 1800).



2.6.23. In addition the S7 runs a limited, out of peak hours only service between Witney and the John Radcliffe Hospital in Headington along the A40. Discussions with Stagecoach have suggested that they are unwilling to run services during the peak because of the current impossibility of operating to a reliable timetable during these hours.



2.6.24. Data on patronage has been supplied by the operator and is shown in Figure 13 which shows that the overall number of boardings on these three services has risen by almost 30% between 2007 and 2013 (because of service changes earlier data are not compatible).

2.6.25. The data are limited to numbers of passengers boarding each service and do not allow a separation of shorter trips (e.g. Carterton – Witney) from longer ones (e.g. Carterton – Oxford). Thus some or all of this trip growth could be made up of increases which are not related to trips which might use the A40. However, this high growth rate in bus patronage could explain, at least in part, the pattern in traffic flows on A40 previously noted if people have switched from car to bus use suppressing the expected traffic growth.

Conclusions

2.6.26. Three conclusions can be drawn from this assessment:

- i. The A40 is currently operating above capacity, and has been doing so for a considerable time;
- ii. The A40 is experiencing congestion problems, in terms of low average speeds and prolonged journey times, affecting all users, throughout the day;

- iii. The A40 experiences high levels of day to day journey unreliability, making journey planning difficult.

2.7. Constraints

2.7.1. The A40 is a wide single carriageway road for its entire length between Wolvercote roundabout and the eastern end of the Witney Bypass. Currently there is a footway/cycleway along the northern verge between Witney and Eynsham and on both verges between Eynsham and Oxford.

Oxford Green Belt

2.7.2. The entire length of the A40 from Eynsham Roundabout to the Oxford Ring Road lies within the Oxford Green Belt. This includes the village of Cassington.

Dukes Cut

2.7.3. Immediately to the west of the A34 there are a series of bridges over the Oxford Canal, Oxford-Banbury/Worcester railway and Duke's Cut (a canal link connecting the Oxford Canal and River Thames) where the verge is limited to that necessary for the provision of the footway/cycleway (0.7 km). Any on-line improvement to the route would need these bridges to be either widened, supplemented or replaced. This would add considerably to the cost and engineering complexity of such a scheme.

Cassington Gravel Works

2.7.4. The Cassington Gravel Works form the northern boundary of the A40 for most of the section of road between Cassington and Duke's Cut. At the eastern end these are mostly worked out sections of quarry which have been allowed to flood, creating a series of ponds and small lakes. The lakes at the very eastern end (Oxey Mead, see Figure 14) have been extensively restored since gravel extraction ceased and are now an important local wildlife reserve. The current workings, including the materials processing plant, are to the western end of the site around the line of the old Oxford-Witney railway, which has been converted into a haul road for the site. The gravel works (current and worked

out) cover the entire area between the A40 and the Cotswold rail line and could present an important constraint to any off-line transport improvements.

Oxford Meadows

2.7.5. South of the road along this section of the road is the *Oxford Meadows Special Area of Conservation* (Figure 14) which is noted for lowland hay meadows including vegetation communities that are “*perhaps unique in the world in reflecting the influence of long-term grazing and hay-cutting. The site has benefited from the survival of traditional management, which has been undertaken for several centuries, and so exhibits good conservation of structure and function.*”³

2.7.6. The level of protection afforded by the SAC status means that encroachment into the designated area by any transport improvement is unlikely to be permitted. In addition, the flora in this area would be potentially affected by air pollution from the A40. This both adds to the urgency with which a solution is required to be developed and restricts what would be likely to be environmentally acceptable.

Cassington

2.7.7. Cassington is a strongly linear village built along the minor road from Eynsham to Yarnton, at an angle to the line of the A40. It would present a considerable obstruction to any off-line improvement of the A40 north of the current line.

Eynsham

2.7.8. The A40 through Eynsham is highly constrained by existing development which would restrict any on-line improvement of the route. The Local Plan includes a considerable extension to the village to the south of the A40 and west of the current village envelope, whilst a major Garden Village extension to the north of the A40 is also planned.

³ <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0012845>

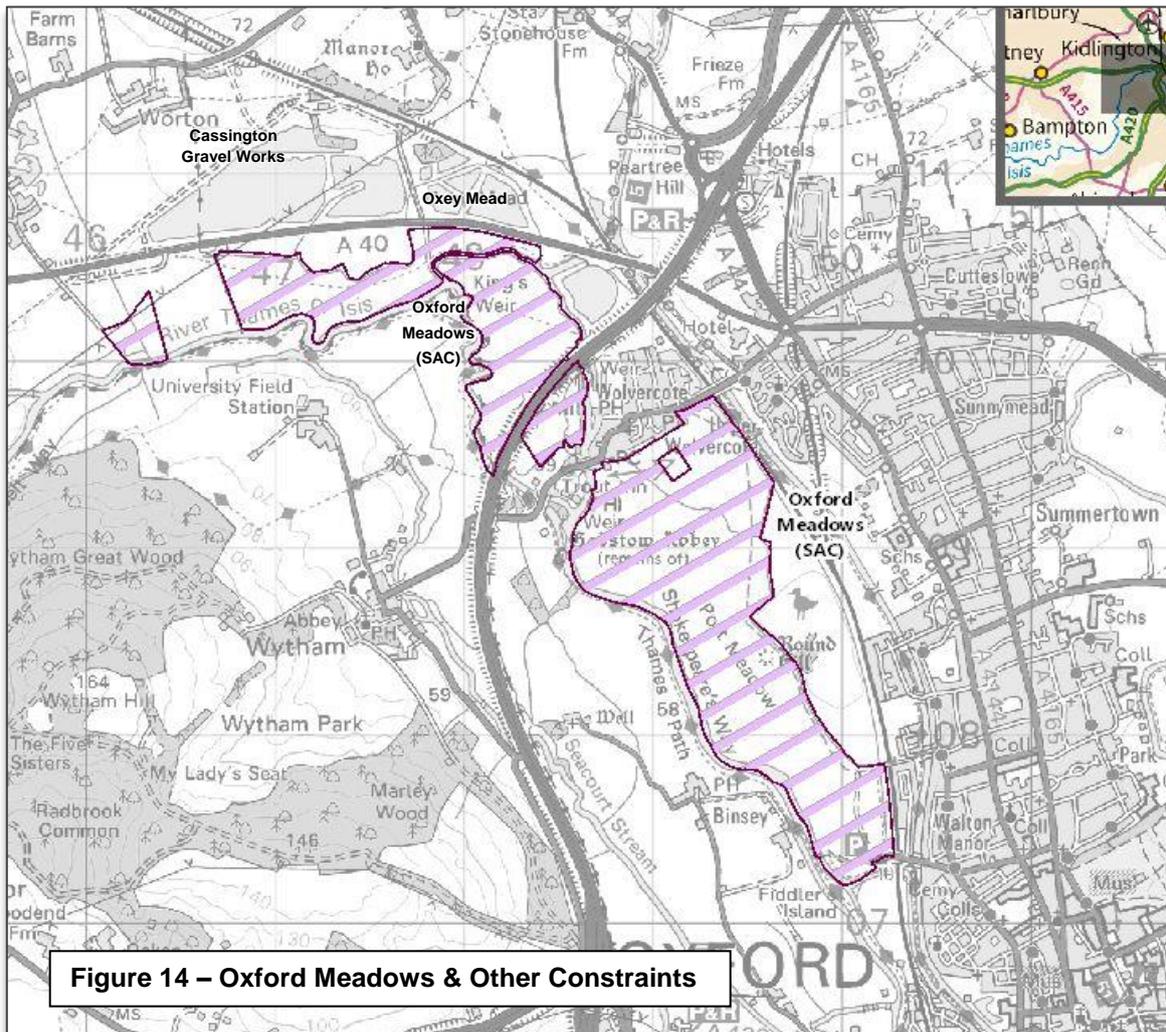


Figure 14 – Oxford Meadows & Other Constraints

Barnard Gate

2.7.9. It is believed that there is the site of a medieval village adjacent to the A40 in this area, although its exact location is not known.

2.8. Opportunities

2.8.1. The current transport problems on the A40 are a major drag on the economic attractiveness of West Oxfordshire. The considerable development envisaged in the Local Plan has the potential, if it were to go ahead without significant investment in increased transport capacity, to exacerbate these problems. Alternatively, the continuation of these problems could have an impact on the

economic attractiveness of the area for investment, meaning that the levels of development set out in the Local Plan are not able to be realised.

2.8.2. Four strategic development sites have been identified in the A40 Corridor in the West Oxfordshire Local Plan (see Appendix 1):

- North Witney (1400 homes)
- East Witney (350 homes)
- West Eynsham (1000 homes)
- West Oxfordshire Garden Village (2200 homes)

The current traffic conditions on the A40 could undermine the potential for success of some or all of these developments.

2.8.3. The improvement of travel within the A40 Corridor therefore represents the opportunity to accommodate this development without adding to the existing travel problems. This would make the area more attractive to investment generally, and high value investment in particular, as well as improving the environment for existing residents and businesses.

2.8.4. Strategic improvements to transport in the A40 corridor also offer the opportunity to reduce noise, greenhouse gas and other emissions, and to improve mobility and accessibility for those without access to a car. Reductions in congestion and improvements in journey reliability would also potentially improve the local economy through improved productivity.

3. The future ‘without scheme’ scenario

3.1. Impact of other transport interventions

3.1.1. The wider programme of improvements within the A40 Corridor is shown in Figure 14. The more developed schemes within this strategy are discussed below.

Wolvercote Roundabout (completed Autumn 2016)

3.1.2. Proposals were developed as part of the City Deal programme, part-funded by the Department of Transport, to reduce congestion and future proof the junction to accommodate future growth pressures at Northern Gateway and elsewhere. The project involved widening to provide additional traffic lanes on the A40 and A44, and signal control of the roundabout. There was some change to the central island and the opportunity was also been taken to provide signal controlled pedestrian and cycle crossings through the junction, which amongst other things will help serve the Northern Gateway site.

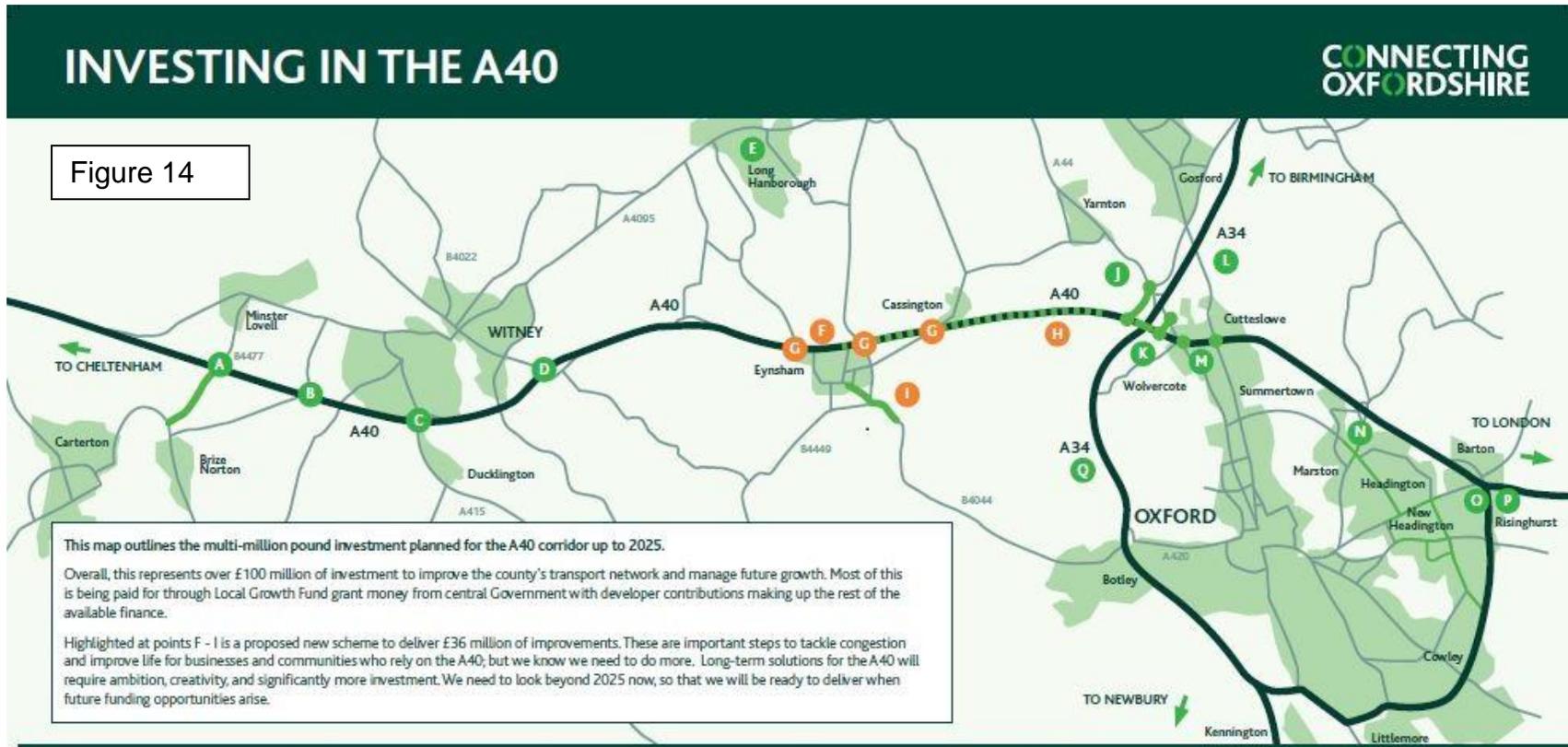
Cuttleslowe Roundabout (completed Autumn 2016)

3.1.3. Proposals were developed as part of the City Deal programme, part-funded by the Department of Transport, to reduce congestion and future proof the junction to accommodate future growth pressures at Northern Gateway and elsewhere. The project involved widening on the A40 approaches to provide additional traffic lanes, and provision of traffic signal control at the roundabout. The opportunity was also taken to provide signal controlled pedestrian and cycle crossings through the junction.

Peartree Interchange (at pre-planning stage)

3.1.4. The Peartree Interchange is the main junction providing access between North Oxford and the A34. The Interchange also provides access to Peartree Services and to the Peartree Park and Ride site to the immediate south.

3.1.5. At the present some temporary queueing and delay is experienced at the roundabout, although on site observations suggest that queueing is transient and related to delays at Wolvercote queueing back to the junction.



- A** **Access to Carterton**
Improvements to the B4477 and western facing slips on the A40 at Minster Lovell – subject to funding
- B** **Access to Witney – Downs Road**
New Junction at Grade roundabout
- C** **Access to Witney – Ducklington Lane**
Junction capacity and safety improvements at junction with Ducklington Lane and Station Lane – completed in 2014
- D** **Access to Witney – Shore's Green**
New western facing slips at Shore's Green
- E** **Hanborough Station**
First Great Western has applied for funding to expand the car park, provide a bus/rail interchange and improve passenger facilities at Hanborough Station
- F** **A40 Park & Ride**
New Park & Ride on the A40, possibly near Eynsham – part of Local Growth Fund Scheme
- G** **A40 Junction Improvements**
Junction improvements to A40 at Eynsham and Cassington – part of Local Growth Fund Scheme
- H** **A40 Bus Lane**
New bus priority measures – part of Local Growth Fund Scheme
- I** **Bus Priority at the Swinford Toll Bridge**
New bus priority scheme on Oxford bound approaches to Swinford Toll Bridge, Eynsham – part of Local Growth Fund Scheme
- J** **A40-A44 Strategic Link Road**
New road linking A40-A44, bypassing Wolvercote roundabout and providing a link to the A34 and Oxford Parkway Station from West Oxfordshire
- K** **Northern Gateway Site Link Road and A40/A44 Junctions**
New infrastructure to access development and also provide a more direct link to Peartree Park & Ride and A34
- L** **Oxford Parkway Station**
New rail station next to Water Eaton Park & Ride providing direct rail links between Oxford and London Marylebone – opening autumn 2015
- M** **Cuttleslowe & Wolvercote Roundabouts**
Junction improvements to Cuttleslowe and Wolvercote roundabouts – work starts summer 2015
- N** **Access to Headington Scheme**
Junction and road improvements to reduce congestion and improve access to the hospitals in Headington
- O** **A34 Improvements**
Highways England is planning improvements to the Peartree and Botley interchanges and improved driver information on the Trunk Road by the end of 2019/20. The A34 around Oxford is included in the wider Oxford-Cambridge Expressway study, which could reduce pressures on A40 by providing an alternative route for some trips
- P** **Expansion of Thomhill Park & Ride**
Car parking capacity increased by 500 spaces, new A40/London Road bus priority and cycle improvements – completed summer 2013

www.oxfordshire.gov.uk/connectingoxfordshire



3.1.6. Based upon the increase in traffic levels predicted by 2026 the roundabout is predicted to be operating over capacity on some approaches, specifically the A44 East approach, predicted to be operating with a RFC (ratio of flow to capacity) value of 1.00 and queues of 35 vehicles predicted. Post 2026 this is predicted to worsen, with predicted queues on this approach of 118 vehicles by 2031.

3.1.7. A preliminary improvement to the Interchange has been designed to accommodate these future traffic levels and to improve the overall safety of the junction for non-motorised users by providing signal controlled pedestrian and cycle facilities on each major approach. Highways England are currently investigating lengthening the A34 northbound off slip.

Peartree Park and Ride Access (at planning stage)

3.1.8. The Peartree Park and Ride access junction may need to serve an additional access function in the future, with a new 4 arm junction being required to serve development to both the east and west of the A44. The Northern Gateway access road may also pass across the site to a junction on A40 which would allow for traffic to access the Park and Ride from A40 (west) without having to pass through either Wolvercote or Pear Tree roundabouts. Two main options have been considered for this junction, the first being a signalised crossroads and the second being a signal controlled roundabout.

A40-A44 Link Road (preliminary investigation stage)

3.1.9. There are longer term aspirations to deliver a western link road to the west of the A34, linking the A40 (at its southern end) with the Loop Farm Roundabout and the A44 (to the north).

3.1.10. Initial assessment work associated with the development of scheme options for the Northern Gateway identified the potential benefits associated with the provision of the development link road in removing A40 to A44 trips from the Wolvercote Roundabout. It could therefore be expected that the western link road could provide a similar benefit to the operation of junctions to the west of the north Oxford area by removing longer distance traffic from local junctions, whilst also removing northbound A44 trips from the Peartree Interchange.

3.1.11. The delivery of the western link road would also be expected to provide a range of wider non-highway benefits including the following:

- Improvements to the pedestrian and cycle environment and scope for improvement to sustainable mode priority on the A40 and A44 as a result of reduced levels of highway traffic;
- Improved links to and from the Oxford Parkway from the west of Oxford; and
- Scope to improve local congestion and air quality issues.

Hanborough Station (at pre-planning stage)

3.1.12. Hanborough Station is the main railway station in West Oxfordshire and lies just to the south of the A4095 east of the village of Long Hanborough. It lies on the Cotswold (Oxford – Worcester) line. In recent years this line has had partial reinstatement of two-line operation to allow for hourly services in each direction (although this has not yet been achieved). Additionally the station has had a significant increase in parking to 241 spaces.

3.1.13. The Oxfordshire LTP seeks to enhance the role of Hanborough Station by looking to extend the double track to cover the section from Wolvercote Junction to Hanborough and re-instating two platforms at the station. This would potentially allow the extension of stopping services from London to Oxford to provide a 2 trains an hour service. The LTP also looks to develop the station as a local parkway interchange with additional parking and improved provision for pedestrians and cyclists.

3.1.14. No commitment to these service and route improvements has yet been made by the railway industry.

Science Transit Phase 1 (Detailed Design Stage)

3.1.15. The Phase 1 project in the Science Transit programme involves the construction of a bus priority lane on the A34 at its approach from the south to the Oxford ring road at Hinksey Interchange.

- 3.1.16. The project will allow buses to bypass the queues which extend back from the Hinksey Interchange onto the A34 Trunk Road at peak hours. The scheme will thereby reduce bus journey times and improve the attractiveness of public transport over private vehicle travel between Oxford and Abingdon & Science Vale.
- 3.1.17. The scheme is currently being designed and it is expected that construction will commence in Spring/Summer 2018.

3.2. Future network conditions⁴

- 3.2.1. The Oxfordshire Strategic Model (OSM) is a suite of multi-modal strategic models designed to provide evidence to support robust future assessments for funding bids and scheme prioritisation. The model uses a 2013 base year based on the existing highway, bus and rail networks and a future forecast year of 2031 based on identified development locations⁵ and a series of 25 “committed” highway and 11 public transport improvement schemes.

Table 9: A40 – OSM modelled flows

<i>pcus</i>	am peak highway demand	pm peak highway demand	am peak bus demand	pm peak bus demand
2013 Oxford-Witney	107	249	40	125
2013 Witney-Oxford	215	123	112	39
2013 two-way	322	372	152	164
2031 Oxford-Witney	250	326	81	133
2031 Witney-Oxford	325	233	113	80
2031 two-way*	575	559	194	213

- 3.2.2. The model shows peak hour bus loads in 2013 of 187 passengers between Witney and Oxford, an average of 27 passengers per bus, with a bus journey speed of 11-15 mph and a journey time of 35-50 minutes. The model also

⁴ This section is based upon the Oxfordshire Strategic Model Problems & Issues Report prepared by Atkins for Oxfordshire County Council September 2014

⁵ The growth here does not include all the development included in the 2014 Oxfordshire Strategic Housing Market Area (SHMA) report and so may not represent a “worst case” scenario.

shows increased rail movements between Witney and Oxford via Hanborough in 2031, albeit from a low base. Bus passenger numbers are predicted to rise in 2031 to around 240 passengers in each peak hour, an average of 34 passengers per bus with bus times increasing in line with those for general highway traffic.

- 3.2.3. The model agrees with the analysis in this report that sections of the A40 between Oxford and Witney are overcapacity which is compounded by the capacity constraints at Wolvercote roundabout and at the junctions around Eynsham. These result in traffic speeds below 85% of the free flow speeds on the A40 and delays as shown in Table 10.

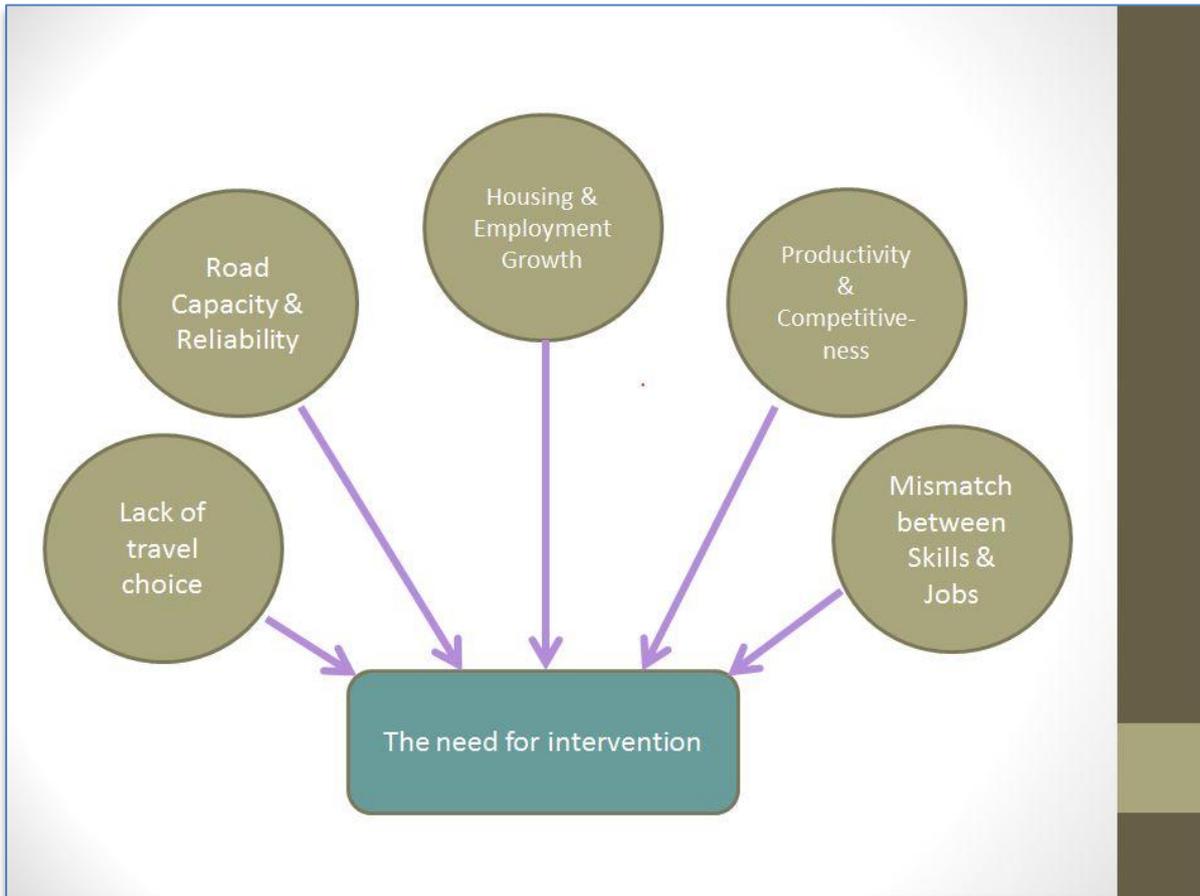
Table 10: A40 – OSM estimated journey times and delays

	am peak journey time	am peak delay	pm peak journey time	pm peak delay
2013 Oxford-Witney	27	4	40	14
2013 Witney-Oxford	37	14	32	8
2031 Oxford-Witney	29	6	53	27
2031 Witney-Oxford	44	15	35	12

- 3.2.4. The model predicts on this basis that there will be a worsening and an extension of the areas on the already constrained corridor between Oxford and Witney that is operating over capacity and a general increase in the number and severity of problem junctions.

4. The need for intervention

- 4.1. The A40 is an important long distance route linking central and east England with the south west and south and west Wales. It is also the major artery in West Oxfordshire linking the growing towns of Witney and Carterton with Oxford and the wider country.



- 4.2. Significant housing and employment growth has occurred in recent years in Witney and Carterton and further growth is planned in the next 15 years in these settlements and in Eynsham (for instance, 1850 homes at two sites at Witney, 1400 at three sites in Carterton and 3200 at two sites in Eynsham). This development forms an important part of the Oxfordshire Local Economic Plan.
- 4.3. The A40 has long standing issues of congestion and leading to extended journey times and high journey unreliability. The problems and challenges for the Witney-Oxford corridor can be summarised as: highway links which are currently operating at or above capacity for extended periods of the day with

journey speeds as low as 10mph in the am peak and unreliable and unpredictable journey times; junctions with capacity constraint issues on at least one arm; buses carrying large numbers of trips on generally congested routes; an expected large increase in demand on an already congested and capacity constrained route subject to worsening delays in both directions; and commercial and residential development focused on areas where the highway network is already under pressure.

- 4.4. There are few alternative means of travel from this part of West Oxfordshire: the alternative road routes also suffer from heavy congestion; there is no convenient rail or other fixed link connection; buses have no alternative but to use the congested roads.
- 4.5. West Oxfordshire has the lowest productivity and competitiveness indices of any of the districts in Oxfordshire; despite its apparent wealth the district scores below the national average in these measures.
- 4.6. There is a mismatch between the skills and occupation of the residents of West Oxfordshire and the jobs currently available within the district. This has contributed to increasing commuting both into and out of the district.
- 4.7. The planned development within West Oxfordshire will lead to increased congestion in the A40 corridor, with longer journey times (up to 7 minutes longer by 2031) and queues and these occurring for longer periods of each day. Alternatively the congestion in the A40 corridor could undermine the attractiveness of the district for investment which would have adverse impact on the overall countywide economic and development strategy.
- 4.8. It would be expected that significant contributions would be made from the developers within West Oxfordshire to resolving the transport problems on the A40 corridor. However, given its current and long standing nature it would not be appropriate for any strategy to be wholly developer funded or delivered and that a significant public investment in the strategy would also be appropriate.

5. Objectives and intended outcomes

- 5.1 Objectives need to be in line with the over-arching objectives of the Oxfordshire Local Transport Plan, *Connecting Oxfordshire*, and should not either prescribe or preclude any of the potential options (so objectives to restore the railway line or one to dual the A40 would not be acceptable).
- 5.2 The goals which were set out in the LTP, together with their supporting objectives, are given in Table 11.
- 5.3 Taking these countywide objectives into account, together with the conclusions on the need for intervention, the following set of objectives was developed to guide the development of a A40 strategy:
- To improve travel times and/or journey reliability between Witney/Carterton and Oxford
 - To reduce carbon emissions and other pollutants associated with travel
 - To stimulate economic growth within Oxford, West Oxfordshire and the Oxfordshire Knowledge Spine
 - To encourage safer travel between Witney/Carterton and Oxford

The links between the LTP Goals and objectives and these project objectives are outlined in Table 11.

- 5.4. While not an objective of the scheme, per se, it was identified that the chosen strategy should not undermine the current high level of public transport between Witney/Carterton and central and west Oxford and ideally should seek to increase the currently low proportion of trips between Witney/Carterton and the rest of the city.
- 5.5. The draft objectives were presented to a stakeholder forum made up of representatives of local councils, county councillors and local interest groups in Summer 2015 which accepted them as appropriate for the development of improvement options for the corridor.

Connecting Oxfordshire Goal	Connecting Oxfordshire Objective	Relevance to A40 situation	Project Objective
To support jobs and housing growth and economic vitality	Maintain and improve transport connections to support economic growth and vitality across the county	High – West Oxfordshire has the lowest productivity and competitiveness in the county but has been identified for significant growth	To improve travel times and/or journey reliability between Witney/Carterton and Oxford
	Make most effective use of all available transport capacity through innovative management of the network	High – A40 is at or close to capacity for much of the day leading to problems	To improve travel times and/or journey reliability between Witney/Carterton and Oxford
	Increase journey time reliability and minimise end-to-end public transport journey times on main routes	High – journey times along A40 have high variability and buses have no way to avoid them.	To improve travel times and/or journey reliability between Witney/Carterton and Oxford
	Develop a high quality, innovative and resilient integrated transport system that is attractive to customers and generates inward investment	Low – Will be significant whichever option is chosen	
To support the transition to a low carbon future	Minimise the need to travel	Low – none of the options would have a direct impact on this, although they may have an indirect impact through influencing location of development or encouraging longer distance commuting	
	Reduce the proportion of journeys made by private car by	High – The high levels of bus use between West Oxfordshire and	Chosen strategy should not undermine the current high level

	making the use of public transport, walking and cycling more attractive.	Oxford city centre has been a notable success of the county's transport strategy of the last 20-30 years.	of public transport between Witney/Carterton and central and west Oxford and ideally should seek to increase the currently low proportion of trips between Witney/Carterton and the rest of the city
	Influence the location and layout of development to maximise the use and value of existing and planned sustainable transport investment	Low – Will be significant whichever option is chosen	
	Reduce per capita carbon emissions from transport in Oxfordshire in line with UK Government targets.	High – stationary or slow moving traffic will be emitting excess carbon for extended periods daily	To reduce carbon emissions and other pollutants associated with travel
To support social inclusion and equality of opportunity To protect and, wherever possible enhance Oxfordshire's environment and improve quality of health To improve public health, safety and individual well being	Mitigate and wherever possible enhance the impacts of transport on the local built, historic and natural environment	Medium – this would need to be taken into account whichever option is chosen	
	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.	High – stationary or slow moving traffic will be emitting excess carbon for extended periods daily; traffic conditions may put off prospective walkers or cyclists on route.	To reduce carbon emissions and other pollutants associated with travel To encourage safer travel between Witney/Carterton and Oxford

Table 11 - Connecting Oxfordshire and A40 Strategy Objectives

6. Options Generation & Initial Sifting

6.1. Options Generation

6.1.1 A Baseline Statement for the A40 Witney-Oxford Corridor Route Strategy was prepared in September 2014. Analysis in this Statement identified that the demands on the A40 would continue to grow for the foreseeable future. In order to manage this growth in demand and to give a clear strategic direction for the future, the strategy developed in the Baseline Statement sought to identify a range of potential schemes to:

- Influence travel behaviour through better informed travellers who will be better equipped to decide when, where and how to travel;
- Make best use of existing and emerging technology to improve operational efficiency by gathering data on the use of the route and by providing information to road users and the operators of other networks;
- Improve the operational running of the route in order to maximise the capacity of the existing highway asset; and
- Develop physical improvements to the network which complement existing infrastructure to address the conflict between demand from the strategic road network and that of local traffic traversing the route.

6.1.2 Based on these principals the Baseline Statement sought to identify a comprehensive list of possible elements which would be considered for the long term strategy, either individually or in combination.

6.1.3 The potential strategy elements were divided into those which could be implemented within 5 years and those which would require a longer timeframe. The short term measures considered were:

- Land Use policies
- Travel planning/Improved information technology
- Encouraging walking and cycling

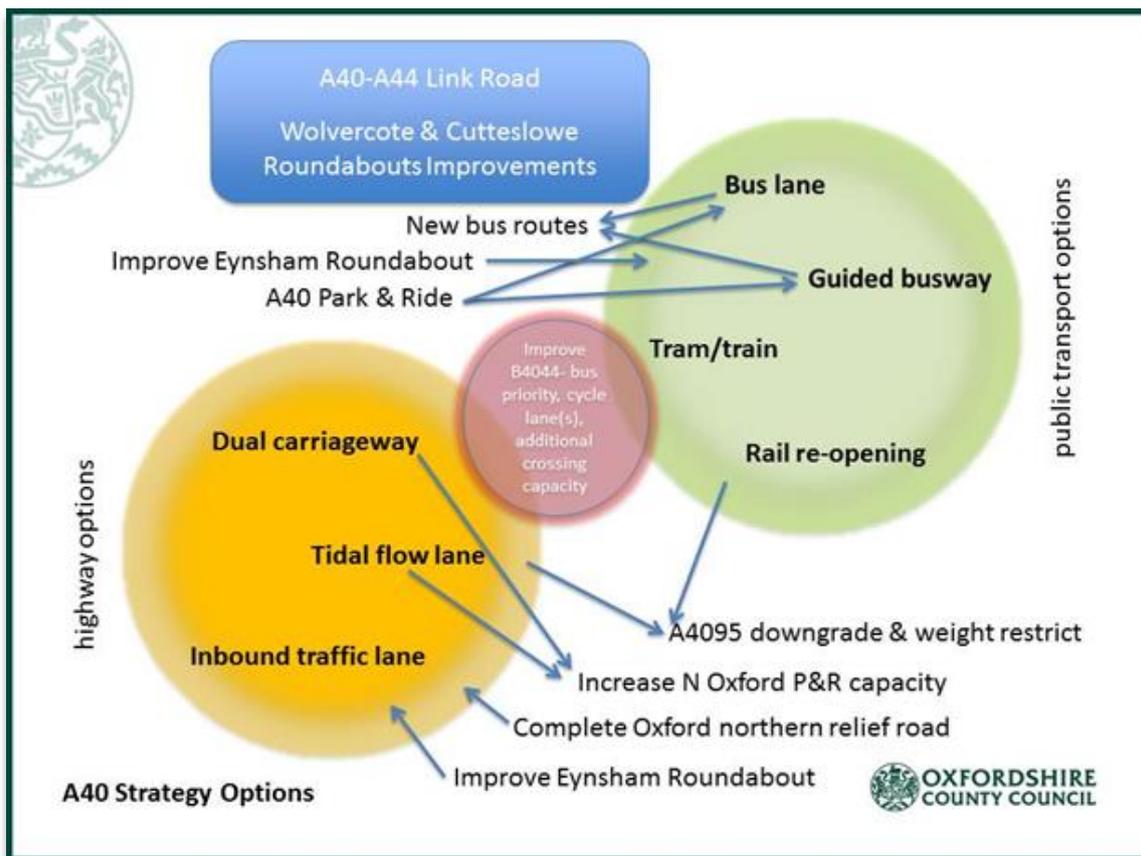
- Improved traffic management
- B4044 highway improvements

6.1.4. Land use policies were seen as critical for the success of any strategy, but not sufficient in themselves to resolve the issues of the corridor; similarly, travel planning and information technology; encouraging walking and cycling, and improved traffic management were seen as a support to other, more substantial measures rather than being the main focus of improvement.

6.1.5. Measures considered for the B4044 include removing the toll from Swinford Toll Bridge, a bus lane on the approach to the Toll Bridge and a cycle track from the Toll Bridge to Dean Court, Botley. It was considered unlikely that any or all of these improvements would provide sufficient additional capacity or reduce demand to the extent that a larger scheme was no longer required. It was recognised, though, that each of these potentially has its merits and could form part of a wider strategy for the corridor.

6.1.6. The potential longer term measures, shown in Figure 15, were identified as:

- * Bus lanes
- * Tidal Flow bus lane
- * Rail line re-opening
- * Guided busways
- * Train/tram
- * Non-conventional rapid transit (people movers/automatic light rail/monorail)
- * Dual Carriageway
- * Tidal Flow lanes
- * Additional Traffic lanes



**Figure 15 – A40 Strategy Baseline Statement
Potential Longer Term Measures**

(Options within circles represent major strategy measures, options outside circles represent supporting measures, arrows represent possible connections between measures)

6.2. Initial Sifting

- 6.2.1. URS/AECOM were commissioned in Autumn 2014 to look at the broad feasibility of re-opening the rail line, together with alternative public transport options for tram operation along the former rail line and the introduction of bus lanes along the line of the A40. A subsequent commission extended their brief to also looking at widening the A40 to dual carriageway standard. The aim of these studies was to better understand the engineering issues associated with them and to give a broad estimate of the likely costs of these options. Engineering Feasibility Study Reports were produced by them in March 2015 (Public Transport Options) and June 2015 (Dual Carriageway).
- 6.2.2. Subsequent work questioned the value for money of the Tidal Flow Bus lane solution in that this scheme would be considerably more expensive than a

permanent eastbound bus lane but would only be likely to be switched to westbound operation for 1-2 hours per day (i.e. only at those hours when westbound delays are greater than eastbound) and that even in these periods an eastbound bus lane would still deliver significant benefits.

- 6.2.3. The option for retaining the road as a single carriageway but adding an additional traffic lane, either permanently in one direction or as a tidal flow controlled road, was also taken no further due to safety concerns, particularly with the unusualness of these designs on rural roads, and concerns about the visual impact of overhead gantries to control tidal flow operation.
- 6.2.4. Options for non-conventional rapid transit were also not looked at in any greater detail, principally because of the wide variation in project type, costs and benefits within this category. Following the public consultation two rival proposals for monorail based systems to connect Witney and Oxford were put forward for consideration.
- 6.2.5. At the same time the Oxford Transport Strategy was updated as part of the review of the Oxfordshire Local Transport Plan. This included a proposal for an outer ring of Park and Ride schemes to supplement or, in the longer term, potentially replace the 5 current sites located in the vicinity of Oxford Ring Road. A study was then commissioned to look at potential locations along the main routes into the city, including the A40.
- 6.2.6. The initial sifting of the options identified in the Baseline Statement in summarised in Table 12.

Measure	Reason
Options not taken further	
Tidal Flow Bus Lane	Would be considerably more expensive than a permanent eastbound bus lane but would only be likely to be switched to westbound operation for short periods each day. Therefore unlikely to present good value for money compared to a permanent single direction bus lane.
Non-conventional Rapid Transit (people movers/automatic light rail/monorail)	Wide variation in project type, costs and benefits within this category makes comparison with other strategies difficult. Any project within this scheme would present a considerable risk if pursued due to untried/experimental nature.
Tidal Flow Lanes	Safety concerns, particularly given the unusualness of these designs on rural roads, and concerns about the visual impact of overhead gantries to control tidal flow operation.
Additional Traffic Lanes	Unusual layout for unlit rural roads which could have safety implications. Capacity increases might be negated by choke point where additional lane ends.
Options taken forward to consultation	
Bus Lanes	Deliverable within medium term; potential for congestion free travel
Railway Line Re-opening	Deliverable within medium/long term; potential for congestion free travel
Guided Busways	Deliverable within medium term; potential for congestion free travel
Light Rail	Deliverable within medium/long term; potential for congestion free travel (if tram/train operation pursued)
Dual Carriageway	Deliverable within medium/long term; potential for congestion free travel (if issues in north Oxford resolved)

Table 12 – Initial Sifting Results

7. Stakeholder Involvement & Consultation

7.1. An initial public consultation into the long term strategy ran from the 26th of September to the 8th of November 2015 with a high response rate of nearly 800 views. The conceptual options presented were:

- a) **A40 Bus Lanes** in both directions between Witney and Duke's Cut Canal bridge.
- b) **Guided busway** between Ducklington Roundabout and Duke's Cut Canal Bridge in both directions along the alignment of the old railway line.
- c) **A40 Dual Carriageway** from Witney to Duke's Cut Canal bridge
- d) **Train** from Witney to Oxford by joining the Cotswold line at Yarnton, either by re-instating the old line or building a new route entirely to the north of the A40.
- e) **Tram** from Ducklington Roundabout and Duke's Cut Canal Bridge in both directions along the alignment of the old railway line.

7.2. The options displayed are shown in Appendix 4; Table 13 sets out the options in more detail and the pros and cons of each option as shown in these displays for easy comparison.

Table 13 : Comparison of Costs and Benefits from Public Exhibition

Option	Description	Costs ⁶	Benefits	Comments
Dual Carriageway	Widening the A40 to 2 lanes in each direction separated by a central reservation between Shores Green and A40/A44 Link Road generally within current corridor but with significant alterations to junctions. Two options suggested at Eynsham – either widening on current line or bypassing to the north.	£120 million Considerable land acquisition Heavy clearance of verge side trees Possible adverse impact on Oxford Meadows SAC	7 minute journey time from Shores Green to Wolvercote (excluding delays from Wolvercote junction) 35 minutes Witney-Oxford city centre ⁷ Readily serve P&R at Eynsham	May require north of Oxford Bypass to fully realise potential benefits (costing an additional £100m+) May encourage additional car trips to Oxford requiring additional parking. Would require removal of A40 Science Transit scheme.
Bus Lane	Building 3 metre wide bus lanes on the existing verges between Shores Green and Dukes Cut bridge in both directions. The bus lanes would be separated from the general traffic by a 1 metre buffer.	£65 million Predominantly within highway boundary Minimal impact on Oxford Meadows SAC	11 minute journey time from Shores Green to Wolvercote. High frequency buses 43 minutes Witney – Oxford city centre Readily serve P&R at Eynsham	Builds on A40 Science Transit scheme Could be extended to A40/A44 Link Road by replacing pinch point at Duke’s Cut bridges, but at considerable extra cost.

⁶ The derivation of the costs for each option are set out in Appendix 6. Figures quoted are rounded to nearest £5m.

⁷ For all options the estimated Witney-Oxford city centre represents time between Witney High Street and Oxford Carfax including walking times at each end and public transport waiting times equal to half the expected headway (see Appendix 5).

Guided Busway	Installing a two-way guided busway track to provide a new route from Witney to Oxford using specially adapted buses. The route would use the line of the old railway from Witney to Cassington, except through Eynsham, but would continue alongside the A40 to Duke's Cut canal bridge.	£165 million Considerable land acquisition Heavy clearance of verge side trees Probable negative impact on wildlife and vegetation along old railway line. Minimal impact on Oxford Meadows SAC	12 minute journey time from Ducklington to Wolvercote. 46 minutes Witney to Oxford city centre Medium to high frequency buses	Could be extended to A40/A44 Link Road, but at considerable extra cost.
Heavy Rail (Train)	Building a new single track railway line with double track running through stations to allow for trains to pass each other. The line would run from a new station south of Ducklington Roundabout to join the old line near South Leigh, then pass between Eynsham and B4449 before joining the Cotswold line at Yarnton.	£285 million Considerable land acquisition Probable negative impact on wildlife and vegetation along old railway line.	17 minute journey time from Witney station to Oxford station 42 minutes Witney to Oxford city centre 2 trains per hour	Possible extension to Littlemore and Cowley (at additional cost) Alternative route could run wholly north of A40 and be less disruptive to build.
Light Rail (Tram)	Double track light rail line from south of Ducklington to the old railway at South Leigh then using the old railway line to Eynsham where a new line would be created between the village and the southern bypass. The line would continue on the old railway line to A40 where it would either continue to the Cotswold Line at Yarnton or continue alongside the A40 toward Oxford.	£240 million Considerable land acquisition Probable impact on wildlife and vegetation along old railway line.	20-25 minute journey time from Witney to Oxford. 4 trams per hour 42 minutes Witney to Oxford city centre	May only realise full benefits if linked to on-street sections within Witney and Oxford (costing an additional £100m+) Use of railway line only possible if railway authorities allow mixed use of line. Alternative route alongside A40 from Witney to north Oxford.

7.3. A detailed report has been prepared on the results of the consultation. In summary, the greatest level of support was for the dual carriageway option, which also received the lowest number of respondents who do not support the concept. Train and bus lanes also received good levels of support with just over 50% with around 50 respondents supporting both of these. Tram was supported by 41% of people and guided bus received the lowest level of support at 26% as well as having the highest number who did not support this option.

7.4. Respondents to the questionnaire were asked to what extent they supported each other the five concepts presented. Table 14 identifies the percentage of support from the 796 respondents. This shows the greatest level of support of for the dual carriageway option, which also received the lowest number of respondents who do not support the concept. Train and bus lanes also received good levels of support at just over 50% and just under 50%, respectively, of respondents supporting these. Tram was supported by 41% of people and guided bus received the lowest level of support at 26%.

Table 14: Level of Support for each Concept

Concept	Support or tend to support	Do not support
Dual Carriageway	66%	23%
Train	51%	24%
Bus Lane	47%	29%
Tram	41%	31%
Guided Busway	26%	41%

7.5. People were also asked ‘which one scheme or combination of options, do you think Oxfordshire County Council should give top priority to?’ Table 15 lists these in order of respondent’s preference.

Table 15: Top Priority Options

Concept	Percentage
Dual Carriageway	29.4%
Bus Lane	15.3%
Train	13.3%
Train & Dual Carriageway	12.7%
Other	9.4%
Bus lane & Dual Carriageway	7.5%
Tram	5.4%
Tram & Dual Carriageway	4.3%
Guided Bus	3.5%
Guided bus & Dual Carriageway	3.1%
Prefer not to say	0.1%
Total*	104.1%

**on the paper questionnaires some people ticked more than one option resulting in a total of more than 100%.*

8. Option Appraisal

8.1. Process

8.1.1. While the consultation provided a significant insight to people's views about the A40, there were further considerations which needed to be included as part of any recommendation for an approach to a long term strategy. These included timeframe for delivery, available funding (or likely future available funding), engagement with key delivery partners, effectiveness, and environmental and other physical constraints.

8.1.2. The five strategy options were assessed in 3 ways:

- Using the EAST process
- A qualitative assessment using the Options Appraisal Framework
- An assessment of the likely impact against meeting the objectives set for the strategy.

8.1.3. The first two of these assessments are designed to give an early indication of whether the option would deliver a high quality business case against the 5-case Business Case Model.

8.1.4. Following this, the results from the public consultation plus any practical or technical issues which arose during the appraisal period are considered in order to arrive at a preferred long term strategy.

8.2. EAST Assessment

8.2.1. The Options were assessed using the Department for Transport's Early Assessment and Sifting Tool (EAST). EAST is a decision support tool aimed at providing decision makers with relevant, high level, information to help them form an early view of how options perform and compare. The results of the EAST assessment are summarised in the Appendix 3, and summarised in Table 16 indicating the likely business case of each option.

Table 17: Summary of Option Business Cases based on EAST appraisal

Option	Strategic Case	Economic Case	Managerial Case	Financial Case	Commercial Case
Dual Carriageway	Will assist in delivery of Local Plan growth but worries that it may generate additional traffic and exacerbate problems in north Oxford area. Only partially in line with wider policy aims.	High value for money and assists with encouraging economic growth but negative impact on sensitive local environment and some indicators of well-being.	Should be practically possible with few difficulties but likely to be strong reactions (pro and anti) to its being proceeded with and may only realise benefits fully with significant additional investment in north Oxford.	Would require DfT funding support but some contributions could arise from local developments.	Could be delivered in phases although this is limited by need to have viable terminations at each stage.
Bus Lane	Provides congestion free alternative. Assists with delivery of Local Plan growth and meets with environmental and economic policies. Issues with attractiveness and amount of traffic relief it would provide for A40.	High value for money and positive impacts on encouraging economic growth, reducing carbon emissions, local environment, well-being and socio-distributional impact.	Readily achievable but likely to be mixed reaction in terms of whether this provides a sufficient response to scale of problems.	Would require DfT funding support but some contributions could arise from local developments.	Large scope for flexibility in delivery if funding not fully available.

Guided Busway	Assists with delivery of Local Plan growth and meets with environmental and economic policies. Issues with attractiveness and amount of traffic relief it would provide for A40.	High (but uncertain) value for money and positive impacts on encouraging economic growth, reducing carbon emissions, local environment, well-being and socio-distributional impact.	Considerable land acquisition issues likely and likely to be mixed reaction in terms of whether this provides a sufficient response to scale of problems.	May be difficult to justify capital outlay in terms of benefits over simpler public transport options.	Limited scope for reducing scope of scheme – need minimum scheme to justify adaptations to vehicles
Heavy Rail	Assists with delivery of Local Plan growth and meets with environmental and economic policies. Key uncertainty regarding the level of service that could be delivered and how attractive this is likely to be.	Could have high value for money but would require detailed usage estimation to confirm. Supports local economic growth but would have negative overall environmental impact.	Considerable land acquisition issues and issue of congestion on railways in Oxford area.	Would need to be supported through DfT and railway industry.	Limited or no flexibility – could be delivered to Witney in two phases but uncertainty about whether this might reduce viability of investment.
Light Rail	Assists with delivery of Local Plan growth and meets with environmental and economic policies. Key uncertainty about whether shared use of railway to Oxford Station would be permitted.	Could have high value for money but would require detailed usage estimation to confirm. Supports local economic growth but would have negative overall environmental impact.	May only fully realise benefits of system with extensions to line within Oxford and Witney. Considerable land acquisition issues likely.	Funding route unclear.	Limited or no flexibility – could be delivered to Witney in two phases but uncertainty about whether this might reduce viability of investment.

8.2.2. The EAST Assessment includes an element in which the expected value for money of each of the five options was assessed. In the absence of a quantified assessment this was carried out using based on a qualitative assessment of the likely benefits of each project. Each of the options was assessed as giving a potentially high cost-benefit scheme, due in large part to the scale of the problem and the provision of a congestion free alternative. However this assessment was subject to a number of provisos:

- i. The dual carriageway scheme is dependent upon the provision of an additional project to provide a congestion free route around north Oxford. If such a scheme was not provided then the project would be likely to be high cost/low benefit and would, at best, be classified as low/medium vfm.
- ii. The heavy rail is dependent upon the project being able to deliver a frequent enough service to make it an attractive alternative. Without this the scheme is unlikely to give better than low vfm.
- iii. The same proviso applies to the light rail option with the additional condition that its value would be dependent upon either shared use of the rail network being permitted from Yarnton to Oxford station or an on-street network in Oxford being separately and cost-effectively provided to deliver the tramway closer to passengers' intended destinations. Without this the scheme would be likely to deliver low vfm.

8.2.3. The EAST assessment does not in itself make comparisons or recommendations between options but it is possible to take the output from the EAST assessments and use this to assess the relative “value” of the different options. A variation on this process, developed to allow for its application to both transport and non-transport projects, has been developed by Oxfordshire LEP to prioritise candidate schemes for inclusion within the Strategic Economic Plan and submission for Local Growth Funds. In the Oxfordshire LGF assessment, the cases are weighted according to local priorities: 45% Strategic, 35% Economic, 10% Financial, 5% Managerial, 5% Commercial, as shown in Table 17.

OPTION	Strategic (/20)	Economic (/30)	Managerial (/20)	Financial (/20)	Commercial (/5)	TOTAL %
Dual Carriageway	15	20	15	11	3	69
Bus Lane	16	26	14	14	5	82
Guided Bus	14	26	11	8	2	71
Heavy Rail	15	22	11	6	1	66
Light Rail	15	25	11	7	1	70

Table 17 : EAST Assessment – LGF scoring

8.3. Option Assessment Framework

- 8.3.1. A qualitative, subjective appraisal was made of the options against the criteria included in the Option Assessment Framework (OAF). The results of this are shown in Table 20. In this table a tick means a positive impact (two ticks a strong positive impact) while a cross denotes a negative impact (two crosses being a strong negative impact), a dash denotes no impact or a balance of positive and negative impacts.
- 8.3.2. As an indicator of the overall impact given in this framework, each tick in the OAF is scored as +1 and each cross as -1. This gives a composite score as shown in Table 21.

TABLE 20: OPTION ASSESSMENT FRAMEWORK

	Dual carriageway	A40 Bus Lane	Guided Busway	Rail	Tram
Strategic Fit Case					
Regional Policy Alignment	✓✓	✓✓	✓✓	✓	✓
Local Policy Alignment	x	✓	✓	✓	✓
Scheme Objectives Fit	-	✓	✓	-	-
Value for Money Case					
a) Impact on the economy					
Business Users	✓✓	✓✓	✓	✓	✓✓
Transport providers	x	✓✓	✓	-	-
Reliability	-	✓	✓✓	✓✓	✓✓
Regeneration	-	-	-	-	-
Wider impacts	-	-	-	-	-
b) Impact on the Environment					
Noise	xx	-	x	x	-
Air Quality	x	✓	✓	✓✓	✓✓
Greenhouse gases	xx	x	x	✓	✓
Landscape	xx	x	xx	xx	xx
Townscape	-	-	-	-	-
Historic environment	-	-	-	-	-
Biodiversity	x	x	x	-	-
Water environment	-	-	-	-	-
c) Impact on society					
Non-business users	✓✓	✓✓	✓✓	✓✓	✓✓
Physical activity	x	-	-	✓	
Journey Quality	✓	✓✓	✓	✓	✓
Accidents	✓	✓	✓	✓	✓
Security	-	-	-	-	
Access to services	✓	✓✓	✓	✓	✓
Affordability	-	-	-	-	-
Severance	xx	x	xx	xx	xx
Option Value	-	✓	✓	✓✓	✓✓
d) Public accounts					
Cost to broad transport budget	xx	x	xx	xx	xx
Indirect tax revenues	✓✓	✓	✓	-	-
e) Distributional impacts					
User benefits	-	✓	✓	-	-
Noise	-	-	-	-	--
Air quality	-	-	-	-	-
Accidents	-	-	-	-	-
Security	-	-	-	-	-
Severance	-	-	-	-	--
Accessibility	-	-	-	-	-
Affordability	-	✓	✓	-	-

f) Indicative cost-benefit ratio					
Cost to Private Sector	-	x	x	xx	xx
Indicative Net Present Value	✓✓	✓	-	✓	✓
Indicative Cost Benefit Ratio	✓	✓✓	x	-	x
Financial case					
Outturn cost to implement	xx	x	xx	xxx	xxx
Operating & Maintenance Costs	x	x	xx	xx	xx
Funding Allocation	✓	✓✓	-	-	-
Delivery Case					
Likely Delivery Agents	✓✓	✓	✓	x	x
Stakeholder acceptability	-	✓	-	x	x
Public Acceptability/Interest	✓✓	✓	x	✓	x
Commercial case					
Route to market	✓✓	✓✓			x

Option	OAF score
Dual Carriageway	+4
Bus Lane	+23
Guided Busway	+3
Heavy Rail	+2
Light Rail	-1

Table 21: Composite scores for Options Assessment Framework

8.4. Contribution to Meeting Objectives

8.4.1. The options were assessed in terms of their contribution to meeting the project objectives defined in Section 5. This is shown in Table 22 where a tick represents a positive contribution to meeting the objective, a cross means that the scheme would undermine the objective and a dash indicates where the impact is likely to be mixed or uncertain.

	To improve travel times and/or journey reliability	To reduce carbon emissions and other pollutants associated with travel	To stimulate economic growth	To encourage safer travel
Dual Carriageway	✓	×	✓	✓
Bus Lane	✓	-	✓	✓
Guided Busway	✓	-	✓	✓
Heavy Rail (Train)	✓	×	✓	✓
Light Rail (Tram)	✓	✓	✓	✓

Table 22 – Contribution to meeting project objectives

- 8.4.2. The dual carriageway would be expected to contribute towards improved travel times (provided that the North Oxford bottleneck was also dealt with) and help to stimulate economic growth but it would be likely to increase pollutant emissions. Dual carriageway roads have a better safety record than single carriageways, and hence it would be expected that the dual carriageway option would deliver a small safety benefit, even if additional traffic were to be generated.
- 8.4.3. The bus lane would provide a congestion free alternative travel option (although this would only extend to its termination at Duke’s Cut) and also provide additional capacity to support local economic growth. The contribution towards reducing emissions would depend upon the type of buses used – with the move towards electric power this might be positive in the long term but the short term impact is more difficult to predict. This assessment is also true for the Guided Busway.
- 8.4.4. The heavy rail option would also make a positive contribution to travel times, economic growth and safety but, on the assumption that this would use diesel powered trains its impact in terms of emissions could be negative.
- 8.4.5. The tram option would make a positive contribution to meeting all four objectives.

- 8.4.6. The additional objective that the solution should not undermine the current high level of public transport between Witney/Carterton and Central & West Oxford and preferably encourage more travel by public transport to other parts of the city would be fully met by the busway and guided bus options, but could be undermined by the dual carriageway. Rail or tram options would provide an alternative public transport option which could reduce the market for bus services affecting the attractiveness of public transport for those without easy access to the train – more detailed assessment would be needed to fully assess the likely impact.
- 8.4.7. Overall the bus and guided bus options are likely to best meet the project's objectives, followed by the rail and tram options with the dual carriageway having the least positive impact.

8.5. Technical and Public Consultation Considerations

- 8.5.1. The consultation provided a significant insight to people's views about the A40 issues but this needs to be considered together with the technical and deliverability aspects of each option. In developing the A40 long term strategy further the following was concluded for each concept:

Tram and Guided Bus

- 8.5.2. The view which emerged across the consultation was that there is little support for the tram and guided busway concepts, where there is support there is acknowledgement of the limitations and high costs associated with these types of schemes. These two concepts received the greatest number of respondents stating they did not support these modes.
- 8.5.3. The main challenge to delivery of both these concepts is the complexity of land assembly along the route of the former railway line and for tram how this infrastructure would continue to key destinations along road, or heavy rail infrastructure. Delivering these options would also potentially limit the deliverability of rail in the future, due to utilising the former railway alignment.

8.5.4. The high cost of these options would also mean that they would be unlikely to get an acceptably high BCR in the economic assessment.

8.5.5. It was therefore recommended the tram and guided busway concepts are excluded from further consideration in the A40 long term strategy.

Train – Heavy Rail

8.5.6. Considerable support was recorded for the train concept, as the most favoured of the public transport options presented. However there was no support received for the idea from within the rail industry.

8.5.7. A key economic concern for pursuing heavy rail any further is the likelihood, or not, that a commercially viable rail service (for a rail operator) could be delivered based on the estimated low frequency of trains at 1-2 per hour, and whether this would be attractive to users particularly for short distance journeys to Oxford. This, along with its high cost, would mean that it would be uncertain what level of BCR the scheme would get in an economic appraisal.

8.5.8. A key strategic issue is whether there is significant enough mass to support a further rail line. Provision would provide existing rail users with the option of using the new line or continuing with the existing Cotswold Line at Harborough Station. Furthermore bus services would continue to operate (while commercially viable to operators), providing three public transport options. Whilst the draft West Oxfordshire Local Plan proposes 10,500 new dwellings in the district, it is presumed a much greater population growth would be required to support a new rail line.

8.5.9. It was therefore acknowledged that the aspiration of rail remains but recommended it was not taken forward in isolation by the council as the A40 long term strategy. Opportunities to realise the aspiration with lead partners Network Rail and Rail Operators will be pursued in the future.

Bus Lanes

- 8.5.10. Bus lanes were the second most favoured public transport concept by respondents of those presented. Their choice appears to have been influenced by the lower delivery cost than other options, likely success of attracting new users due to improvement in journey times, and range of origins and destinations the bus services could serve.
- 8.5.11. The comparatively low capital cost, together with the ability to run a frequent and flexible service mean that the scheme has a good chance of getting a high Cost Benefit Ratio in the economic assessment. It was recommended that the bus lane be further considered as part of the long term strategy.

Dual-Carriageway

- 8.5.12. The Dual-Carriageway concept received the greatest level of support from respondents of the five concepts presented in the public consultation. Over a quarter of respondents identified a dual-carriageway as their preferred scheme, and over quarter more identified a dual-carriageway and one of the public transport schemes as their preferred concept.
- 8.5.13. However, many respondents commented that providing a dual carriageway would increase traffic and in the long term not reduce congestion. Others cited that the north of Oxford bypass (Tin-Hat) scheme would need to be delivered first, in order for the A40 dual-carriageway to have benefit to congestion. These issues mean that there is some uncertainty about what level of return the dual carriageway would achieve in an economic assessment.
- 8.5.14. The dual carriageway would be difficult to deliver in the section between Cassington and Wolvercote because of the likely physical impact that such a scheme would have on the Oxford Meadows SAC or the Oxey Mead Conservation Area or both. Even an on-line dualling scheme would be likely to encroach into these sensitive areas or to risk increasing air pollution in them.

8.6. Preferred Long Term Strategy

- 8.6.1. Considering the assessment above there was concern that a wholly dual carriageway approach would only be successful if it was combined with other schemes which have proved difficult to deliver in the past (namely the Oxford Northern Bypass). Equally a wholly bus priority approach may not achieve the levels of congestion relief that the area requires to realise its potential.
- 8.6.2. Consequently, it was decided that the appropriate long term response would be to combine elements of the two strategies with the aim of creating a hybrid strategy which:
- Addresses the specific identified problems and provides a better fit with the strategy's objectives
 - Is affordable and deliverable
 - Is likely to be acceptable based on stakeholder and public consultation
- 8.6.3. The dual carriageway option was the preferred solution at public consultation but the continuing need to provide a remedy to the north Oxford congestion issues means that its deliverability and effectiveness is questionable. However the western half of this scheme would appear to provide an answer to the capacity issues on that section with a reduced likelihood of wider impact on the network.
- 8.6.4. At the same time as the A40 strategy was being investigated the County Council was developing a strategy for the development of the Park and Ride network serving Oxford. This suggested that a ring of park and ride sites on the main roads remote from the city could provide an effective alternative which would reduce on these routes and in the vicinity of Oxford Ring Road. A subsequent study suggested that the most appropriate location for a remote Park and Ride in the A40 corridor would be in the vicinity of Eynsham to the west of the B4449 roundabout.

- 8.6.5. While the bus lane option did not score very highly in the public consultation it would fit with this Park & Ride strategy as well as proving the most readily affordable and deliverable option for the A40.
- 8.6.6. The Council's Cabinet therefore resolved that the preferred long term improvement strategy for the A40 should be a combined package of measures comprising:
- a dual-carriageway from the eastern end of Witney Bypass to a park and ride at Eynsham
 - 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
 - provision of high quality cycleways along the length of the route.
- 8.6.2. This combined strategy was estimated to cost £86 million, including the provision of the Park & Ride site. This was made up of £42 million for the dualling element, £6 million for the park & ride and £38 million for the bus lanes (cost at 2016 price levels including land, contingencies and risk).
- 8.6.3. Although the exact standard of the elements of the strategy would be a matter for the engineering design of the individual projects it is assumed that the dual carriageway section will comprise two lanes in each direction with an appropriate width of lateral hard strip and verge, generally grade-separated junctions and minimal or no accesses along its length; the park and ride would initially provide parking for 500 vehicles, although it should be on a site sufficient to allow expansion to 1,000 spaces as demand requires; the bus lane will involve the addition of a single lane built in each verge separated from the carriageway by a paved, hatched strip. The cycleway provision along the road should be as good as or better than the current situation.
- 8.6.4. This combined strategy will provide additional capacity on the section of the A40 where the flow most exceeds its theoretical capacity and where link

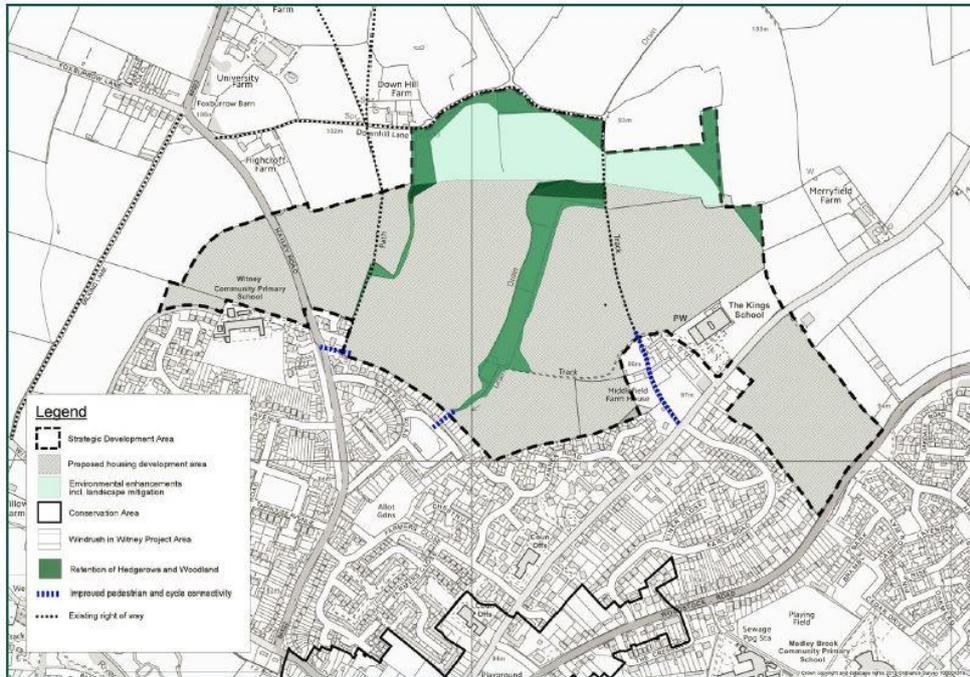
capacity related congestion is already being experienced. It also provides an improvement in line with the clear favourite option in the consultation. The roundabout entry to a park and ride site at Eynsham (initially 500 spaces but with room to expand to 1,000 when demand requires) would provide a safe and appropriate termination to the dualling. This would provide people with journeys that end in Oxford an opportunity to change to buses. From this location east to Oxford the long term strategy would provide bus priority to give both those on service buses and those who have changed mode at the park and ride to have a congestion free journey into the city.

9. Conclusions

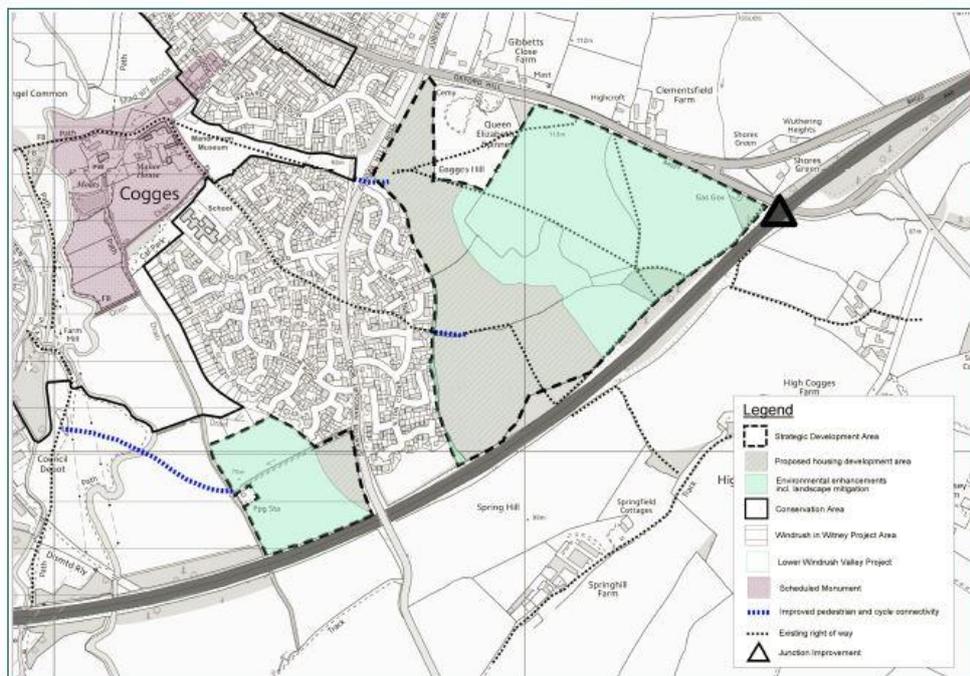
- 9.1. As part of the Local Growth Deal, Oxfordshire Local Enterprise Partnership has been provisionally awarded £35 million, to be matched by a local contribution of at least £5 million, to expand the integrated public transport system along the knowledge spine and deliver major enhancements to the A40 strategic route.
- 9.2. At its meeting on 28 July 2015 Oxfordshire County Council's Cabinet resolved that the best use of this funding would be a package of measures comprising:
- i. Eastbound bus lane on A40 from Eynsham Roundabout to west of the Duke's Cut, Wolvercote
 - ii. Westbound bus priority in A40 on the approaches to Cassington traffic lights and Eynsham Roundabout
 - iii. Bus priority on the Oxford-bound B4044 approach to Swinford Toll Bridge
 - iv. Junction improvements at accesses onto the A40 at Eynsham and Cassington
 - v. Park and Ride in the Eynsham area.
- 9.3. This can be clearly seen as a first phase of the implementation of the preferred long term strategy for the A40 route. Further phases of the strategy are likely to be:
- A40 dualling (Witney Bypass to Eynsham)
 - Westbound bus lane from Dukes Cut Eynsham (sections not covered in Science Transit scheme)
 - Either widening of existing bridges or construction of a parallel structure to allow for bus priority in both directions across the bridges over the Oxford Canal, Oxford-Banbury/Worcester Railway, Dukes Cut canal link and, possibly, Kingsbridge Brook to extend the Science Transit scheme to the edge of the Oxford built up area.

- 9.4. This strategy does not allow for consideration of options or alternatives for the Science Transit scheme except in matters of detail. Options for junction treatments and how to provide an improved cycle facility on the route will be included within the design parameters for the scheme.

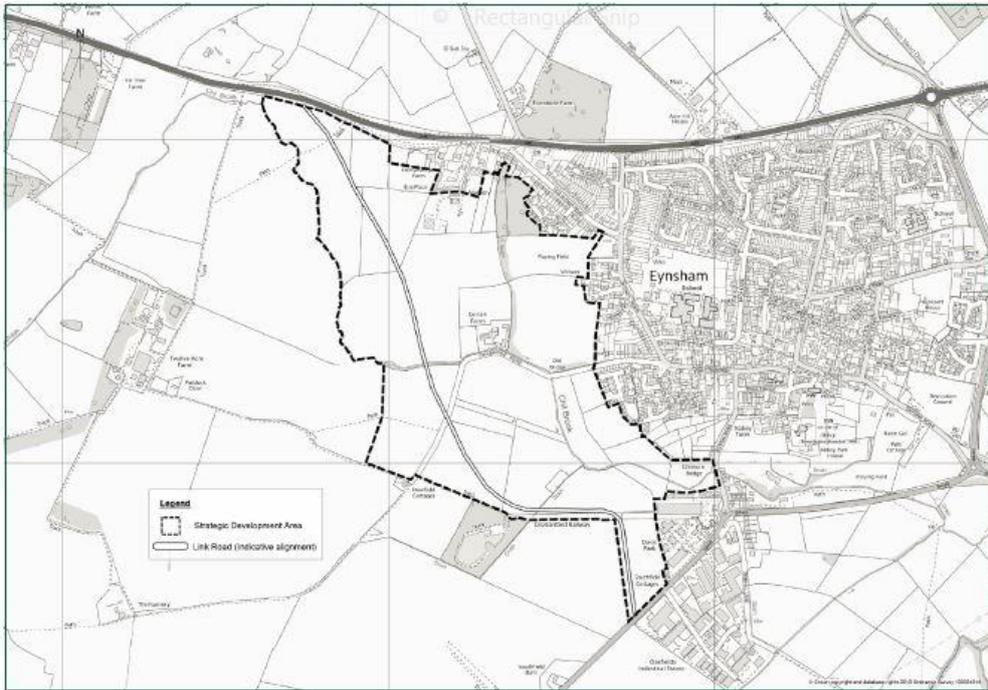
Appendix 1: Strategic Site Allocations in A40 Corridor



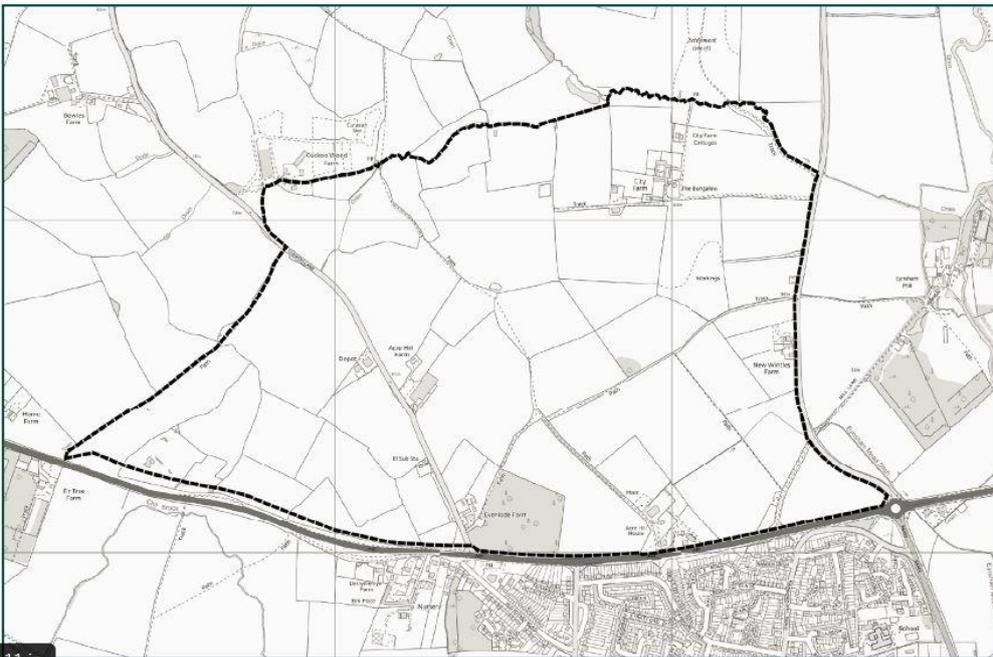
North Witney : urban extension of 1,400 homes



East Witney – urban extension of 450 homes



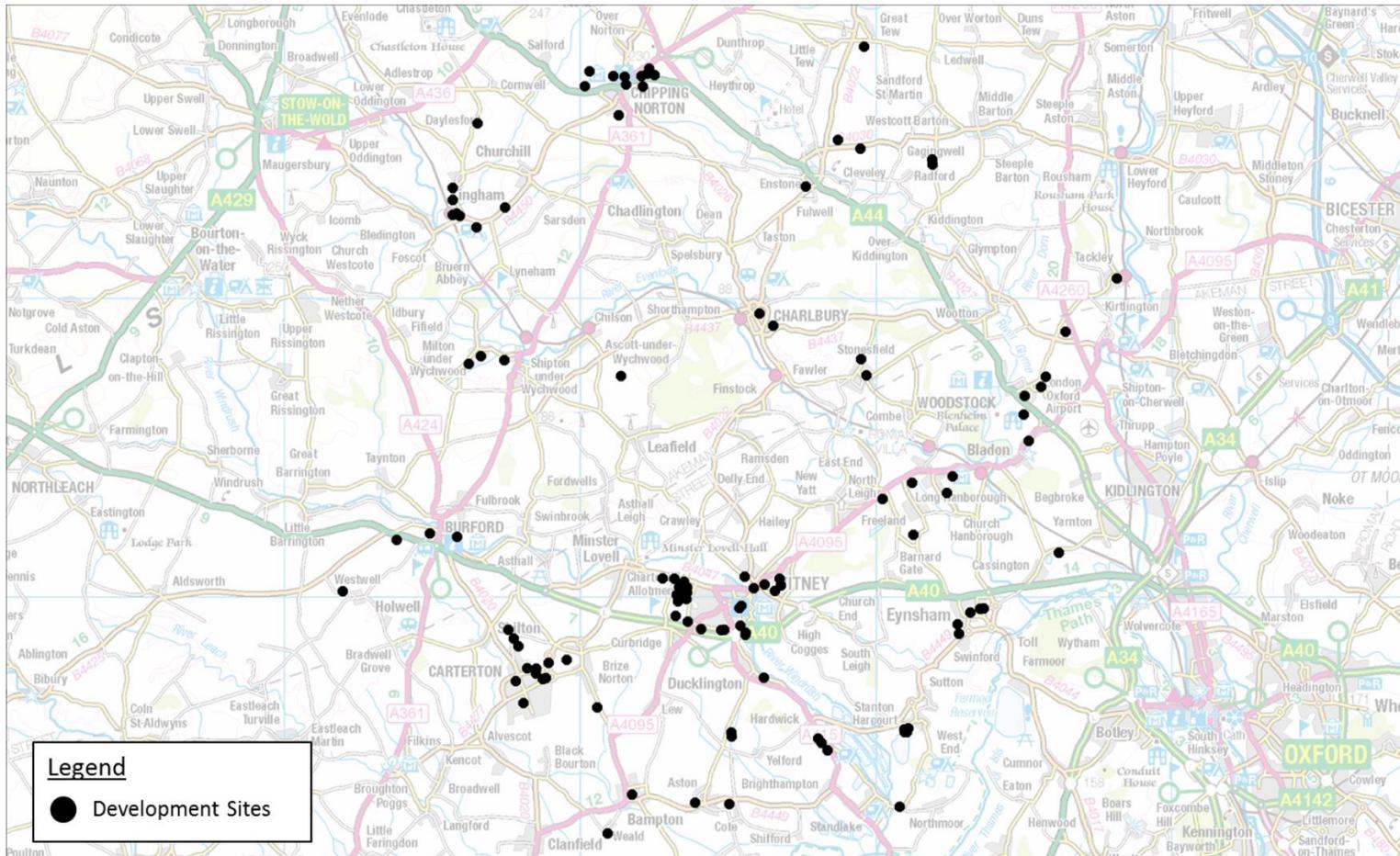
West Eynsham – urban extension of 1,000 homes



West Oxfordshire Garden Village - new settlement of 2,200 homes based on “garden village” principles

Appendix 2: Developments expected in West Oxfordshire 2013-2031 (from 2015 draft West Oxfordshire Local Plan)

Development Sites in West Oxfordshire



Type	Status	Site Name	Houses	Jobs	Area (m ²)
Residential	Completions 2014 - 2016	Buttercross Works, The Leys, Witney, Oxfordshire, OX28 4AS	158		
Residential	Completions 2014 - 2016	Land at Swinbrook Road, Carterton, Oxfordshire	44		
Residential	Completions 2014 - 2016	Land to the rear of 2 Shipton Road	44		
Residential	Completions 2014 - 2016	10 Oxford Street, Woodstock, OX20 1TR	33		
Residential	Completions 2014 - 2016	Nursery, Springfield, Curbridge, Witney, Oxfordshire, OX29 7NR	26		
Residential	Completions 2014 - 2016	Four Seasons House, 102B Woodstock Road, Witney, Oxfordshire, OX28 1DZ	21		
Residential	Completions 2014 - 2016	Land off Cox's Lane	20		
Residential	Completions 2014 - 2016	Land at Riely Close, Long Hanborough	17		
Residential	Completions 2014 - 2016	Land adj. 1 Crawley Road, Witney, Oxfordshire	15		
Residential	Completions 2014 - 2016	17 Mill Street, Eynsham, Oxfordshire, OX29 4JX	13		
Residential	Completions 2014 - 2016	St Leonards House, 13 - 15 Mill Street, Eynsham, Oxfordshire, OX29 4JX	13		
Residential	Completions 2014 - 2016	Former, 1 Oxford Hill, Witney, Oxfordshire, OX28 3JS	13		
Residential	Completions 2014 - 2016	10 Newland, Witney, OX28 3JD	11		
Residential	Completions 2014 - 2016	Car Park, Black Bourton Road, Carterton	10		
Residential	Completions 2014 - 2016	Farways, Yarnton Road, Cassington, Oxfordshire, OX29 4DY	10		
Residential	Completions 2014 - 2016	63 Burford Road, Carterton, Oxfordshire, OX18 3AQ	10		
C2 Residential	C2 Permissions	Penhurst School, Chipping Norton	93		

C2 Residential	C2 Permissions	Freeland House, Freeland	40		
Residential	Large commitments	West Witney	1000		
Residential	Large commitments	Land Between Monaghan Way, Carterton Road And Burford Road, Carterton	700		
Residential	Large commitments	Land South And East Of Walterbush Road Walterbush Road Chipping Norton, Chipping Norton, OX7 5DP	228		
Residential	Large commitments	Swinbrook Road, Carterton	205		
Residential	Large commitments	REEMA North, Northwood Crescent, Carterton	200		
Residential	Large commitments	Land south of A4095 to the west of Long Hanborough	169		
Residential	Large commitments	75 New Road, Bampton, Oxfordshire, OX18 2NP	160		
Residential	Large commitments	Land at Rockhill Farm, London Road, Chipping Norton, Oxon, Chipping Norton	96		
Residential	Large commitments	Coral Springs (Other) Thorney Leys, Witney	95		
Residential	Large commitments	Swinbook Road, Carterton	66		
Residential	Large commitments	Land south of High Street, Milton-under-Wychwood	62		
Residential	Large commitments	Coral Springs (C2) Thorney Leys, Witney	60		
Residential	Large commitments	Land to the North East of Marlborough School, Shipton Road, Woodstock, Oxon, Woodstock, OX20 1LW	51		
Residential	Large commitments	Land To East Of Church Road Long Hanborough, Long Hanborough	50		
Residential	Large commitments	Carterton Petrol Station, Upavon Way	42		
Residential	Large commitments	Land north of Cote Road, Aston	41		
Residential	Large commitments	Land between Saxel Close and Aston Village Hall and recreation ground, Aston	38		

Residential	Large commitments	Charity Farm Woodstock Road Stonesfield Witney, Stonesfield, OX29 8EJ	37		
Residential	Large commitments	Springfield Nursery, Curbridge Road, Witney	36		
Residential	Large commitments	Land between Wychwood House and Malvern Villas, Witney Road, Freeland	29		
Residential	Large commitments	Home Farm, Grove Road,, Bladon, OX20 1RH	27		
Residential	Large commitments	Street Farm 22 Nethercote Road, Tackley	26		
Residential	Large commitments	Rushy Bank, Charlbury	25		
Residential	Large commitments	Standlake Road, Ducklington	24		
Residential	Large commitments	Land north of Little Lees, Charlbury	22		
Residential	Large commitments	Buttercross Works, The Leys, Witney, Oxfordshire, OX28 4AS	16		
Residential	Large commitments	Land south of Church Street, Kingham, Chipping Norton, Oxfordshire, OX7 6YA	16		
Residential	Large commitments	Pink Hill House, Southfield Road, Eynsham, Oxon, Eynsham, OX29 4HY	16		
Residential	Large commitments	Court Farm, Butchers Hill, Great Tew, Oxfordshire, OX7 4AD	15		
Residential	Large commitments	Park Farm, Standlake Road, Northmoor, Northmoor, OX29 5AZ	15		
Residential	Large commitments	Brooklands Nurseries, Shilton Road, Carterton	15		
Residential	Large commitments	Chipping Norton War Memorial Hospital, Horsefair, Chipping Norton, Oxfordshire, OX7 5AJ	14		
Residential	Large commitments	Land adjacent to Newland Street, Eynsham	13		
Residential	Large commitments	Land east of Farley Corner, Farley Lane, Stonesfield	13		
Residential	Large commitments	Land at Northfield Farm, Woodstock Road, Witney, Oxfordshire, Witney	11		
Residential	Large commitments	Linden House, Kilkenny Lane, Carterton	10		

Residential	Large commitments	The Old Brewery, Priory Lane, Burford, Oxfordshire, OX18 4SG	10		
Residential	Large commitments	New Road, Kingham	10		
Residential	Large commitments	24 Hensington Road, Woodstock, OX20 1JL	10		
Commercial	Strategic sites	W Witney SDA		3077	126154
Commercial	Strategic sites	Parker Knoll		615	25231
Commercial	Strategic sites	N of London Rd		615	25231
Commercial	Committed and completed	Land at Windrush Park		516	21139
Commercial	Committed and completed	Unit 1, Stanton Harcourt Industrial Estate, Stanton Harcourt, Oxfordshire, OX29 5SL		266	3194
Commercial	Committed and completed	Viscount Industrial Estate, Station Road, Brize Norton, Oxfordshire, OX18 3QQ		220	9000
Commercial	Extant Emp Permissions (B Class)	Gateway House, Windrush Park Road, Windrush Industrial Estate, Witney, OX29 7EY		205	2461
Commercial	Committed and completed	Kingstanding, Ascott Under Wychwood, Oxfordshire, OX7 6AR		158	1900
Commercial	Committed and completed	Cotswold Farm, Cotswold Dene, Standlake, Oxfordshire, OX29 7RB		127	9544
Commercial	Committed and completed	Plot 1 Phase 3 De Havilland Way Windrush Industrial Park		127	5205
Commercial	Committed and completed	Former Highways Depot Banbury Road Chipping Norton		113	1350
Commercial	Committed and completed	Station Garage, Station Road, Kingham, Oxfordshire, OX7 6UP		109	1302
Commercial	Extant Emp Permissions (B Class)	Signal Court, Old Station Way, Eynsham, OX29 4TL		98	1178
Commercial	Committed and completed	Land at Primsdown Ind Estate Worcester Road		64	2303
Commercial	Committed and completed	17 Elmsfield Farm Industrial Estate		60	720

Commercial	Committed and completed	Whiteways Technical Centre, Enstone, Oxfordshire, OX7 4EE		58	693
Commercial	Committed and completed	Whiteways Technical Centre, Enstone, Oxfordshire, OX7 4EE		58	693
Commercial	Committed and completed	Unit C11, West Oxfordshire Retail Park Wavers Ground, Carterton, Oxfordshire, OX18 3FP		57	4276
Commercial	Extant Emp Permissions (B Class)	Freelands Farm, Westwell, OX18 4JT		52	629
Commercial	Committed and completed	Lakeside Industrial Park, Cotswold Dene, Standlake, Oxfordshire, OX29 7PL		52	1874
Commercial	Committed and completed	Plot 1, De Havilland Way, Windrush Industrial Park, Witney, Oxfordshire		50	3759
Commercial	Extant Emp Permissions (B Class)	The Cowyards, Oxford Road, Woodstock, OX20 1QR		47	564
Commercial	Committed and completed	Slade Farm, Kingham, Oxfordshire, OX7 6TF		42	498
Commercial	Committed and completed	Langston Priory Workshops, Station Road, Kingham, Oxfordshire, OX7 6UP		41	490
Commercial	Committed and completed	Unit 1, Stanton Harcourt Industrial Estate, Stanton Harcourt, Oxfordshire, OX29 5SL		38	2824
Commercial	Committed and completed	Upton Downs Farm, Upton, Burford, Oxfordshire, OX18 4LY		35	420
Commercial	Committed and completed	3 Bridge Street, Witney, Oxfordshire, OX28 1BY		33	398
Commercial	Extant Emp Permissions (B Class)	Claywell Farm, Aston Road, Ducklington, Witney, OX29 7QZ		29	1030
Commercial	Committed and completed	Jason Hydraulics Ltd, Burford Road, Minster Lovell, Oxfordshire, OX29 0RD		28	330
Commercial	Committed and completed	Lakeside Industrial Park, Cotswold Dene, Standlake, Oxfordshire, OX29 7PL		27	325
Commercial	Committed and completed	Field Barn Wootton		26	317
Commercial	Committed and completed	Ventura Park, Broadshires Way, Carterton, Oxfordshire, OX18 1AD		26	1957
Commercial	Extant Emp Permissions (B Class)	West plot of land at Book End, Book End, Witney,		26	1944
Commercial	Committed and completed	11 Thorney Leys Park, Witney, OX28 4GE		25	300

Commercial	Committed and completed	Lakeside Industrial Park, Cotswold Dene, Standlake, Oxfordshire, OX29 7PL		25	299
Commercial	Committed and completed	Carterton Leisure Centre, Broadshires Way, Carterton, OX18 1AA		24	290
Commercial	Committed and completed	Plot 1, De Havilland Way, Windrush Industrial Park, Witney, Oxfordshire		23	279
Commercial	Committed and completed	12 Thorney Leys Park, Witney, Oxfordshire, OX28 4GE		23	278
Commercial	Committed and completed	Churchill Heath Farm, Kingham, Oxfordshire, OX7 6UJ		23	270
Commercial	Committed and completed	Enstone Flying Club, Enstone Airfield, Enstone, Oxfordshire, OX7 4NP		21	857
Commercial	Committed and completed	Unit 3, Bampton Business Centre (South), Weald, Bampton, Oxfordshire, OX18 2AN		21	246
Commercial	Committed and completed	Unit 7, Wychwood Business Park Milton Road, Shipton Under Wychwood, Oxfordshire, OX7 6XU		20	236
Commercial	Committed and completed	Bampton Design, Avenue One, Witney, Oxfordshire, OX28 4XZ		18	218
Commercial	Extant Emp Permissions (B Class)	The Burford Laundry, Tannery Yard, Witney Road, Burford, OX18 4DW		18	212
Commercial	Extant Emp Permissions (B Class)	Abbott Diabetes Care, Range Road, Windrush Industrial Park, Witney, OX29 0YL		15	540
Commercial	Committed and completed	Unit 25-26, Avenue One, Witney, Oxfordshire, OX28 4BZ		15	175
Commercial	Committed and completed	Hopcrofts Holt Garage, Hopcrofts Holt, Steeple Aston, Bicester, Oxfordshire, OX25 5QQ		15	525
Commercial	Committed and completed	Lakeside Industrial Park, Cotswold Dene, Standlake, Oxfordshire, OX29 7PL		14	173
Commercial	Extant Emp Permissions (B Class)	10 High Street, Chipping Norton, OX7 5AD		14	170
Commercial	Committed and completed	152B Corn Street, Witney, Oxfordshire, OX28 6BY		14	162
Commercial	Extant Emp Permissions (B Class)	Land off Station Road, Kingham, OX7 6SX		13	990

Commercial	Committed and completed	Harcourt House, Cotswold Dene, Standlake, Oxfordshire, OX29 7PL		13	158
Commercial	Committed and completed	Unit C11, West Oxfordshire Retail Park Wavers Ground, Carterton, Oxfordshire, OX18 3FP		13	150
Commercial	Committed and completed	The Freight Terminal Enstone		12	894
Commercial	Committed and completed	The Freight Terminal Enstone		12	139
Commercial	Extant Emp Permissions (B Class)	Unit 11, Oakfield Industrial Estate, Eynsham, OX29 4TH		12	415
Commercial	Committed and completed	Unit 16, Cromwell House Cromwell Park, Chipping Norton, Oxfordshire, OX7 5SR		11	130
Commercial	Committed and completed	Unit K, Ventura Park Broadshires Way, Carterton, Oxfordshire, OX18 1AD		11	130
Commercial	Committed and completed	Claywell Farm, Aston Road, Ducklington, Witney, Oxfordshire, OX29 7QZ		11	128
Commercial	Committed and completed	Whiteways Technical Centre, Enstone, Oxfordshire, OX7 4EE		11	128
Commercial	Committed and completed	Unit 1, Eagle Industrial Estate, Witney, Oxfordshire, OX28 4YR		11	127
Commercial	Committed and completed	Groves Business Centre, Shipton Road, Milton Under Wychwood, Oxfordshire, OX7 6JF		10	123

Appendix 3: Options Displayed at Public Consultation

A40 DUAL CARRIAGEWAY

**CONNECTING
OXFORDSHIRE**



Approximate cost £120 million
Additional £100 million may be required for 'North Oxford' bypass

This option involves widening the A40 to 2-lanes in each direction separated by a central reservation barrier. The A40 Dual Carriageway would follow the existing road and would require significant alterations to junctions at Barnard Gate and Cassington to provide safe access. The Dual Carriageway central reserve would prevent certain movements and restrict direct access in some cases.



Features

- Dual Carriageway benefits both freight and passenger vehicles (buses, cars, lorries etc.).
- Estimated journey times (without delays inc. at North Oxford junctions) of 3 minutes from Eynsham to Wolvercote roundabout and 7 minutes from Witney to Wolvercote.
- No priority for buses and removal of A40 Science Transit bus lane scheme.
- Could easily serve possible Park and Ride to the north of the A40 at Eynsham, although no bus lanes would limit the appeal to users.
- May need to be considerable clearance of verge side trees and other vegetation to create space for dual carriageway.
- Possible adverse impact of Oxford Meadows Special Area of Conservation due to potential encroachment on protected land.
- Considerable land acquisition needed along the length of the route, for both widening and junctions, particularly if the alternative Eynsham bypass is pursued.
- May require an additional 'North Oxford' bypass to provide a high standard through route. Would require an additional £100+ million investment.
- May encourage additional car trips to Oxford which would require extra parking to be provided within the city.
- May encourage traffic growth which could reduce benefits of dual carriageway in future years.

www.oxfordshire.gov.uk/connectingoxfordshire



A40 BUS LANE



Approximate cost £50 million

This option involves building 3 metre wide bus lanes on the existing verges between Witney Bypass (Shores Green) and the Duke's Cut canal bridge in both directions. The bus lanes will be separated from the general traffic lanes by a 1 metre buffer. Use of the bus lanes will normally be restricted to buses but could also be used by emergency vehicles, and by other traffic when necessary.



Features

- High frequency bus services serving a range of origins and destinations.
- Delay free bus journey from Witney to north Oxford.
- 11 minute journey time from Shores Green to Wolvercote.
- Easily serve possible Park and Ride to the north of the A40.
- May need to be considerable clearance of verge side trees and other vegetation to create space for bus lanes.
- Predominantly uses land within the highway boundary, therefore minimal land needs to be acquired. Although additional land may be required for tree planting to screen the A40.
- Minimal physical impact on Oxford Meadows Special Area of Conservation.
- Could be extended to junction with proposed A40-A44 Strategic Link Road, but at considerable additional cost.
- Builds on from the proposed A40 Science Transit bus lane scheme, reducing the cost by £15 million.

GUIDED BUSWAY

CONNECTING
OXFORDSHIRE



Approximate cost £165 million

This option involves installing a two-way guided busway track to provide a new route from Witney to Oxford using specially adapted buses. The proposed route would use the line of the old railway from Witney to Cassington, except in Eynsham where buses would use the roads through the village. The route would continue with a guided busway alongside A40 to Duke's Cut canal bridge.



Features

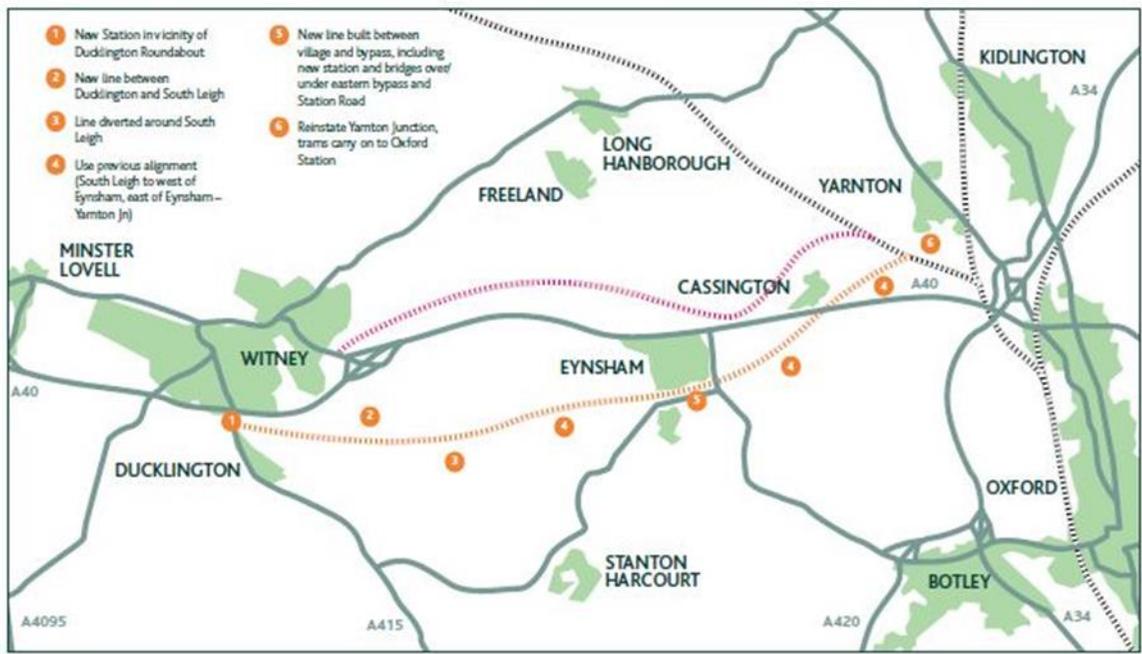
- High or Medium frequency buses serving a wide range of origins and destinations
- Time savings of up to 15 minutes for guided bus users at peak times from Witney to Oxford.
- 12 minute journey time from Ducklington to Wolvercote.
- Use of old railway corridor would require considerable land acquisition.
- May need to be considerable clearance of verge side trees and other vegetation to create space for guided busway on the A40
- Probably impact on the vegetation, wildlife habitat and land uses along the line of the old railway.
- Cost does not include widening or replacing the existing railway and canal bridges at Duke's Cut, where buses will merge into the general traffic lane.
- Should be minimal physical impact on Oxford Meadows Special Area of Conservation.
- A guided busway uses new track provided for the exclusive use of compatible buses. Buses are specially adapted to use the busway but can also use ordinary roads.

WITNEY – OXFORD TRAIN



Approximate cost £285 million

This option involves building a new single-track railway line, with double track running through stations providing two platforms and allowing the opportunity for trains to pass each other. Trains are likely to be diesel powered. Trains would run from south of Ducklington roundabout to join the line of the old railway near South Leigh, then pass between Eynsham and B4449 before joining the Cotswold Line at Yarnton, where trains would carry on to Oxford Station.



Features

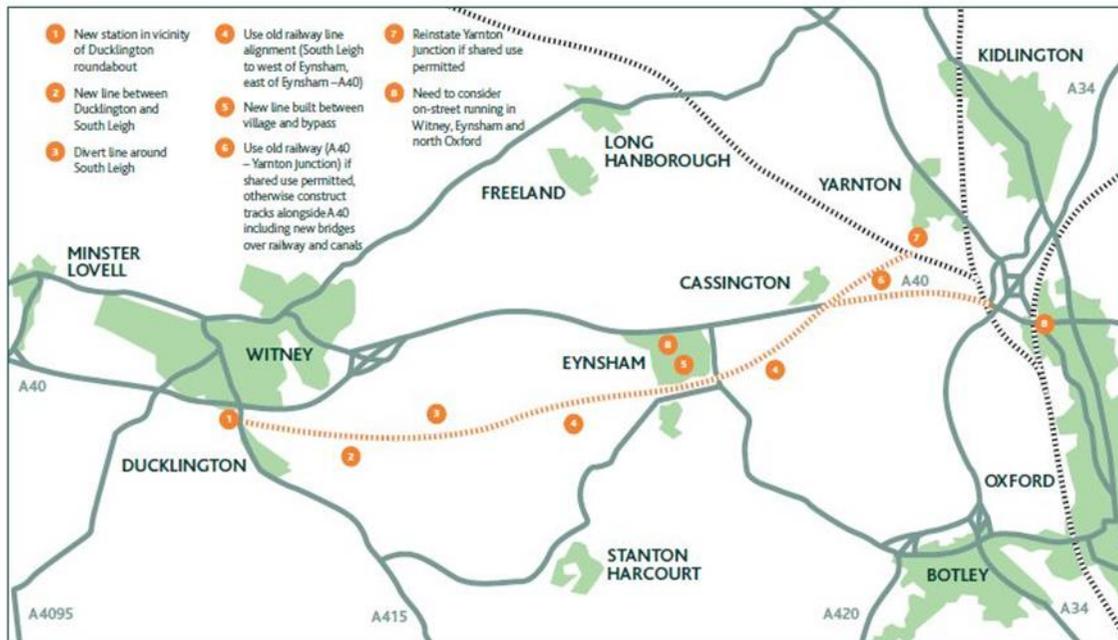
- Journey time from Witney to Oxford approximately 17 minutes.
- Single track would only allow up to 1-2 trains per hour in each direction, due to limited opportunities to pass each other.
- Stations would require adequate car parking to act as Parkways.
- Would require considerable land acquisition, including through Cassington Quarry.
- There will be an impact on the vegetation, wildlife habitat and landuses along the route.
- Trains could be extended run from Oxford Station to Littlemore and Cowley using Cowley Branch Line for passenger services.
- Provides bus connections at Oxford Station to wider range of local destinations, and access to national rail network.
- Bridges needed to avoid building level crossings on Station Road, Eynsham and B4449 Eynsham bypass road; line would need to be diverted to avoid impacts in South Leigh.
- The railway lines through Oxford may not have sufficient spare capacity to allow more frequent services to run.
- Proposal needs to be economically viable for Network Rail and a Train Operating Company.
- Possibility that an alternate route (shown in red) could run north of A40, from near Oxford Hill at Witney to Yarnton. This would cost a similar amount and may be less disruptive to build; but it would however preclude any future extension to Carterton.

WITNEY - OXFORD TRAM



Approximate cost £240 million

New double track, light rail line linking from south of Ducklington roundabout to the old railway line at South Leigh then using the railway alignment to Eynsham, where a new line would be created between the village and the southern bypass. From close to Siemens the line would follow the old railway line to A40. At the A40 the line would either continue to a railway junction at Yarnton, if a joint tram-train operation was permitted, or continue alongside the A40 toward Oxford.



Features

- 1 Journey times from Witney to Oxford 20-25 minutes.
- 2 Double track allows 4 trams per hour in each direction but the railway lines through Oxford may not have sufficient spare capacity to allow such frequent services to run.
- 3 Tram stops would require adequate car parking to act as Parkways.
- 4 Would require considerable land acquisition, including through Cassington Quarry.
- 5 There will be an impact on the vegetation, wildlife habitats and land uses along the route.
- 6 The railway authorities may not permit joint tram-train operation, as this would be the first in the UK.
- 7 An alternative route would be along the A40, but this would require either a terminus to be provided in north Oxford, or on-street running to Oxford City Centre at considerable extra costs (£100m+).
- 8 Provides connections to local bus services at Oxford Station and access to national rail network.
- 9 Proposal needs to be economically viable for operating company.

Appendix 4: EAST Assessment Summaries

Early Assessment and Sifting Tool (EAST) - Expanded Print View

Option Name/No.	Dual Carriageway	
Date	19/10/2016	
Description	Widening A40 to 2 lanes in each direction separated by a central reservation between Shores Green and A40/A44 Link Road.	

Strategic

Identified problems and objectives	Capacity of road is lower than demand for significant periods of the day leading to queues, delays and increased journey times.	
Scale of impact	5. Significant impact	
Fit with wider transport and government objectives	3	Meets objectives on congestion and economic development. Not in line with climate change or air quality policies.
Fit with other objectives	4	Assists with Local Plan policies for development within West Oxfordshire
Key uncertainties	Will road encourage additional traffic onto A40 corridor and thereby create problems in the north Oxford area - this could necessitate the additional provision of a north of Oxford Bypass (estimated £100m+)	
Degree of consensus over outcomes	3	Direct outcomes accepted but may be more debate over extent of indirect outcomes (such as trip generation)

Economic

Economic growth	5. Green	Improves connectivity, accessibility and resilience; required for housing delivery
Carbon emissions	3. Amber	Reduced vehicle km, increased embedded carbon
Socio-distributional impacts and the regions	4. Amber/green	No change on SDIs, positive impact on economic growth
Local environment	2. Red/amber	Negative impact on noise/air quality but low quality area
Well being	2. Red/amber	Negative impact on severance, physical activity and road safety, positive impact on access to goods and services
Expected VfM category	2. High 2-4	Scores 4.

Managerial

Implementation timetable	6. 5-10 years	Scores 4
Public acceptability	4	Likely to be mixed reactions
Practical feasibility	4	Should be no problems
What is the quality of the supporting evidence?	5. High	Pre-feasibility report completed
Key risks	May generate additional traffic which could require additional road building in North Oxford.	

Financial

Affordability	3	Affordable if DfT funding is made available
Capital Cost (£m)	06. 50-100	Scores 4
Revenue Costs (£m)	01. None	
Cost profile		
Overall cost risk	3	
Other costs		

Commercial

Flexibility of option	3	Could be reduced in scope if full funding not available but only limited number of points which would be suitable for termination.
Where is funding coming from?	LLMS?	
Any income generated? (£m)	No	

Early Assessment and Sifting Tool (EAST) - Expanded Print View

Option Name/No.	Bus lane
Date	19/10/2016
Description	3 metre wide bus lanes on the existing verges between Shores Green and Dukes Cut bridge in both directions. The bus lanes would be separated from the general traffic by a 1metre wide buffer plus there would be cycle facilities along the whole length of the section to be improved.

Strategic

Identified problems and objectives	Capacity of road is lower than demand for significant periods of the day leading to queues, delays and increased journey times. The objective would be to provide a congestion free alternative so that overall choice is improved.	
Scale of impact	4	
Fit with wider transport and government objectives	5. High	Meets with environmental and economic development policies
Fit with other objectives	4	Assists with Local Plan policies for supporting development within West Oxfordshire
Key uncertainties	Would scheme provide relief for traffic on A40 or attract additional traffic currently using alternate routes?	
Degree of consensus over outcomes	3	Issues with attractiveness of scheme and amount of traffic relief it would provide for A40

Economic

Economic growth	4. Amber/green	Improves connectivity, reliability and resilience; question on facilitating development.
Carbon emissions	5. Green	Reduced vehicle km; improves carbon efficiency of travel
Socio-distributional impacts and the regions	5. Green	Positive on SDIs, encourages economic growth
Local environment	4. Amber/green	Positive impact on air quality and overall environmental impact, question impact on noise.
Well being	4. Amber/green	Improved road safety and accessibility to goods and services
Expected VIM category	2. High 2-4	Scores 4.

Managerial

Implementation timetable	5. 2-5 years	Scores 3
Public acceptability	3	likely to be mixed reactions
Practical feasibility	4	Readily achievable, mostly within current highway
What is the quality of the supporting evidence?	4	pre-feasibility report completed
Key risks	Minimal improvement in numbers of vehicles on A40 due to transfer of traffic from alternative routes now being taken.	

Financial

Affordability	4	Affordable if DfT funding is made available
Capital Cost (£m)	06. 50-100	Scores 5.
Revenue Costs (£m)	01. None	
Cost profile		
Overall cost risk	4	
Other costs		

Commercial

Flexibility of option	5. Dynamic	Large scope for reducing length of scheme if funding not fully available.
Where is funding coming from?	LMMS or equivalent	
Any income generated? (£m)	Yes	

Early Assessment and Sifting Tool (EAST) - Expanded Print View

Option Name/No.	Guided Busway
Date	19/10/2016
Description	Two way guided busway track to provide a new route from Witney to Oxford using specially adapted buses. Either using the old railway line or alongside A40.

Strategic

Identified problems and objectives	Capacity of road is lower than demand for significant periods of the day leading to queues, delays and increased journey times. The objective would be to provide a congestion free alternative so that overall choice is improved.	
Scale of impact	3	
Fit with wider transport and government objectives	4	Meets with environmental and economic development policies; less flexible than bus lane.
Fit with other objectives	4	Assists with Local Plan policies for supporting development within West Oxfordshire
Key uncertainties	Would patronage support extra investment in specialised vehicles for operator?	
Degree of consensus over outcomes	3	Issues with attractiveness of schemes and amount of traffic relief it would provide for A40

Economic

Economic growth	5. Green	Improved connectivity, reliability and resilience.
Carbon emissions	5. Green	Reduced vehicle km; improved carbon efficiency of travel
Socio-distributional impacts and the regions	5. Green	Positive on SDIs, encourages economic growth
Local environment	3. Amber	Limited air quality and noise benefits, negative overall impact on local environment
Well being	4. Amber/green	improved road safety and accessibility to goods and services
Expected VfM category	2. High 2-4	Scores 4

Managerial

Implementation timetable	6. 5-10 years	Scores 5.
Public acceptability	2	Likely to be mixed/negative reactions
Practical feasibility	2	Considerable land acquisition issues
What is the quality of the supporting evidence?	2	Limited
Key risks		

Financial

Affordability	2	May be difficult to justify capital outlay in terms of benefits over simpler pt schemes
Capital Cost (£m)	07. 100-250	Scores 04.
Revenue Costs (£m)	01. None	
Cost profile		
Overall cost risk	1. High risk	
Other costs		

Commercial

Flexibility of option	2	Limited scope for reducing size of scheme - need minimum scheme to justify adaptations to buses
Where is funding coming from?	LMMS (?)	
Any income generated? (£m)	Yes	

Early Assessment and Sifting Tool (EAST) - Expanded Print View

Option Name/No.	Heavy Rail	
Date	19/10/2016	
Description	New single track railway line with passing places at stations from Duckington to Cotswold Line at Yarnton.	

Strategic

Identified problems and objectives	Capacity of road is lower than demand for significant periods of the day leading to queues, delays and increased journey times. The objective would be to provide a congestion free alternative so that overall choice is improved.	
Scale of impact	4	
Fit with wider transport and government objectives	5. High	Meets with environmental and economic development policies
Fit with other objectives	3	Assists with Local Plan policies for supporting development within West Oxfordshire.
Key uncertainties	Attractiveness of service that would be able to be run	
Degree of consensus over outcomes	3	Would infrequent service attract enough passengers to justify investment.

Economic

Economic growth	5. Green	Improved reliability, resilience and connectivity, and will facilitate development
Carbon emissions	4. Amber/green	Reduced vehicle km and improved carbon efficiency of travel but significant construction required.
Socio-distributional impacts and the regions	3. Amber	Encourages economic growth, question impact on SDIs
Local environment	2. Red/amber	Negative overall environmental impact - local impact dependant on design
Well being	4. Amber/green	Improved road safety and accessibility to goods and services.
Expected VfM category	2. High 2-4	Scores 4.

Managerial

Implementation timetable	6. 5-10 years	Scores 2.
Public acceptability	4	Likely to be mixed reactions
Practical feasibility	2	Considerable land acquisition issues, including passage through Cassington Quarry
What is the quality of the supporting evidence?	3	Pre-feasibility report completed
Key risks	May not attract sufficient passengers to support investment; congestion on railways in Oxford would limit number of available paths; needs railway industry sponsor.	

Financial

Affordability	2	Would need to be supported by DfT and railway industry
Capital Cost (£m)	08. 250-500	Scoes 2.
Revenue Costs (£m)	01. None	
Cost profile		
Overall cost risk	1. High risk	
Other costs		

Commercial

Flexibility of option	1. Static	No flexibility - need scheme to be delivered in entirety
Where is funding coming from?	Network Rail / Train Operating Company/Government	
Any income generated? (£m)	Yes	

Early Assessment and Sifting Tool (EAST) - Expanded Print View

Option Name/No.	Light Rail	
Date	19/10/2016	
Description	Double Track light rail line from south of Ducklington to either the railway line at Yarnton (tram/train) or alongside A40 toward Oxford (tram)	

Strategic

Identified problems and objectives	Capacity of road is lower than demand for significant periods of the day leading to queues, delays and increased journey times. The objective would be to provide a congestion free alternative so that overall choice is improved.	
Scale of impact	4	
Fit with wider transport and government objectives	4	Meets environmental and economic development objectives
Fit with other objectives	4	May assist with policies to support development in West Oxfordshire.
Key uncertainties	Would the trams be allowed to share rail lines from Yarnton to Oxford. Otherwise would require on street operation to terminus in Oxford (not costed)	
Degree of consensus over outcomes	3	Difficult to assess attractiveness of unknown service.

Economic

Economic growth	5. Green	Improves connectivity, reliability and resilience, may assist with economic development
Carbon emissions	4. Amber/green	Reduced veh km and improved carbon efficiency but significant construction required.
Socio-distributional impacts and the regions	4. Amber/green	Positive on SDIs, positive impact on economic growth
Local environment	4. Amber/green	Positive impact on local environment but negative overall impact
Well being	4. Amber/green	Improved road safety and accessibility to jobs and services.
Expected VFM category	2. High 2-4	Scores 4.

Managerial

Implementation timetable	6. 5-10 years	Scores 2
Public acceptability	4	Likely to be mixed reactions
Practical feasibility	3	Significant land acquisition issues - including passing through Cassington Quarry if tram/train allowed.
What is the quality of the supporting evidence?	2	Limited
Key risks	Tram/train would provide the better solution but may not be possible given historic opposition in rail industry and limited capacity on railway lines in North Oxford. Possible that service would only be attractive if it was extended into different parts of the settlements at each end; difficult to assess value of project without looking at overall plan which is not under consideration.	

Financial

Affordability	2	Funding route unclear
Capital Cost (£m)	07. 100-250	Scores 4.
Revenue Costs (£m)		
Cost profile		
Overall cost risk	1. High risk	
Other costs		

Commercial

Flexibility of option	1. Static	
Where is funding coming from?		
Any income generated? (£m)	Yes	

Appendix 5: Witney High Street – Oxford Carfax

Assumed travel times

Dual carriageway

Walk to car park	2 mins
Car park – Shores Green	5 mins
Shores Green – Wolvercote Rbt	7 mins
Wolvercote Rbt	5 mins
Wolvercote Rbt – City centre car park	13 mins
Car park – Carfax	<u>3 mins</u>
TOTAL	35 mins

Bus Lane

Walk to bus stop	1 min
Wait at bus stop	7 mins
Bus time to Shores Green	6 mins
Shores Green – Wolvercote	11 mins
Wolvercote Rbt	4 mins
Wolvercote Rbt – City centre	12 mins
Walk to Carfax	<u>2 mins</u>
TOTAL	43 mins

Guided Busway

Walk to bus stop	1 min
Wait at bus stop	10 mins
Bus time to Ducklington	5 mins
Ducklington to Wolvercote	12 mins
Wolvercote Rbt	4 mins
Wolvercote Rbt – City Centre	12 mins
Walk to Carfax	<u>2 mins</u>
TOTAL	46 mins

Heavy Rail

Walk to Witney Rail Station	5 mins
Wait at Rail station	15 mins
Rail time Witney – Oxford	17 mins
Walk Oxford Rail Station – Carfax	<u>5 mins</u>
TOTAL	42 mins

Light Rail

Walk to Witney Rail Station	5 mins
Wait at Rail station	7 mins
Rail time Witney – Oxford	25 mins
Walk Oxford Rail Station – Carfax	<u>5 mins</u>
TOTAL	42 mins

APPENDIX 6 – COST ESTIMATES

Option	URS initial Cost Estimate	Land Cost	Con-tingency	Optimism Bias Allowance	TOTAL	source of cost estimate
Bus Lane (Witney - Kingsbridge Brook - 2 way)	34	3	7	20	64	Eynsham - Wolvercote Bus Lane (URS Corridor Strategy p22) * 2.2
Guided Busway (Witney - Kingsbridge Brook)	91	5	18	53	167	URS Corridor Study p54
Light Rail (Witney - Oxford)	129	13	26	75	242	URS Corridor Study p53 - assumes shared use of rail Yarnton-Oxford
Heavy Rail (Witney - Yarnton)	151	15	30	88	284	URS Corridor Study p52
Dual Carriageway (Witney - A44 Link Road)	72	7	14	42	117	URS Dual Carriageway Concept Study p24 + £12m (link road) + £10m (railway bridge)