Bicester London Road Level Crossing

Option Assessment Report (OAR) Part 1

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OXFORDSHIRE COUNTY COUNCIL

Version	Author	Date	Comment
1.0	Roger O'Neill		Background sections and assessment of DS1 & DS2 undertaken
1.1	Katie Parnell	01/12/20	Assessment of DS3a & DS3b undertaken, review of previous assessment and updates for consistency, conclusions and recommendations added
1.2	Katie Parnell	20/04/21	Final review and edits undertaken across document
1.3	Katie Parnell & David Rawson	10/05/21	Addition of executive summary

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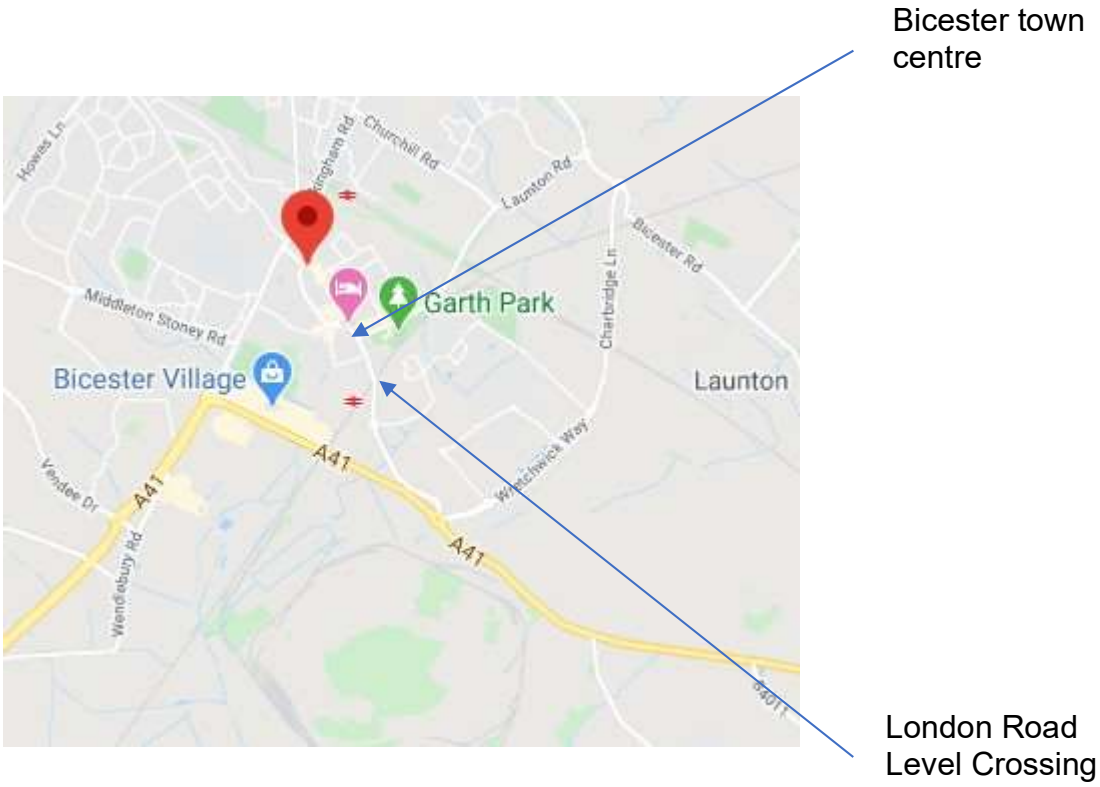


Figure 1: Area of Interest

Executive Summary

1. Introduction

An interim report on this Options Appraisal Report (OAR) was presented by Oxfordshire County Council (OCC) to the East West Rail (EWR) Consortium Strategic Board on 9th December 2020.

An update, on the final OAR, was presented by OCC to the EWR Consortium Strategic Board on 16th March 2021. The Recommendations of this Agenda Item were agreed.

The OAR presents this work, which has been collaboratively contributed to by EWR Co., and is intended to inform EWR Co. in its further development and delivery of the Project.

2. Background

The OAR was funded through the Consortium Work Programme, with the work undertaken by the OCC Innovation Team (iHub), in association with transport modelling by consultants WYG using the Bicester model.

The OAR sets out and appraises options for interventions that will help enable continued access to and from Bicester town centre as level crossing down-time increases in line with train service frequencies. In particular, the OAR considers what measures should be prioritised for investment once train service frequencies increase above those already expected following opening of the next EWR stage (Bicester to Bletchley/Milton Keynes).

By developing the evidence base, the OAR helps to build a common understanding amongst Partners of the longer-term transport access investment options needed in Bicester as the EWR project develops. This is considered key to enabling the longer-term potential of EWR to be realised.

3. Methodology

6 *project objectives* were developed:

i) To facilitate expansion of rail services while maintaining connectivity across the town and promoting town centre vitality and accessibility.

ii) To encourage the development of a high-quality, innovative and resilient integrated transport system that promotes active travel provision and supports healthy place-shaping.

iii) To promote opportunities for pedestrians and cyclists in Bicester.

iv) To reduce carbon emissions from transport in Bicester and improve air quality in the town, particularly within the designated Air Quality Management Area.

v) To improve connectivity between key employment and residential areas and their access to the strategically important transport networks, including rail services.

vi) To encourage and facilitate the efficient operation of bus services in Bicester and the surrounding area.

In addition, 3 intervention *project options* were defined:

• Option (do-something) 1: Deliver SE Link Road and Bicester Bypass improvements.

• Option (do-something) 2: Direct highway intervention at London Rd (bridge or underpass).

• Option (do-something) 3a and 3b: Delivery of a package of sustainable transport improvements taking account of the Bicester Local Cycling and Walking Infrastructure Plan (LCWIP) – 3a sets out a series of comprehensive cycle and walking improvements, which 3b adds further to.

Both Options 3a and 3b forecast a scenario where travel demand in the Bicester urban area shifts towards walk/cycle trips. The mode split predicted in the Bicester LCWIP for each of these scenarios is shown in Figure 19.

The OAR work pulls together the assessment of these options, both against the objectives set for the project, but also using evidence from modelling work to assess their benefits/disbenefits, before going on to produce an EAST (Early Assessment and Sifting Tool) assessment for each option.

4. Outcomes of study work undertaken

a) Assessment of Options against objectives

The options were assessed against the objectives, each objective being scored. The proposed sustainable transport options generally score better overall against the objectives set, than the highway intervention options. See Table 8.

b) Assessment of options using the Bicester model

Transport modelling for Options 1 to 3b was undertaken:

• Option 1: Delivery of the SE Link Road and Bicester East Perimeter Road improvements.

• Option 2: Direct highway intervention at London Road (either a bridge or underpass).

• Option 3a: Development of a comprehensive cycle and walking network for Bicester.

• Option 3b: Development of cycle network, including certain road closures to re-allocate space to active travel modes.

and compared against a 'do-nothing' option, and a 'do-minimum' option, see Table 7.

• 'Do nothing' – continued use of London Road assuming approx. 50% down-time.

• 'Do-minimum'- closure of London Road with no additional intervention.

c) Assessment of options using the central government Early Assessment and Sifting Tool (EAST)

Each option was also appraised through use of an EAST assessment, against the strategic, economic, managerial, financial and commercial cases. See Table 9.

5. Conclusions/ Next Steps

Option 2, a direct highway intervention at London Road, scores least well overall, scoring low in Objective iv), and only achieving mid-scores in Objectives ii), iii), and vi).

Option 3b, a package of significant interventions to promote sustainable transport, scores best overall, scoring high in all 6 of the Objectives in the Methodology, as well as obtaining the highest EAST scores and generally more favourable traffic flow impacts than the other options.

However, although each option was assessed in isolation to complete the OAR, it is recognised that a package of transport investments will be needed to mitigate the severance issues that further rail services will cause along London Road. The package will need to deliver a place-based solution that fits with the wider Bicester area transport strategy and fits with wider existing and imminent policy.

6. Recommendation

It is recommended that the Promoter and Developer, in developing EWR:

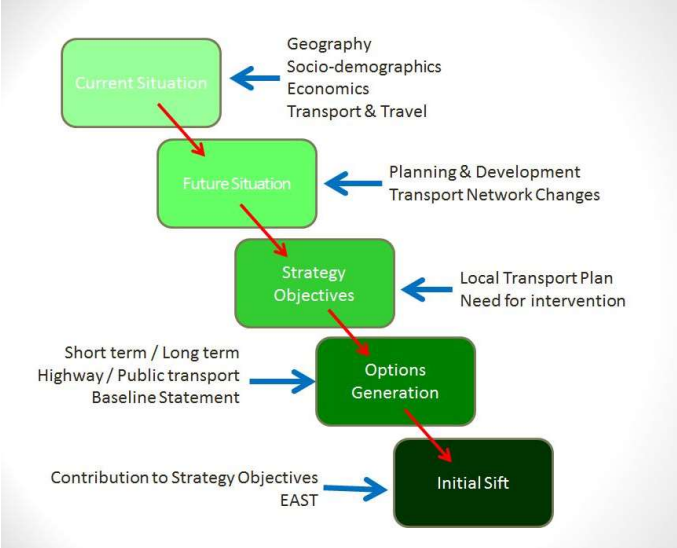
6.1 use the outcomes of this OAR to inform the development of a safe and effective longer-term solution for London Road, and;

6.2 maintain OCC as a key Stakeholder in a collaborative relationship.

1. Introduction

This Part 1 Options Assessment Report centres on the transport issues within Bicester, focusing on those around the London Road and, in particular, the level crossing. It sets out the initial development of options to resolve the traffic issues within the Bicester area. It will follow the following process:

Figure 2: Part 1 OAR processes



2. Current Situation

2.1. Geographic Context

Bicester is an historic market town located in Cherwell district, Oxfordshire. The total population of Bicester wards in 2011 was 30,854 residents including 62 people living in communal establishments. Between 2001 and 2011 Bicester had grown by 2,182 residents (7%)[i], making it one of the fastest growing towns in the county.

The town lies just to the north of Junction 9 of the M40. The A41 former trunk road connects the motorway with Aylesbury and Tring, passing to the south of the town in a bypass.

Bicester lies on two railway lines: the Oxford – London Marylebone line and the Banbury – London Marylebone line (although these two lines do not allow for transfer between them and have separate stations within Bicester).

The London Marylebone line also allows for the future re-opening of the line to Bletchley and Bedford and the longer-term restoration of the line between Bedford and Cambridge.

Bicester has long had a strong connection with the military. RAF Bicester was constructed in the inter-war period and RAF operations continued until 2004. It is a designated battlefield site. The Depot at Graven Hill has been a long-standing store for ammunition and other military materiel, complete with its own railway access and sidings (also now discontinued).

2.2. Socio-demographic Context

The following data for Bicester comes from the 2011 Census. As such, it is worth noting that some change might reasonably be expected to have occurred since then, particularly given the impact of COVID-19 on aspects such as employment rates for example. The data should therefore be viewed with some caution. The data aggregates the returns from the Town, West, North, East and South wards (essentially the area within the Perimeter Road.)

The total population of the Bicester wards in 2011 was 30,854 residents, up 2,183 (7%) from 2001. There were 12,286 households in the town, up 6% from the previous Census.

The qualification attainment of the population (16+) is shown in Table1.

No qualifications	18%
Below 5 GCSE A*-C	17%
5 GCSE A*-C	17%
Apprenticeship	4%
2 A levels	13%
Degree or higher	26%
Others	6%

Table 1: Resident Population aged 16+ by highest qualification, 2011

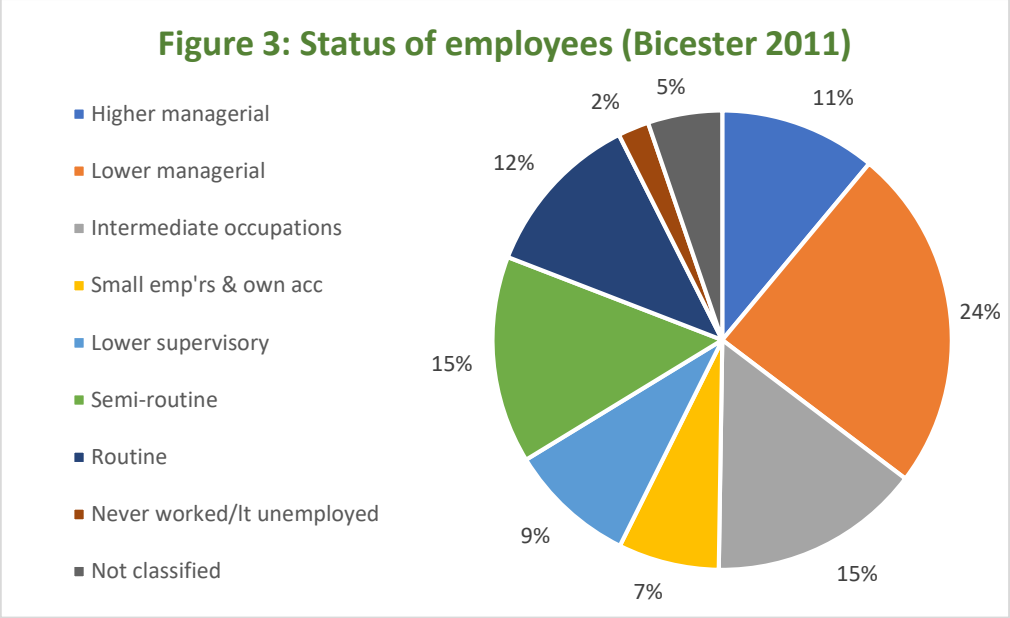
The 16-74 population also includes 1,207 full time students. As well as university students this will include full-time students at schools and colleges.

Of the 2011 population 56% of the resident population (aged 16+ years) were defined as full-time employees, with a further 8% self-employed and 15% defined as part-time employees. The unemployment rate was 3% of this population.

The National Statistics Socio-Economic Classification classifies residents according to occupation, employment status, supervisory role and size of workplace. The 2011 results for Bicester are summarised in Table 2 and Figure 3.

Higher managerial & professional	11%
Lower managerial	24%
Intermediate occupations	15%
Lower supervisory	9%
Small employers/own account	7%
Semi-routine	15%
Routine	12%
Never worked/ unemployed	2%
Not classified	5%

Table 2: Socio-Economic Class Bicester 2011



In 2011 71% of households were owner-occupiers, 12% were social rentals, and a further 15% were privately rented. About 30% of households lived in each of detached houses, semi-detached houses and terraced houses while 10% of households lived in flats.

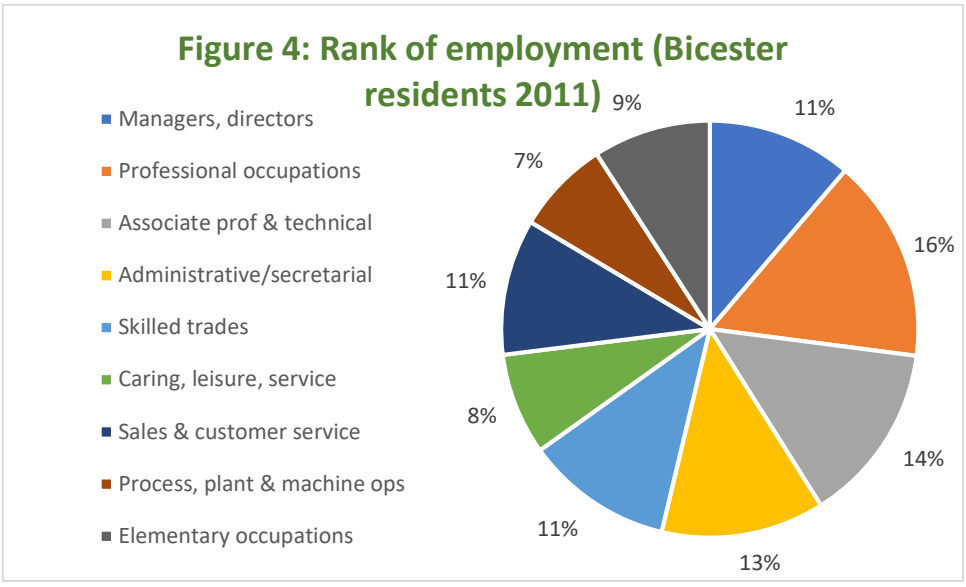


Figure 4 shows that in 2011 41% of Bicester residents were in managerial, professional or technical occupations, with a further 13% in administrative roles. Customer-facing occupations took up a further 19% with

27% of residents in generally "blue-collar" roles.

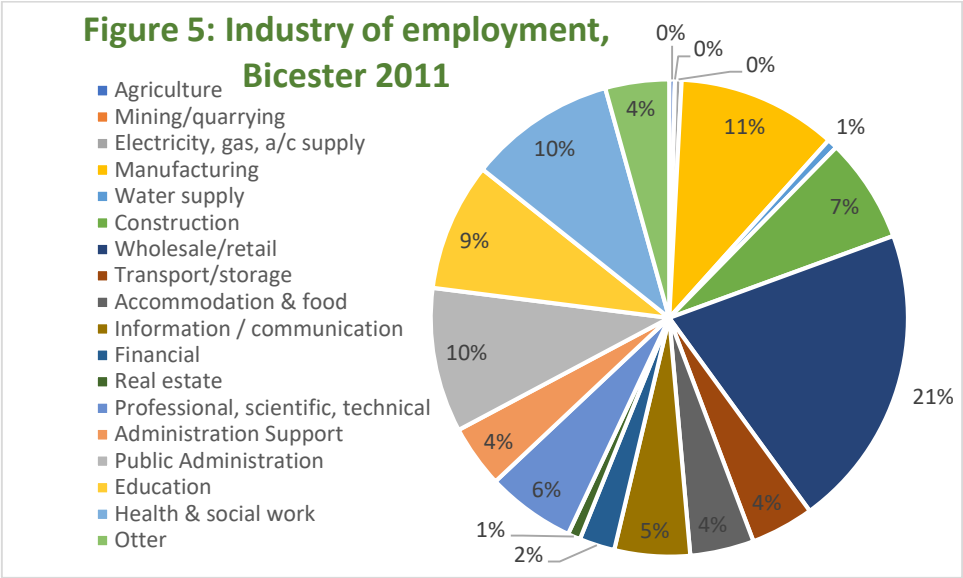


Figure 5 shows the industries in which Bicester residents worked in 2011, irrespective of their role in that industry. This shows a variety of industries, with only wholesale/retail (21%), manufacturing (11%), public administration (10%) and health/social work (10%) employing 10% or more of the local workforce. (It should be noted that these figures relate to the employment of Bicester residents, irrespective of where they are employed).

In 2011, households in Bicester owned 17,031 cars/vans. This was an increase of 8% from 2001 and represents about 1.4 cars per household. Given this, it is perhaps unsurprising that over two thirds of employed residents in Bicester (16-74) travel to work by car, either as driver or as passenger. The full breakdown of travel to work is given in Table 3.

Train	3%
Bus	4%
Driving car	62%
Car passenger	6%
Motorcycle / moped	1%
Bicycle	4%
On foot	10%
Work at home	9%

Table 3: Method of travel to work, 2011

Table 3 also shows the low figure who travel to work by public transport (7%), although the figure for walking and cycling is a comparatively high at 14%. This compares to an average 5% within the South East as a whole, 7.5% in Oxfordshire, and 6% in Cherwell; whilst these latter encompass rural areas where walking and cycling is likely to be lower, due to distances involved, the comparative figures are indicative of the relatively high propensity to active travel within Bicester.

2.3. Economic Context

Cherwell's Economic Development Strategy (2011 – 2016) highlights the current opportunities for Bicester to develop a 'low-carbon economy', by developing 'green' technologies and knowledge around existing and new employers, sectors and clusters - to create a centre of expertise and potential competitive advantage.

This is reflected in the Local Plan 2040 review paper, produced to facilitate stakeholder engagement on updating the Cherwell Local Plan, with its key theme of 'maintaining and developing a sustainable local economy'. The importance of agricultural land is also noted in this document, which is important in this context, since much of Bicester is surrounded by grade 3 agricultural land.

The role of high tech and innovation employment is also of importance for Bicester, which seeks to attract these kinds of employers into newly developed and developing commercial sites, drawing on its location along the Oxfordshire 'knowledge spine', which links Bicester to Oxford and Science Vale. This is also part of the wider Growth Corridor, which connects these

areas through to Milton Keynes and Cambridge.

Historic environment and its importance to the local economy is also mentioned in this document – particularly around supporting tourism in the district.

2.4. Planning and Development Context

Bicester is a market town which has grown rapidly in the last 50 years and where further significant growth is planned. It has good road and rail links and infrastructure and significant further investment is planned. Employment in the town is mainly in the distribution and manufacturing sectors.

Underpinning the Cherwell Local Plan is a vision and a spatial strategy for the District. The spatial strategy for how the growth in the District is managed can be summarised as:

- Focusing the bulk of the proposed growth in and around Bicester and Banbury;
- Limiting growth in rural areas and directing it towards larger and more sustainable villages; and
- Aiming to strictly control development in open countryside.

The Bicester Masterplan has helped forge a consensus amongst stakeholders that the town needs:

- to secure sustainable growth through new job opportunities and a growing population;
- to be a desirable employment location that supports local distinctiveness and economic growth;
- to be a sustainable community with a comprehensive range of social, health, sports and community functions;
- a vibrant and attractive town centre with a full range of retail, community and leisure facilities;
- an exemplar eco-town building upon Eco Bicester – One Shared Vision;
- a safe and caring community set within attractive landscaped spaces;

- business and community networks that promote the town and the eco-development principles;
- and to be developed as a continuing destination for international visitors to Bicester Village and other destinations in the area.

The Local Plan identifies a number of large developments for the town, as shown in Table 4. Of particular note in relation to London Road is ensuring continued access to/from Graven Hill, given its proximity to the site. It should be noted that the Cherwell Local Plan is currently being updated, and there may be some changes following this process.

	hectares
North-west Bicester eco-town	10
Graven Hill	26
Bicester Business Park	29.5
Bicester Gateway	18
North-east Bicester	15
South-east Bicester	40
Housing Allocations	**homes**
North-west Bicester eco-town	3293
Graven Hill	2100
South-west Bicester Phase II	726
South-east Bicester	1500
Gavray Drive	300

Table 4: Employment and Housing Growth, Bicester

Source: Cherwell Local Plan 2011-2031

On 26 September 2016, the Oxfordshire Growth Board (a joint committee) agreed an apportionment of Oxford's unmet housing need to the Oxfordshire districts, including 4,400 homes to Cherwell District (2011-2031). A Partial Review of the Cherwell Local Plan was conducted in 2016-17 to cover the issue of meeting this unmet housing need. As a result of this, Cherwell District Council published a set of proposed Main Modifications to the Local Plan, submitted to the Secretary of State in March 2018. This proposed the allocation

of the 4,400 homes to sites in north Oxford, Kidlington. Begbrooke, Yarnton and Woodstock

The Local Plan identifies the key environmental challenges facing Bicester as being:

- the need to improve the appearance of the town centre and historic core;
- delivering town centre redevelopment and environmental improvements to Market Square;
- accommodating major growth whilst addressing constraints such as:
  - the severing effect of the town's perimeter roads,
  - managing growth in a way that will not unacceptably harm important natural and historic assets,
  - addressing the capacity of the sewage works and energy infrastructure, and
  - maintaining the character, appearance and setting of historic assets such as RAF Bicester Conservation Area and nearby villages;
- accommodating growth without having an adverse effect on the Oxford Meadows Special Area of Conservation;
- addressing deficiencies in 'green' infrastructure; and
- improving the attractiveness of the town's employment areas.

The paper put together for consultation around the formation of the new Local Plan for Cherwell – 'A Community Involvement Paper' – does also outline some additional key issues facing the town, as follows:

- the need to improve daytime, evening and night-time use of the town centre
- the need to manage continued out-commuting
- the need for an Eastern Peripheral Road
- the need to discourage unnecessary car trips within the town centre

The aim is that by 2031, Bicester will have grown significantly to become an important economic centre in its own right, and on the Oxford-Cambridge corridor. It will have become a more attractive place to live and work and will be significantly more self-sustaining both economically and socially. Bicester will have established itself as a

location for higher-technology businesses building on its relationship with Oxford through the Bicester Gateway development.

The consultation paper for the new Local Plan does, however, identify challenges with attracting higher-technology businesses to date, and aims to consider ways to address this and other employment-related challenges within the new plan.

2.5. Transport Context

Figure 6 shows the flows recorded at an automatic traffic counter on London Road just to the south of the level crossing since 2001.

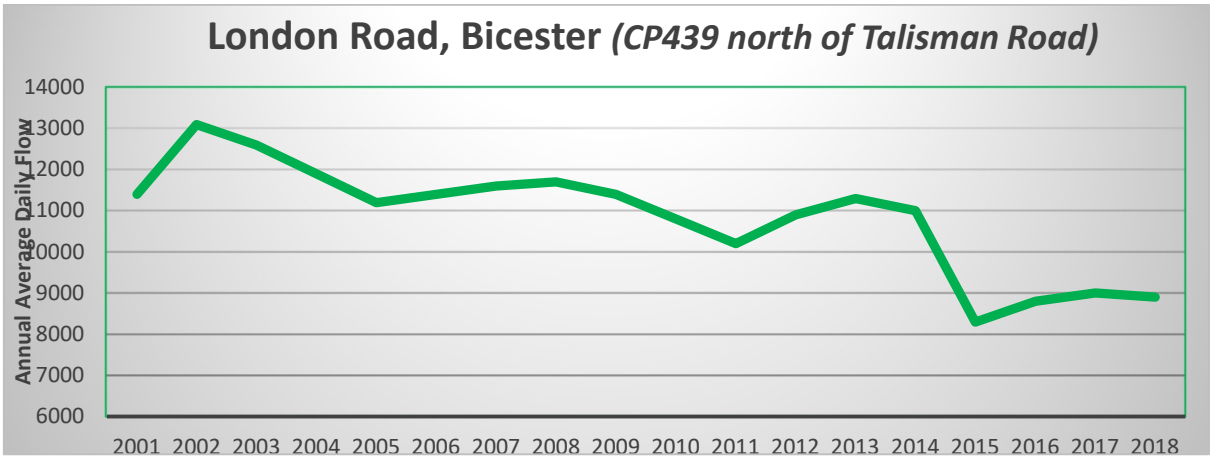


Figure 6 Traffic Flows – London Road

(note: some data were missing and have been interpolated)

The data show that traffic levels have declined steadily over the past 20 years from a high point recorded in 2002. This possibly relates to changes in the road layout within Bicester town centre making London Road a less attractive route.

The sharp decline in traffic in 2014/2015 relates to the period when the railway was being worked on prior to the opening of the Oxford-London Marylebone service. Since this low point, traffic levels have stabilised at about 9,000 vehicles per day.

2.6. Bus Services

Bicester is served by a small network of buses operating a mixture of local and longer distance bus services around and through the town. Most of the town is served by one of these services. The main services are shown in Table 5.

Service	Serving	Weekday Frequency
8	Middle Barton	2x daily Fridays only
18**	Buckingham	5x daily weekdays only
21	Highfield	Every 30 mins, no service Sunday
26*	Kingsmere	Every 30 mins, no service Sunday
250	Upper Heyford, Oxford	Approx every hour, no service Sunday
E1	Elmsbrook, Bicester Village	Every 30 mins, no service Sunday
S5*	Oxford	Every 15 mins
X5	Oxford, Buckingham, Milton Keynes, Bedford, Cambridge	Every 30 mins

Table 5: Bus Services in Bicester

(November 2020 – timings approximate, based on weekday running times
** - changes to timetables and some routes anticipated in January '21*
*** - possible changes to timetable and route)*

With regard to the London Road, currently (as of November 2020) the S5 runs 1 service an hour along the road and on to Ambrosden, Bullingdon and Arncott, but from January 2021 this will cease and the S5 will no longer serve this section of its route. However, new services H5 and 55 will (partially) replace the section of the route no longer to be served by the S5, running from Bicester to the John Radcliffe hospital in Oxford and to Bullingdon respectively via London Road. This will mean more buses running along the London Road as of January 2021.

2.7. Rights of Way

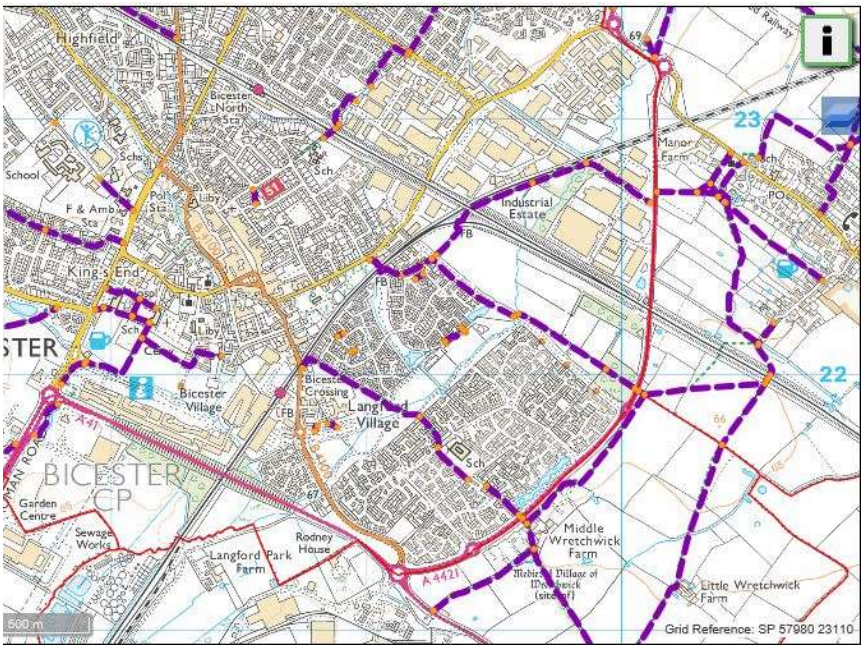


Figure 7: Rights of Way, Bicester

Source: DEFRA, MAGIC website

As seen in Figure 7, Bicester has a rights of way network not untypical of small market towns where most footways are alongside highways supplemented by a few dedicated footways. The railway lines create major barriers for walking with only a limited number of crossing points. Near the London Road crossing there is only one non-roads-based footpath, with a link which runs from just south of the level crossing around the back of some allotments, through Langford Village and on to meet the perimeter road close to Wretchwick Farm. Beyond the perimeter road, there is a typical network of rural footpaths.

The Cherwell Local Plan notes that Bicester is in an excellent position to benefit from several important wider initiatives including the proposed improvements to the rail network from Chiltern Railways and the East-West Rail.

2.8. Constraints

Statutory Land Designations

Habitats

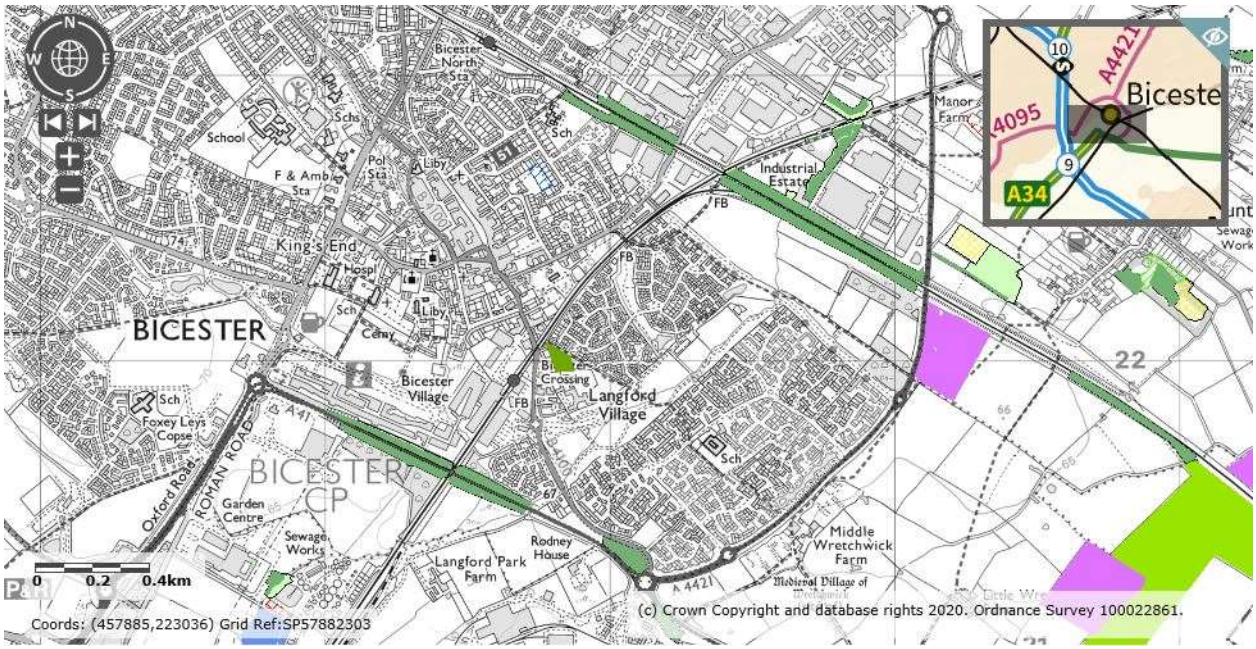


Figure 8: Bicester, Natural Habitats Designations

Source: DEFRA, MAGIC website

Figure 8, using data from DEFRA's MAGIC database, shows that the bypass is designated as deciduous woodland, as is much of the railway embankment and the small area bounded by the A41 Bypass and London Road (shown in darker green). A small area of the open land, abutting the allotment gardens, is designated as a traditional orchard (mid green), and beyond the perimeter road there are areas of good quality, semi-improved grassland (pink and paler green).

Heritage

As can be seen in Figure 9, there is a high concentration of listed buildings in Bicester town centre (mostly Grade 2 but with a few Grade 2* and 1 Grade 1) (depicted with squares – yellow Grade 1, red Grade 2, blue Grade 2*). Beyond the perimeter road the site of the medieval village of Wretchwick is a Scheduled Ancient Monument (excepting where the buildings of Middle Wretchwick Farm have been built over it) (shown in yellow).

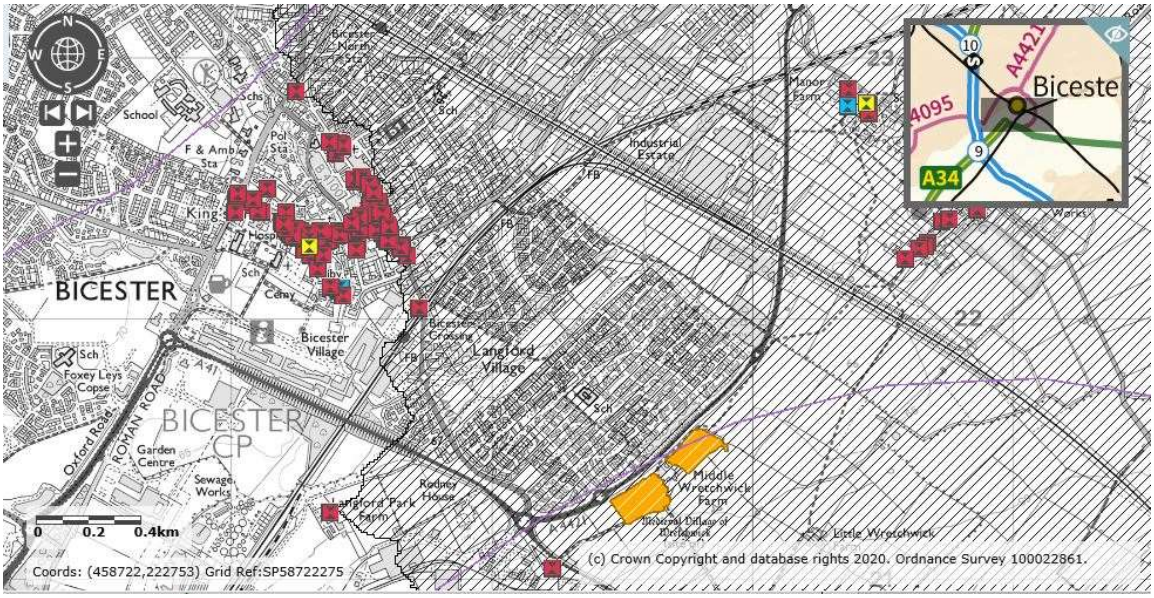


Figure 9: Land Designations, Bicester

Source: DEFRA, MAGIC website

It should be noted that much of the local area is in a Drinking Water Safeguard Zone – a designated area in which the use of certain substances must be carefully managed to prevent the pollution of raw water sources which are used to provide drinking water.

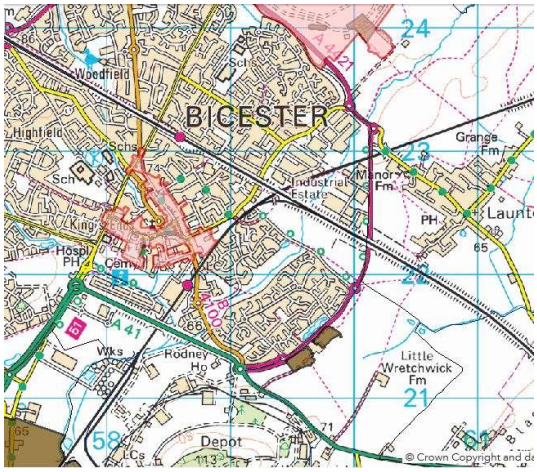


Figure 10: Conservation Areas

Source: Cherwell Local Plan

As can be seen in Figure 10, the area with a high concentration of Listed buildings in the town centre also forms the basis for a large Conservation Area which extends down London Road to the railway line and includes the market square, Sheep Street and as far west as Kings End. Much of the former RAF Bicester site is in a separate

Conservation Area, which is also a designated Battlefield Site.

Flooding

Figure 11: Flood Risk Map

Source: Flood-warning-information-service.gov.uk

Bicester has a number of small rivers and streams passing through or close to it, feeding as tributaries the Rivers Ray, Cherwell and ultimately the Thames. These could impact on the suitability of areas for development through flooding. Figure 11 shows information on flood risk in Bicester. It shows that there is a large area of flooding around the Langford Brook, presumably accounting for the break in development which allows for the parkland and allotments. However, London Road itself is not included in this risk area, despite running through it, and neither is the Oxford-London railway line. The flood risk does extend along some of the other rivers and streams which pass through the town, including the area covered by Bicester Village shopping centre.

Air Quality

Since 1997 each local authority in the UK has been required to carry out a review and assessment in their area and compare the results with national air quality objectives. Bicester was declared in 2015.

If the objectives are not likely to be achieved in an area, then the local authority is required to declare an Air Quality Management Area (AQMA). An AQMA for

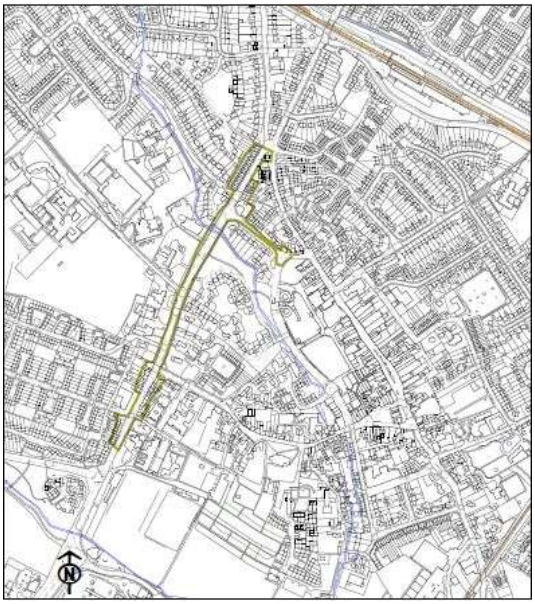


Figure 12: Air Quality Management Area

Source: Cherwell Local Plan

Figure 12 shows the AQMA declared in Bicester by Cherwell District Council. This centres on the B4100 through the town and includes part or all of Kings End, Queens Avenue and Field Street; it also extends along a section of St John's Road.

Since the declaration the air quality in Bicester has slightly improved overall, as shown in Figure 13, however the air quality remains close to or above the objective level. This figure also shows that air quality remains close to that level over a wide part of the town centre, not just the limited area covered by the AQMA.

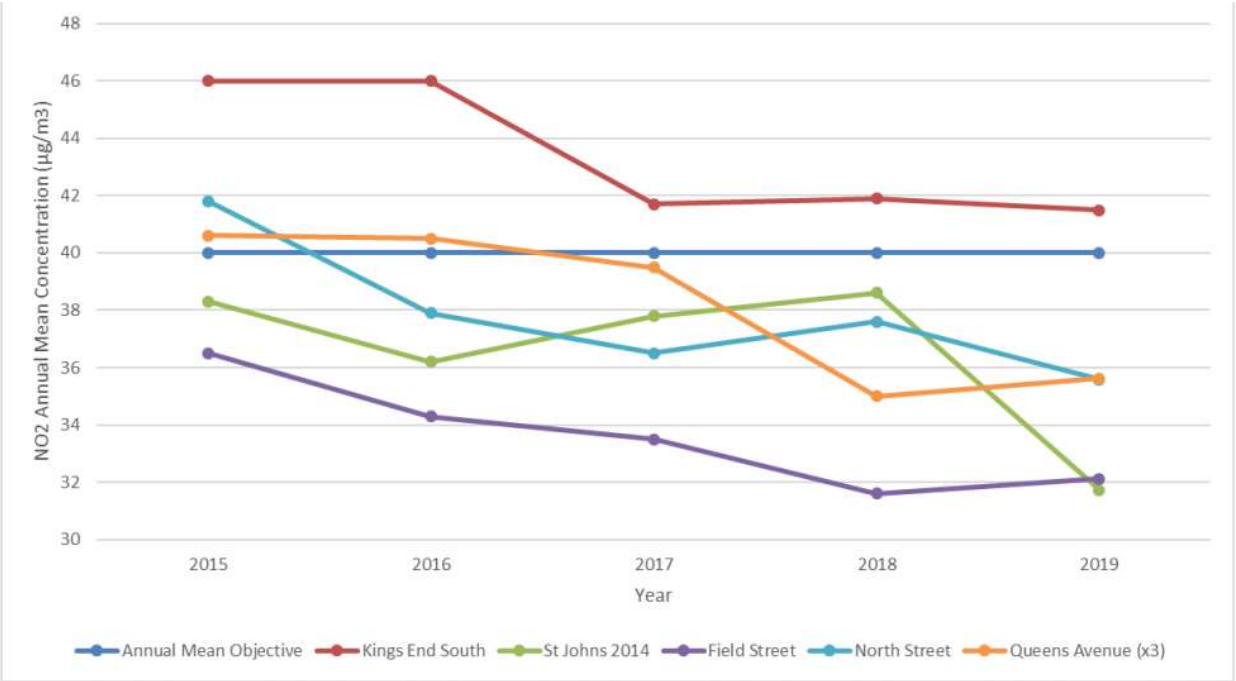


Figure 13: Air Quality Monitoring, Bicester

Source: Cherwell Council

Noise

Figure 14 shows the noise generated by traffic on A-class roads in the Bicester area. It clearly shows the sheltering effect from buildings on the inside of the perimeter roads, with noise spreading further on the outer side of the road. Sadly, this analysis does not include London Road but with its flow it would be expected that the noise generated would be higher than the eastern perimeter road; this would be exacerbated by the lower speed limit and level crossing which would encourage start/stop driving and idling. It would be expected that the noise would be contained close to the road because of the development, particularly on the town centre side of the level crossing.

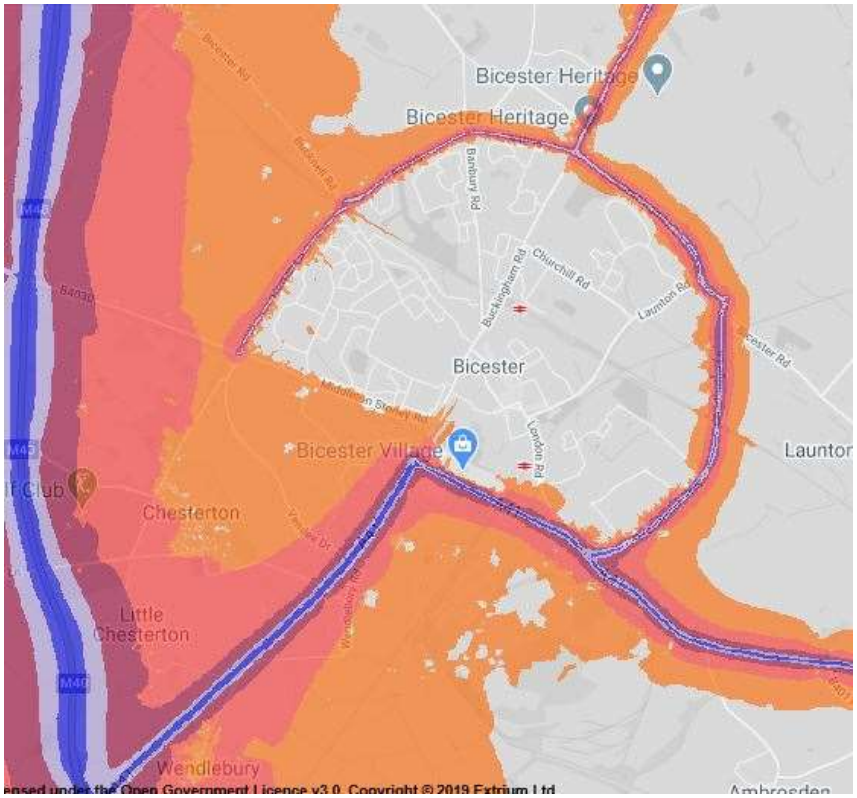


Figure 14: Noise from roads

Source: DEFRA, Extrium website

The same web site also models noise from railways but as this was carried out before the opening of the Oxford-Marylebone it cannot shed light on the noise around the level crossing.

3. The future 'without scheme' scenario

3.1. Future Developments

The railway line between Oxford and Cambridge was closed in 1967. After that the line was used for freight only, with the exception of the Bletchley-Bedford section. This included regular coal trains from the East Midlands to Didcot Power Station and waste transfers for landfill in the clay quarries in Bedford as well as other freight uses.

However, by the early 1990s all these uses had ceased, and the line had become essentially moribund. In 1991 the passenger service from Oxford to Bicester was re-instated but these trains went no farther than Bicester Town (now Bicester Village) station. A campaign to re-open the Oxford-Cambridge line was started shortly thereafter which aimed to achieve its ambitions in a number of phases.

Phase 1 (2016) has delivered:

- Oxford and Bicester: two services per hour (to London Marylebone)

Based on current train service expectations:

-Phase 2 (target date 2024) will additionally allow:

- Oxford and Milton Keynes: two services per hour
- Oxford and Bedford: one service per hour
- Milton Keynes and Aylesbury: one service per hour

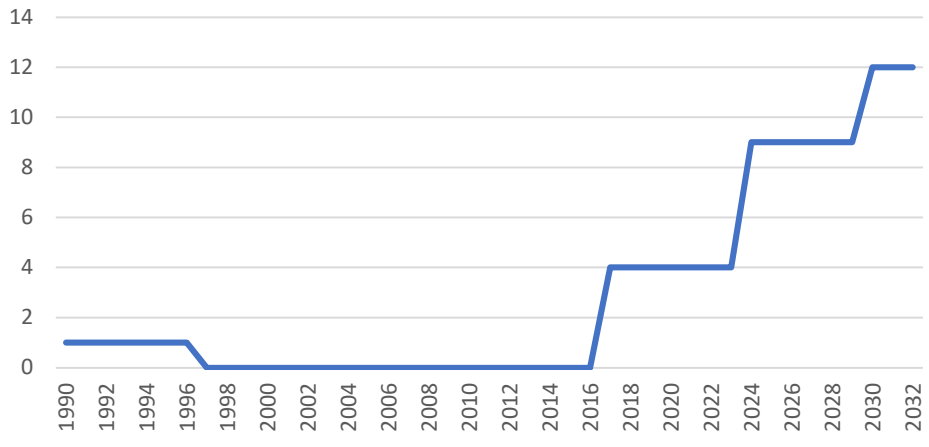
-Phase 3 (target date 2025+) will additionally allow:

- Oxford and Cambridge: one/two services per hour

Figure 15: Sections for East-West Rail Re-instatement

When all three phases are implemented there expected to be up to 7/8 trains passing over the level crossing in each direction per hour, depending on specific service patterns and freight operations. This could mean that the level crossing gates would be closed for the majority of the time through the day, as shown in Figure 16, with severe impacts on the ability of London Road to cope with the demands placed upon it. This compares to the current 12 minute down-time, with an interim point following East West Rail phase 2 opening and signal upgrades being put in place, when it will be closed for a projected 28 minutes an hour.

Figure 16: Possible level crossing closures per hour



3.2. Uncertainties

The speed of the re-instatement of the East-West rail project for passenger services is subject to political and practical considerations and a full detailed programme is not yet available. For the section from Bicester to Bedford The East West Rail Alliance is delivering this phase and is currently commencing construction. This phase will reinstate and upgrade old railway lines, allowing new train services to run between Oxford and Milton Keynes, between Oxford and Bedford and between Milton Keynes and Aylesbury. These services will be phased in over several years, with the first service expected to start running by the end of 2024.

The section from Bedford to Cambridge is more difficult and subject to more processes which have yet to take place. A

five-stage progression has been set out for the processes which would, if successful, lead to a start of construction in 2025 and a re-opening by 2031. Stage 1 (choosing a preferred route option) has been completed, with Stage 2 consulting on specific route alignments expected in 2021.

4. The need for intervention

The impact of the closure of the level crossing can be seen in Appendix 1 by comparing the predicted flows in the DN (Do nothing) and DM (Do minimum) scenarios. These are reproduced in Table 6 below. An explanation of the model used is provided in section 6 of this report.

For the purposes of this appraisal DN represents the "do nothing" situation, when the level crossing remains open, but at reduced hours, whilst DM represents the "do minimum" situation, where the level crossing is completely closed, against which the various proposals will be assessed.

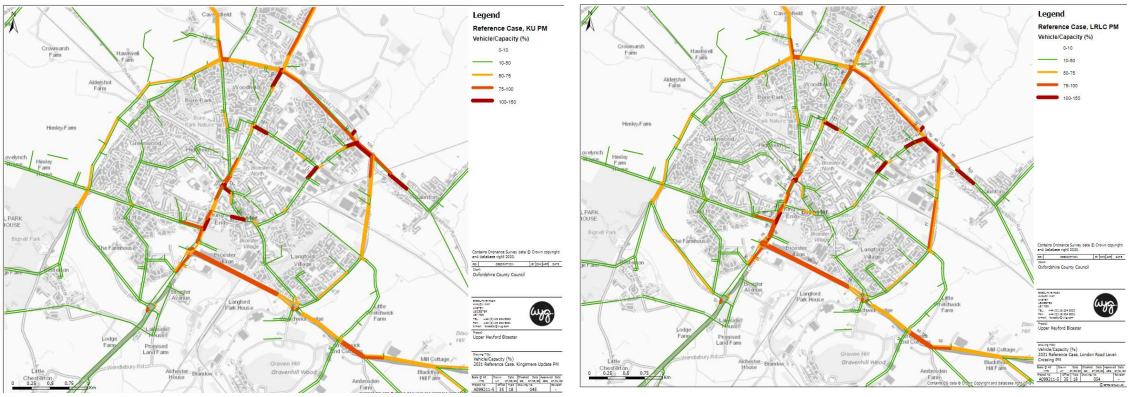
Road	DN	DM
London Road (between Launton Road and level crossing)	6991	2937
London Road (south of level crossing)	4019	0
A41 west of Graven Hill/London Road	30699	32295
Charbridge Lane (at railway bridge)	21650	23379
Launton Road (just north of London Road)	9053	7759
Launton Road (at railway bridge)	13050	12696
Launton Road (north of Churchill Road)	15952	17266
A41 (between Bicester village and Vendee Drive)	38215	38543
Market Square (both sides combined)	9229	8221
Kings End (east of Queens Ave)	5372	6237

Table 6: Do nothing (DN) versus do minimum (DM) flows

(Flows in Passenger Car Units (PCUs). Sections with at- or over- capacity flows at some point of the day are red highlighted)

These figures represent the impact of the complete closure of the road against those of the increased number of level crossing closures with the rising number of trains using the railway through Bicester Village station, when the road is assumed to be closed for 28 minutes per hour.

The major impact is, unsurprisingly, found on London Road itself where the number of vehicles is about halved north of the current crossing and reduced to local traffic only to the south. About half of this traffic transfers onto the A41 Bicester Bypass and about half onto the Eastern Perimeter Road, causing longer sections of these to reach or exceed capacity during AM and particularly PM peak (See figure 17).



Do nothing *Do minimum*

Figure 17: Predicted vehicle capacity percentage 2031 pm peak

On Launton Road there are reductions on the lower end of the road, it is effectively unchanged at the railway bridge, and higher at the northern end (presumably because traffic is now routing into the town from this end of the road). There is a slight reduction in flows in the town centre (Market Square) but an increase in flows on Kings End.

The overall impact of this is that traffic is increased in those areas where there is currently either an air quality or noise problem, although this is balanced by a reduction in those areas where people/traffic interaction is likely to be greatest.

If Bicester were an area without pre-existing traffic and air quality issues, then

the closure of the level crossing without any mitigating measures might be an acceptable solution. However, given that the town has problems at the moment, the closure without any mitigation measures is likely to make these worse, particularly the air quality issue (since the designated AQMA on Kings End would see additional traffic under a closure scenario), the acceptability of this as a solution is reduced (see Figure 13).

The extent of this deterioration has not been quantified, but the number of vehicles would be likely to increase by 16% and the model estimates that the delay at the Middleton Stoney roundabout would increase by up to 25% in the morning peak hour, as shown in Figure 18, with other increases at the A41 roundabout.

Do nothing *Do minimum*

Figure 18: Predicted Delays 2031 am peak

5. Objectives

5.1. Strategy Objectives

The Cherwell Local Plan 2011-2031, plus its Partial Review to 2050, Connecting Oxfordshire (Local Transport Plan 2015-2031), the emerging England's Economic Heartland transport strategy and the forthcoming Joint Strategic Spatial Plan (2020-2051) were consulted on policies which could impact on the proposals. A draft list of objectives was drawn up based on these. These were considered by local county councillors and key partners from England's Economic Heartland (EEH) and Cherwell District Council and the following objectives agreed:

i. To facilitate expansion of rail services while maintaining connectivity across the town and promoting town centre vitality and accessibility
ii. To encourage the development of a high quality, innovative and resilient integrated transport system that promotes active travel provision and supports healthy place-shaping
iii. To promote opportunities for pedestrians and cyclists in Bicester
iv. To reduce carbon emissions from transport in Bicester and improve air quality in the town, particularly within the designated Air Quality Management Area
v. To improve connectivity between key employment and residential areas and their access to the strategically important transport networks, including rail services
vi. To encourage and facilitate the efficient operation of bus services in Bicester and the surrounding area.

Since these objectives were set, it is recognised that there has been further policy development, including endorsement to an Oxfordshire Climate Action Framework, and development of a new Local Transport and Connectivity Plan Vision. Although these are not considered to require any changes to the study objectives, it will be important to review an updated policy context when taking forward any options or proposals for further appraisal.

6. Options Generation and Initial Sifting

6.1. Defining Alternative Strategies

The closure of the London Road level crossing could potentially have significant impact on traffic in and around the centre of Bicester, as identified in section 4. Previously, over the past several years since 2013, work has been undertaken by Oxfordshire County Council and Network Rail, to consider a number of options to address this concern, largely consisting of engineering feasibility and cost/benefit assessment. These studies have comprised:

- 2013, *The Bicester London Road Level Crossing Alternatives Stage 1 – Engineering Feasibility Assessment,* by consultants Atkins:
    - This considered the feasibility of schemes to replace the signalled crossing directly, plus alternative access road improvements between London Road and the A41 and Launton Road and the A4421. Estimated costs were calculated, ranging from £6.3 million for a northern link road between Charbridge Lane and Launton Road to £50 million for new underpass in the vicinity of the current level crossing.
- 2015, *The East West Rail – Phase 2 Pre-Feasibility Engineering Assessment of New Variations to London Road Level Crossing, Bicester, Options A1, C, D1 & D2,* by consultants Parsons Brinkerhoff:
    - This work assessed engineering feasibility for tunnel options close to, or along the existing London Road, as well as potential new A41 to Station Approach link Roads. It concluded that all options were technically feasible.
- 2015, *Bicester Transport Modelling – London Road Options Assessment,* by consultants WYG:
    - This study modelled the traffic impact of underpass options (on and off-line), as well as a potential new link road between the station approach and the A41. It also

calculated benefit to cost ratios (BCRs) for these options, based on assessment against a future 'do-nothing' reference case. This work indicated that off-line options linking the A41 and the station would have a lower BCR (based mainly on journey time savings), compared to options more directly replacing the existing level crossing.

- 2017/18, *Development of Preferred Option for London Road Level Crossing, Bicester*, by Network Rail:
    - The latest work undertaken by Network Rail reviewed the feasibility of 4 options: An on-line subway broadly following the route of the existing London Road, 2 offline subway options running through the current station car park area to the north of London Road, and an overbridge option, also running to the north of London Road. Pedestrian/ cycle facilities could be directly included within the subway options. However, pedestrian/ cycle measures would need to be provided separately due to gradient issues if a compliant height highway bridge was to be constructed to allow for future potential electrification.
- 2017, *Bicester Transport Modelling, London Road Level Crossing Options,* by consultants WYG:
    - The latest traffic model for Bicester was used to assess the BCR of the updated options based on assessment of traffic benefits, against the latest costs. This work forecast a lower BCR than the previous work, with both the underpass and bridge options scheme showing low value for money.

Work to date has ruled out some major infrastructure build options previously considered on cost or value for money grounds, and impacts on the wider Bicester highway network. It was considered that due to high forecast costs, it would be difficult to produce a positive business case for these major schemes based on traffic or

safety benefits. Schemes previously ruled out include:

- An off-line underpass to the existing London road, routing to the north of the road under the station car park and building. This was ruled out due to significant disruption to the running of the station during construction
- An underpass on-line with the existing London Road. This was ruled out due to impact on residents, especially during construction, since it would require closing London Road and crossing for up to 2 years

Following the initial work to rule out some options, three alternative strategies have been put forward to counter the potential impacts of the London Road Level Crossing closure, 2 of which have alternative sub-options (a and b):

1. Delivery of the South East Link Road and capacity improvements on Charbridge Lane to provide an alternative for traffic displaced from London Road;
2. The construction of a direct replacement, either in the form of a) an underpass or b) an overbridge, of London Road to keep the route open without the need for interruptions to allow railway traffic to continue; and
3. Delivery of a package of sustainable transport improvements within Bicester to encourage more internal trips in the town to walk or cycle (or use public transport) and thereby reduce the overall demand.
    a) The creation of a comprehensive cycle network, connecting every neighbourhood and village
    b) The creation of the comprehensive cycle network plus a series of supportive measures to promote a cycling culture in Bicester

It is worth noting that stakeholder engagement into strategy 2 as part of previous studies undertaken, identified that the underpass option is generally more acceptable to wider stakeholders than the overbridge – this option would be less visually intrusive and would not require a separate solutions for walkers and cyclists to use it (as the bridge would do, due to the gradient needed to allow for future electrification), although it would be considerably more costly, time consuming to construct and more complex to engineer than an overbridge.

6.2. Traffic Model Description

Impacts of the different options to be assessed have been modelled using the pre-existing Bicester SATURN model. This model has a forecast year of 2031, and was therefore considered a suitable reference case to test scenarios at a point where the level crossing is assumed likely to be effectively non-operational should phase 3 of the proposed line re-opening go forward.

Variable demand transport model (VDM) runs were undertaken to inform this OAR. VDM runs account for induced and suppressed trips, and therefore show a fuller picture of the likely impacts on traffic levels when compared to fixed demand transport model runs, which assume that demand is at a constant level.

A number of runs were undertaken as follows, to model 'do nothing', 'do minimum', and four 'do something' options:

a) Do nothing (DN) Ref Case 2031 with London road level-crossing partially closed
Takes the existing reference case 2031 model and recodes the network to close the London Road level-crossing for 28 minutes per hour.

b) Do minimum (DM) Ref Case 2031 with London Road level-crossing closed
Takes the existing reference case 2031 model and recodes the network to completely close the London Road level-crossing.

c) Do something 1 (DS1) 2031 with London Road level-crossing closed and South East Link Road + Eastern Perimeter Road dualling (Charbridge Lane)
Takes the new above DM reference case 2031 and codes the network to include the Southeast Link Road and the Eastern Perimeter Road capacity improvements.

d) Do something 2 (DS2) 2031 with London Road level-crossing closed and a London Road grade-separated crossing for traffic
Takes the new above DM reference case 2031 and codes the network to include a bridge or underpass on London Road.

e) Do something 3a (DS3a) 2031 with London Road level-crossing closed and sustainable package option a
Takes the new above DM reference case 2031 and creates a representation in the model of the comprehensive cycle network delivery.

f) Do something 3b (DS3b) 2031 with London Road level-crossing closed and sustainable package option b
Takes the new above DM reference case 2031 and creates a representation in the model of the comprehensive cycle network delivery and supportive measures.

For runs e and f, fixed percentage reductions were applied to trips internal to Bicester, to account for the shift of mode from car usage to sustainable options, since the model used is not able to consider the impact of non-car modes of transport without external manipulation of this kind. The reductions applied were 17% and 35% respectively, and were based on data from the Bicester Local Cycling and Walking Infrastructure Plan (LCWIP). These assumptions are made based upon expectations of impact of the schemes in question, using comparisons with other locations which have followed approaches at the equivalent level on the CAT, 'Commitment to Active Travel', scale. The CAT scale is based on a 5-point scale, covering the different levels of commitment to support and create increased uptake of active travel. Run e assumes level 'C' on the scale – which is 'comprehensive' support, and run f assumes level 'B' on the scale – which is 'be brave', adopting a more ambitious and challenging approach. These compare to a current level 'D' in Bicester of 'do minimum'. Level 'A', which is 'Ambitious' has not been modelled for the purposes of this OAR. Figure 19 shows the anticipated trips by mode of transport in Bicester for different levels of intervention on the CAT scale.

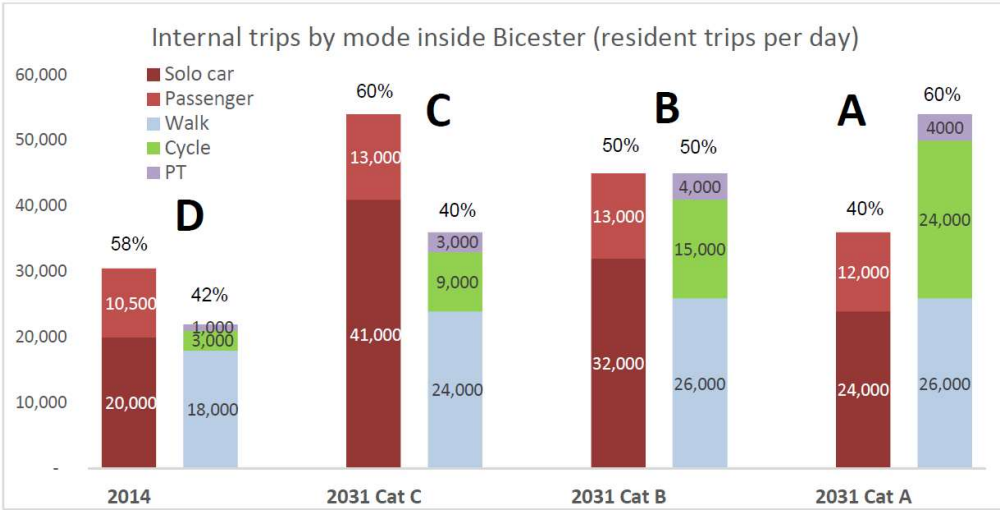


Figure 19: Current (D) and predicted (2031-5) number of daily trips by Bicester residents within Bicester only for different levels of Council commitment

Source: Baxter 2015 for total trip rates in 2031-5 and category C split.

In addition to a comprehensive cycle network being created, network changes were also coded into the model for run f (level B on the CAT scale), as follows:

- Close Causeway one-way section between Church Lane and Market Square.
- Close the Chapel St / Prior Rd route to through traffic.
- Close London Road between Market Square and Launton Road.
- Close Buckingham Road between Banbury Road and the Bicester North Station approach.

Upon an initial run for f, traffic was shown to divert along a number of residential roads, in order to access Bicester Village station car park, which was considered undesirable; to counter this effect, a 10mph speed limit was then applied to the affected roads in order to deter their use. 10mph limits were also set on residential routes offering potential access into Bicester North railway station. As such, this helps identify the need for a sustainable package of measures under this option to include traffic calming measures in surrounding streets, should this option be progressed. The following residential roads were all reduced to 10mph for run f, shown in figures 20 and 21:

- Woodfield Road
- Blake Road
- Brashfield Road
- Longfields
- St John's Street
- Bell Lane
- Victoria Road

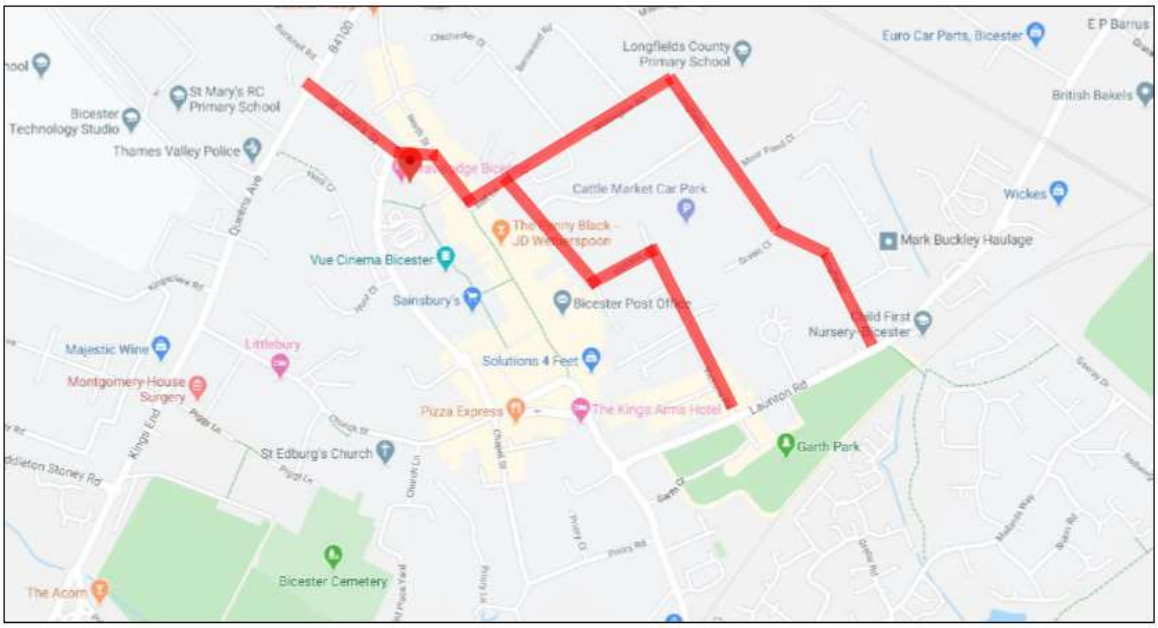


Figure 20: Residential roads with speed limit reduced to 10mph in London Road Level Crossing DS3b Scenario (affecting access to Bicester Village Station)

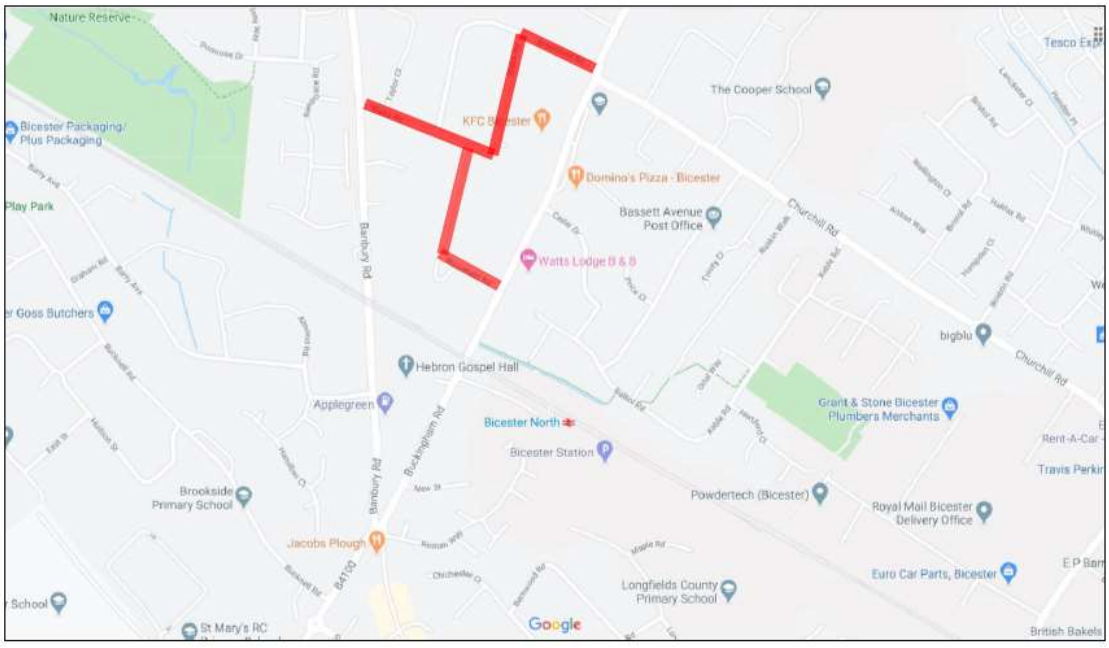


Figure 21: Residential roads with speed limit reduced to 10mph in London Road Level Crossing DS3b Scenario (affecting access to Bicester North railway station)

For each run, the following plots were produced for AM peak, PM peak and inter-peak:

- Delay Plots – showing the levels of traffic delay on the network
- Demand Flow Plots – showing the traffic flow levels on the network

- Vehicle/Capacity Percentage Plots – showing the percentage of vehicle capacity being used on the network
- Select Link Analysis Plots (A41 SE bound) – showing where traffic flows from a selected link location – the A41, Southeast bound
- Select Link Analysis Plots (A41 NW bound) – showing where traffic flows from a selected link location – the A41, Northwest bound
- Select Link Analysis Plots (London Road Northbound) – showing where traffic flows from a selected link location – the London Road, Northbound
- Select Link Analysis Plots (A41 Southbound) – showing where traffic flows from a selected link location – the A41, Southbound
- Delay Difference Plots (Do minimum vs Do Something) – showing the difference in delays experienced between the DM reference case and each do something option
- Demand Difference Plot (Do minimum vs Do Something) – showing the difference in demand between the DM reference case and each do something option

A spreadsheet of flows on particular links was also provided for analysis. Appendix A shows a summary of these.

6.3 Traffic Impact of alternative strategies

The assigned flows for each of the modelled scenarios is given in Appendix 1. This gives the predicted two-way flows on selected roads in Bicester in three time periods (am peak, pm peak and average inter-peak) for the do nothing (DN), do minimum (DM), South-east link road and Eastern Peripheral Road improvement (DS1), direct replacement (DS2), delivery of a comprehensive cycle network (DS3a), and delivery of a comprehensive cycle network with additional supportive sustainable transport measures (DS3b) scenarios. These values can be combined[1] to give an

[1] Assumes 12 hour flow = (2 * am peak flow) + (8 * average inter-peak flow) + (2 * pm peak flow). The assumption of a factor of 2 for the peak hour flow possibly overestimates this and gives an additional emphasis on peak hour conditions.

estimated 12-hour flow on each road as shown in Table 5.

When the level crossing is closed the flows increase on the A41 and Charbridge Lane as traffic finds alternative routes (by about 10% each). This diverted traffic also increases flows on Kings End and the northern end of Launton Road (by over 20%). However, the flows in the town centre at Market Square are reduced by 1000 vehicles per day and at the lower end of Launton Road by 1250 vehicles (both over 10%).

2-way flows	12 hour flow					
Road Name	**DN**	**DM**	**DS1**	**DS2**	**DS3a**	**DS3b**
London Road (between the Launton Road junction and level crossing)	6991	2937	2933	12551	2772	2598
London Road (south of level crossing)	4019	0	0	9645	0	0
A41 west of Graven Hill/London Rd	30699	32295	23908	30238	30632	30463
Charbridge Lane (at railway bridge)	21650	23379	23932	18993	21682	21202
Launton Road (just north of junction with London Road)	9053	7759	7656	12561	7479	2768
Launton Road (at railway bridge)	13050	12696	12422	15666	11517	10701
Launton Road (north of Churchill Road)	15952	17266	16959	13754	16134	14393
A41 (between Bicester Village and Vendee Drive)	38215	38543	29557	37584	37517	35566
Market Square (both sides combined)	9229	8221	8123	9830	7934	866
Kings End east of Queens Ave	5372	6237	6249	5037	6142	1764

Table 7: Predicted 12-hour flows (PCUs)

Figures in red denote the scenario which gives the highest flow on each road section, and figures in green show the lowest flow on each road section

If the improvement of the eastern perimeter road and SE Link Road takes place as well as the level crossing closure, then more traffic is attracted to the eastern route, increasing the flows on this route by a further 600 vehicles (20%). The route is well under its new capacity even with this increase, however. This transfer reduces the traffic on the lower part of Launton Road by 100 vehicles (compared to the level crossing closure alone) and the traffic on Kings End and in Market Square by a similar amount.

If the level crossing is closed but replaced (DS2) by an off grade railway crossing (underpass or overbridge) on a similar line then the result would be to nearly double the traffic on London Road (north of the

railway line) over that with the level crossing still in operation for 32 minutes per hour, and a x4 increase over use of the road if the level crossing was completely closed. Compared to the situation with the level crossing closed there are decreases on A41 Bypass and Charbridge Lane (the latter being where the greatest benefits on traffic levels from DS2 would be seen, when compared to other options) and also decreases on the top end of Launton Road (north of Churchill Road) by about 3500 PCU, with smaller decreases found on the A41 south of Bicester Village. However the traffic is increased in Market Square to levels higher than would be expected with the level crossing still in operation, indicative of higher flows generally in and around the town centre, and on the lower end of Launton Road where flows increase by nearly 100% over the situation where level crossing is closed and 30% over the situation where it remains partially open.

Considering the two sustainable packages (DS3a and DS3b), due to the calculation that overall traffic levels will be reduced by the measures undertaken in these scenarios, we can see generally improved, lower flows across all of the locations outlined in the table when compared to the complete closure of the level crossing.

When compared to the level crossing staying partially open, the only road sections with higher flows for the DS3a (less ambitious) scenario are King's End east of Queen's Avenue (by around 850 PCUs) and Launton Road north of Churchill Road (by a little short of 200 PCUs), with all other locations either virtually the same or lower. All DS3b road sections show lower flows compared against partial opening of the level crossing.

Whilst the benefits shown by the more conservative sustainable package are less significant than the more ambitious option (as outlined below), it does show small improvements in flow levels in all locations when compared against complete level crossing closure; none of the segments considered here show flows of less than 90% of what would be expected in the complete closure scenario however, so benefits are comparatively small. As outlined above, some roads fare slightly worse in the CAT C intervention scenario when compared to partial opening; however, London Road between Launton Road and the level crossing shows flows being only 40% of partial opening levels on this section.

DS3b features the most road segments providing the lowest flow figures as

compared to all other scenarios, with only 4 links not in this category – 3 of which are those which are least likely to be regularly used by internal-Bicester trips. In each of these 4 cases it is still showing significantly better flow levels than the scenario generating the worst flows, and not significantly different from the do-nothing scenario. It therefore seems to be the option which generates the best situation with regard to traffic flows overall.

The greatest benefit with regard to traffic flows under this DS3b scenario can be seen in Market Square, where flows are about 10% of the levels expected for closure or partial opening of the level crossing; in Launton Road, north of the London Road junction, where flows are around a third of the levels generated under closure and partial opening scenarios; and in King's End East of Queen's Avenue (the AQMA), where flows are again only around a third of those generated in closure and partial opening options. London Road between Launton Road and the level crossing also shows significantly better flows (about one third) when compared to a partial opening situation, though less marked benefit against complete closure.

When considering road capacity problems as outlined under DM and DN scenarios in Table 6, the only scenarios which address the capacity issues noted are DS1 and DS3b. DS1 addresses capacity problems:

- Westbound (but not Eastbound) on A41 west of Graven Hill/London Road
- A41, between Bicester Village and Vendee Drive

Due to its nature, it also addresses capacity issues on Charbridge Lane which were not identified in Table 6.

DS3b fully addresses capacity issues on Market Square. In addition, it reduces the problems at:

- Launton Road, at the railway bridge
- Launton Road, north of Churchill Road
- A41, between Bicester and Vendee Drive

All schemes, however, still entail some areas reaching or becoming over-capacity at some point during the day. When comparing all options in terms of capacity, DS2 sees the largest number of areas of town with over-capacity sections of road.

It should probably be noted that the method of ascertaining the change in modal split obviously differs for the sustainable packages when compared to the build (DS1 and DS2), do nothing and do minimum

options; as such, the figures generated by the model are not 100% comparing like with like. The relatively high propensity towards active travel, though still with considerable room for improvement, in Bicester when compared to other locations (as outlined in the Census 2011 data on travel to work method) does indicate that supportive measures for active travel are likely to be effective in increasing uptake however.

6.3. Impact on objectives

The objectives were set out in Chapter 5. These were:

i. To facilitate expansion of rail services while maintaining connectivity across the town and promoting town centre vitality and accessibility

ii. To encourage the development of a high quality, innovative and resilient integrated transport system that promotes active travel provision and supports healthy place-shaping

iii. To promote opportunities for pedestrians and cyclists in Bicester

iv. To reduce carbon emissions from transport in Bicester and improve air quality in the town, particularly within the designated Air Quality Management Area

v. To improve connectivity between key employment and residential areas and their access to the strategically important transport networks, including rail services

vi. To encourage and facilitate the efficient operation of bus services in Bicester and the surrounding area.

Taking the results of the assignments on board each of the scenarios was assessed on the basis of the following scale:

1. Significantly worsen conditions
2. Slightly or moderately worsen conditions
3. No impact on objective
4. Slightly or moderately improve conditions
5. Wholly or significantly achieve objective

The results are shown on Table 8.

	DS1	DS2	DS3 a	DS3 b
Objective i Rail service expansion facilitated & town centre accessibility & vitality promoted	4	4	4	5
Objective ii Integrated transport system supporting active travel & healthy place shaping	4	3	4	5
Objective iii Promote walking and cycling opportunities	3	3	4.5	5
Objective iv Reduce CO2 emissions and improve air quality	3	2	4	4.5
Objective v Improve inter-connectivity	4	4	4	4
Objective vi Facilitate efficient bus services	4	3	3	4
Total	**22**	**19**	**23.5**	**27.5**

Table 8: Impact of scenarios on Agreed Objectives

For Objective 1, DS1 allows for the additional train services on the railway and reduces flows in the town centre, promoting vitality, however reduces connectivity across the railway for motor vehicles. DS2 maintains this connectivity, in fact improving on it, but encourages more traffic into the town centre which will detract from town centre vitality and accessibility for other users. Some areas of town also see additional delays from this option, due to higher traffic flows; in particular, in comparison to other DS options, Market Square sees additional

delays, as does the northern end of the central corridor, reducing the benefit of additional accessibility by vehicle.

DS3a and DS3b both allow for the additional train services on the railway and reduce car traffic into the town centre, particularly and quite significantly in the case of DS3b, thus supporting vitality. The initiatives within these packages will significantly support accessibility by sustainable modes of transport, especially bicycle (albeit that some buses will require re-routing due to closure of London Road Level Crossing – this should be balanced, however, by journey time savings especially in the case of DS3b). Whilst connectivity across the railway for motor vehicles is reduced in both cases however, it is worth noting that where initiatives reducing vehicle use in favour of sustainable modes of transport (particularly walking and cycling) have been put in place in highstreets and town centres elsewhere, businesses have benefited from increased patronage, due to the higher levels of footfall generated. For example, in Dublin, the trial pedestrianisation of streets around Grafton St in 2020 led to increases of between 40% and 100% in business, based on the results of a Dublin City council survey of 292 affected businesses[ii], a result which has similarly been seen in multiple locations across the world. In addition, the reduced levels of delays seen in DS3 options within town (especially DS3b) when compared to the 'do minimum' scenario will also serve to support the local economy to some degree (see figure 22).

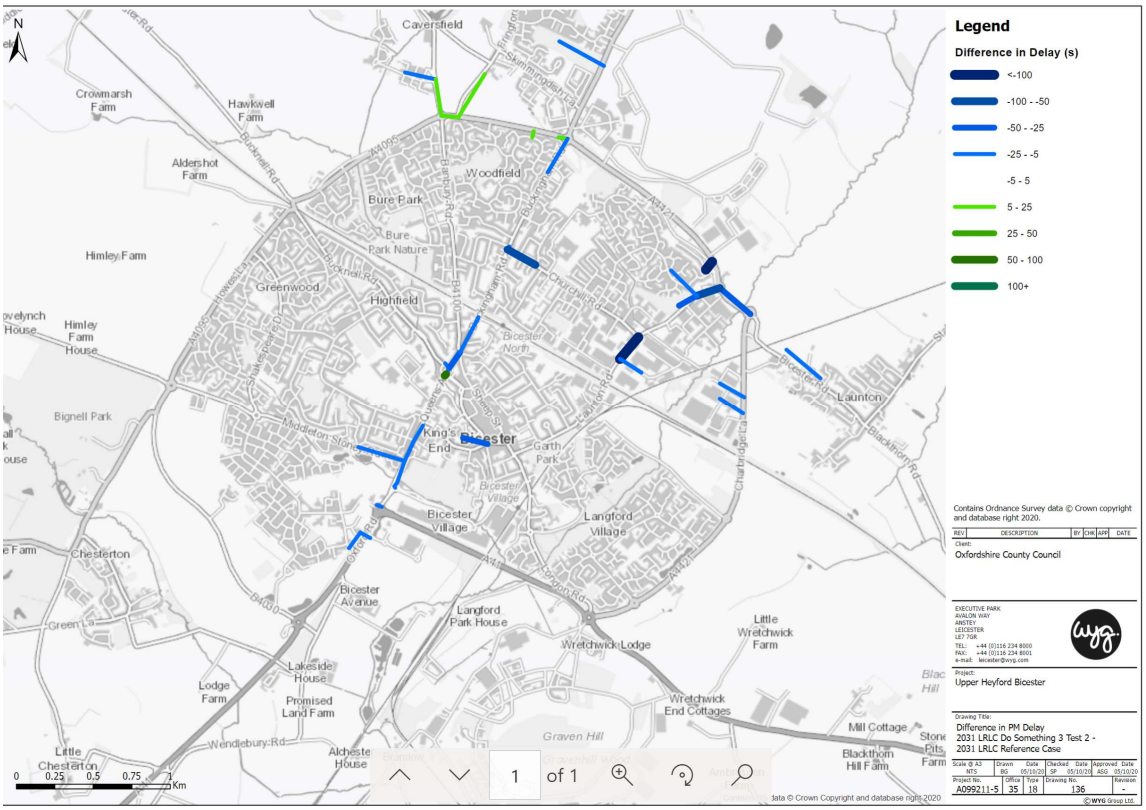


Figure 22: Delay difference between the 'do minimum' and DS3b options, PM peak

For Objective 2, under DS1 the addition of the new road improves the resilience of the town's network and through attracting traffic away from the town centre will help promote active travel within town. DS2 will replace an existing road, with some increased resilience through the removal and replacement of the level crossing but will discourage active travel through the increased traffic in the town centre. DS3 options both encourage active travel and thus healthy place shaping both through the measures within the packages, and via the reduced traffic levels generated by the improvements to the sustainable transport network, especially for option DS3b. Because overall car traffic flows are reduced, overall resilience should also be improved or remain consistent, despite closure of the level crossing with no direct or alternative route replacement, although for DS3a the benefit is unlikely to be large enough to more than cancel out the loss of resilience because of the level crossing closure, since flows are still relatively high in some locations.

For objective 3, the opportunities for active travel are improved (marginally) by DS1 due to reduced traffic in town, as described above; however this is cancelled out by the severance caused for pedestrians and

cyclists by the closure of the level crossing. For DS2 the opposite is true, since opportunities are improved through the replacement of the level crossing, while reduced through the additional motor traffic in the town. Both DS3 options and particularly option DS3b, promote walking and especially cycling, given the nature of the interventions, therefore meeting this objective closely.

For objective 4, DS1 reduces traffic in the rest of the town centre but increases it on Kings End (the AQMA). DS2 has the opposite impacts, but generally would have slightly reduced carbon emissions through allowing more direct motorised journeys (though these would include people routing through town, rather than going around it, which is not optimal); this may however be reduced or negated by increased congestion on the more direct routes through town. There is also potential for the increased traffic levels caused in DS2, on streets around the AQMA to create new AQMAs, even though the existing AQMA sees a small benefit in traffic levels. It should also be noted that both options DS1 and DS2 would involve a greater degree of embodied carbon in creating the infrastructure involved than the DS3 options would. Construction of DS2 would also have the disbenefit of causing air quality reductions near to businesses and residences, especially in the instance of a tunnel, due to potentially significant levels of construction dust, which can have marked impacts on air quality. The reduced overall car usage levels generated by DS3 options on the other hand, will help to reduce carbon emissions and improve air quality. DS3b sees the lowest traffic flows of any of the options for the AQMA. Some embodied carbon and construction worsening air quality might be expected for DS3 options, but to a significantly lesser degree than the other options.

For Objective 5, DS1 would offer slight benefits by taking north-south through traffic outside the town while DS2 allows for more direct access to the employment areas east of Launton Road. DS3 options improve interconnectivity by bicycle in particular, by creating a consistent and joined up cycle network between all areas of Bicester and nearby villages. DS3b, however, slightly reduces inter-connectivity by car, since various roads are closed to motorised traffic under this scenario. This may, however, serve to improve bus interconnectivity by improving service reliability to some degree, and

making bus a more attractive option to users. It should be noted, however that in all options where the level crossing is closed (i.e. all but DS2), bus services along London Road will be disrupted and require alternative routes to be identified.

For Objective 6, as identified above, buses using London Road would need to be re-routed for all options but DS2, meaning some disruption in all other cases. On the other hand however, DS1 removes traffic from the town centre, making bus operations likely to be more attractive, while DS2's increased levels of traffic in town may have the opposite impact. DS3a would likely have some positive and some negative impacts on bus operations – the closure of London Road will reduce connectivity by bus, whilst on the other hand, the reduction of traffic in town should bring about some small journey time savings, likely negating each other.DS3b should have more of a positive impact for buses, due to more significantly reduced traffic levels and roads being closed to cars, providing an overall small benefit when off-set against London Road's closure; the Buckingham Road, which is also closed under this scenario, has buses running along it; to maintain the benefit for public transport under this option, a road closure method which would allow buses to enter (e.g. a bus gate) would be needed, and has been assumed for the purposes of this assessment in scoring options; if a full closure were put in place here, the public transport benefit would be significantly eroded, especially given the closure of London Road as well. DS3b would be the most likely option involving closure of the level crossing to absorb changes to bus routes required without journey time disruption, since it sees the best delay reductions within Bicester of all the scenarios. By promoting a more conducive environment for walkers and reducing traffic levels, DS3 options should also make it more attractive for people to use public transport.

This shows that of the build options, the Eastern Perimeter Road option more closely meets the objectives for Bicester than the underpass/overbridge option, but that neither option would be likely to move the town far towards meeting its overall objectives. On the other hand, the sustainable transport options are generally both more beneficial in helping to achieve the objectives outlined, with the more ambitious package going further towards meeting them.

6.4. EAST Assessment

EAST (Early Assessment and Sifting Tool) is a Department for Transport tool designed to allow options to be assessed when they are at an early stage of development and full data are not available to allow a meaningful assessment to be made using the more developed WebTAG tools.

The results of an EAST assessment of the alternative strategies are given in Appendix 3, where explanations of the scorings are provided, and the scores are summarised in Table 9. The EAST assessment mimics WebTAG by splitting the impact of a scheme into 5 cases (Strategic, Economic, Managerial, Financial and Commercial).

Each case is further split into separate categories where a score (usually 1-5) is given according to the answers to particular, relevant questions. In most instances, 1 is given to a scheme with a severe adverse impact; 5 is given to a scheme with a high positive outcome. Where they do not already reflect this pattern, scores have been adjusted in Table 9 accordingly.

The results of the EAST assessment on the options under consideration are shown in Table 9. Between the two major build options, DS1 and DS2, DS1 has the overall better outcomes. It is possible however, that a business case could be made for either option, though it would be more challenging for DS2, given the low value for money and higher environmental impact; it would likely depend on the funding pot available, however and links to key strategic matters such as major development coming forwards to make the case more viable for this option. . In general, the DS3 options both perform better than the major build options, especially DS3b – business cases would be easier to produce for these options, or potentially for combining one of these options with DS1.

The Strategic Case is roughly similar between the two build options; the major difference is in consensus, where the overpass/underbridge option is likely to face concerns about the traffic impact on London Road, Launton Road and town centre. There is also a less good fit to

objectives – both wider government objectives and those set locally by stakeholders for DS2 than DS1. When considering DS3 options, the strategic case is the strongest for DS3b. Scale of impact is the most significant difference between DS3 options, with DS3b having considerably greater positive impacts on traffic levels than all other options. It should again be noted that there are differences in the methods of calculating modal split between options, however.

In the Economic Case the results are likely to be similar for the major build options, with DS1 performing generally slightly better overall. In particular, the DS1 option scores better on economic growth (because it would help meet development needs and improve the overall network resilience to a greater degree than DS2) and local environment impact (because it helps to separate noise and air pollution from where people live, whereas DS2 would impact more on households and businesses). BCRs have been previously calculated for DS2 variants, showing likely poor value for money. BCRs have not been calculated for DS1, so direct comparison is not possible, but it is likely that value for money would be better, since the option is likely to be cheaper than DS2, and environmental and economic benefits are generally better. DS3 sustainable package options again both perform generally better in the economic case; in particular, value for money is very good, based on BCR calculated for a sub-section of the scheme. DS3b scores better than option DS3a on local environment impact, since it has a greater impact on reducing traffic, and is very beneficial to the AQMA compared to DS3a; and similarly for carbon emissions, since a greater number of people will be travelling sustainably in option DS3b.

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Scenario	Strategic				Economic						Managerial				Financial				Commercial	Total
	Scale of impact	Transport objectives	Other objectives	Consensus on outcomes	Economic Growth	Carbon emissions	Socio-distributional	Local environment	Well-being	Value for Money *	Timetable**	Acceptability	Feasibility	Quality of Evidence	Affordability	Capital Cost ***	Revenue Cost ***	Cost Risk	Flexibility	
DS1	2	3	3	4	5	3	4	2	4	3	1	3	4	3	3	2	5	1	2	**57**
DS2	3	2	2	3	4	2	4	1	3	1	2	3	2	3	2	2	5	1	3	**48**
DS3a	2	4	4	3	4	4	4	4	4	5	2	4	4	3	4	3	4	2	5	**69**
DS3b	4	4	5	3	4	5	4	5	4	5	2	3	4	3	4	2.5	4	2	5	**72.5**

Table 9: Results of EAST assessment (higher score = good)

** - for Value for Money the score is inverted from EAST (1=5, 2=4, 3=3)*

***- for timetable, the score given = (7- EAST score)*

**** - for cost, the score given = ((10- EAST score)/2)*

In the Managerial Case between build options, the overbridge/underpass option is marginally better in terms of the time to construction (though this benefit for DS2 could be eroded if there are engineering challenges in the instance of an underbridge in particular, e.g. due to flooding), while the perimeter road option has the advantage in terms of feasibility (including feasibility risk, since there is a higher risk involved in possible engineering complexities with the underbridge option). The sustainable package options score marginally better than the build options in this category. Public acceptability is highest for DS3a, since it does not entail the more politically difficult elements that are included in option b (road closures in addition to London Road, for example), and recent public surveys in Bicester suggest generally supportive attitudes to improving cycling infrastructure. These two schemes also require less significant build work, so are less disruptive than DS1 and DS2 (albeit that any disruption caused would be more widely spread around Bicester).

In the Financial Case, the two major build options are very similar, with DS1 likely to be less expensive if compared to a tunnel DS2 option (though probably slightly more expensive in the instance of a bridge), although this is the least certain aspect of the assessment. This is because estimates for most option elements are based on figures from a few years back or on proxy scheme figures and do not include maintenance figures, which could potentially be high, especially in the case of a tunnel choice for DS2 (already the more costly option than the bridge), mitigation, land or enforcement costs. Cost risk has therefore been designated as being high for both build options, especially because there is also potential for rail disruption requiring mitigation for DS2. For DS3 options, the scores are generally higher than for the build options. Again, there are uncertainties with the costings, since they are based on a combination of scheme proxies and old costings from several years previous, and do not include maintenance, land, mitigation or enforcement costs. Some elements of the scheme are also not fully costed up, due to the need for additional surveying work on Bicester's cycling infrastructure requirements. However, both sustainable options are likely to be considerably more affordable than build options, with DS3a obviously the cheaper of the 2 (since DS3b includes all elements of DS3a plus additional measures). It should also be noted that some quite significant progress towards either of the two packages of sustainable

measures could be put in place with minimal cost, given that much is around re-designation of road space, road marking and signage improvements and promotional campaigns. Cost risk is not as high as for build options, since the figures are generally lower and likely required mitigation measures should not be as significant, though risk is still quite high, due to the lack of estimates for portions of the work needed. A 44% optimism bias uplift was applied to the costs for all of the options; a 40% risk contingency was included in the costs for infrastructure elements of all options within the estimates originally provided. In addition, since the needs for the 2 sustainable options are not fully scoped as noted above, 40% has been added on to the cost estimates for the creation of a cycle network in each case. In all cases, uplift for inflation was applied to bring estimates up to 2020 levels. The costings used for the options are summarised in Table 10.

Option	**Assumed Cost**
DS1	£74M (£40.5M SE link road; £33.5M EPR)
DS2	£70M (bridge) or £100.5M (tunnel)
DS3a	£22M
DS3b	£32M

Table 10: Option Cost Summary

In the Commercial Case, DS1 would offer more flexibility in its operation than DS2, because of the potential for phasing of link road and Eastern Peripheral Road improvements. DS3 options both offer considerable flexibility due to their nature as packages of measures, meaning phasing and prioritisation could be applied. It should be noted that although there would, of course, be potential to reduce down the total scheme in each case, this would erode the benefits, and reducing DS3b would essentially entail instigating DS3a. The sustainable packages also have the benefit of potential income generation through enforcement of road closures and reduced speed limits, though it is possible enforcement cost could cancel out this benefit.

7. Overall Assessment

The overall assessment points to DS3b as being the most favourable option on the majority of fronts – it has the strongest scores overall in the EAST, objectives and traffic impact analyses. In particular, it scores strongly in terms of:

- Reducing traffic impact in town, including significant improvements in the AQMA
- Fitting well with the objectives set and wider government objectives, including environmental, health and social
- Economic impact, with improved journey time reliability and improved connectivity for active travel modes, supporting growth
- Cost, with the scheme being relatively inexpensive in comparison to build options (though more expensive than the less ambitious sustainable package), with potential for income generation through enforcement of closures and speed limit reductions (depending on cost of enforcement actions)

Elements where it falls short, or which would need consideration or management are:

- Traffic flows on peripheral routes are largely unaffected, meaning that some of these routes are still at or over capacity at peak times
- Car and other motorised vehicle severance is not addressed
- Politically, there may be some challenging elements, for example, around road closures and tighter speed limit restrictions, which may be unpopular with drivers

On the other hand, overall assessment suggests the least favourable option to be DS2 in most areas. In particular, it brings the following challenges:

- Increased traffic levels in town, especially on London and Launton Roads
- Least good fit against the objectives set and wider government objectives, with environmental challenges, both in carbon emissions and local environment impacts
- Previous BCR calculations have shown this option to have a low expected value for money
- It is the highest cost option in the instance of a tunnel, with an attendant high cost risk due to uncertainties and likely engineering challenges, especially

in the case of an underbridge, plus potential disruption to rail

This option is not, however, entirely negative, with the following benefits:

- It is the only option to directly address the severance issue caused by the level crossing closure (including to buses routing along London Road)
- There is potential economic benefit from keeping the more direct transport links open

The other two options sit between these two in terms of the benefits and challenges they bring. DS1 has the following points in its favour:

- Reduced traffic flows on the A41, improving journey times and reliability, with positive economic impacts; potential longer term for the section of the A41 which would be bypassed by the link road to be downgraded
- Increased network resilience due to additional road and capacity improvements, also reduces delays
- Comparatively high practical feasibility (barring mitigation requirements being un-defined)

DS1 has the following main challenges:

- It does not achieve a good scale of impact against the specific objective to mitigate against the impact of the London Road closure
- It has a negative impact on the environment in certain areas, including increasing traffic flows in the AQMA, and has a high potential for archaeological and ecological impact during construction
- It is relatively high cost, with a high cost risk due to mitigation requirements and land acquisition (not covered in cost estimates)

DS3a generally has the same positive and negative attributes as DS3b, but to a lesser and greater degree respectively in some cases. The main differences between DS3a and DS3b are:

- Whilst DS3b is more favourable in most respects, DS3a is likely to be more publicly acceptable, since it does not entail the same degree of road closures and requires fewer reduced speed limits
- Since DS3a entails fewer measures, it would be faster and simpler to implement, as well as being the cheapest option
- The positive impacts of reduced traffic levels due to modal shift are considerably lower for DS3a, meaning it also scores less well against the objectives to support sustainable travel,

environment and air quality, and the scale of impact is much lower

The following table 11 outlines the key positive and negative aspects of each of the options:

Option	Benefits	Challenges
DS1	• Reduced traffic on A41 • Good for economic growth • Good wellbeing and socio-distributional impacts • Relatively high practical feasibility compared to DS2 • Improved network resilience and capacity	• Increased traffic in AQMA • Low scale of impact against set objective • Potential for archaeological and ecological impact, and need for flood mitigation measures • Inflexible option beyond potential phasing of EPR & SE link road • Relatively high cost and high cost risk
DS2	• Directly addresses vehicle severance (including buses) • Some positive economic benefits, due to reduced severance and direct access to town for vehicles	• Increased traffic flows in town, esp. Launton and London Roads • Poorest fit with objectives set • Negative environmental impact, due to increased traffic levels, noise and carbon • Potential for increased traffic incidents • Poor value for money • Highest cost option, with high cost risk, esp. for a tunnel option • Inflexible option beyond choice of tunnel vs bridge
DS3a	• Small reductions in traffic in town • Positive environmental impact (air	• Scale of impact is relatively low, so unlikely to fully address the problem

	quality, noise, carbon etc), to a lesser degree than b • Positive health, wellbeing and socio-distributional impact, to a lesser degree than b • Most affordable option • Good value for money • Good economic impact, to a lesser degree than b • Good fit with set objectives • Relatively high practical feasibility • Flexible option • Income generation potential, to a lesser degree than b	• Little traffic impact outside Bicester town • Does not directly address vehicle severance from crossing closure • Needs soft measure and political support to achieve modal shift predicted, to a lesser degree than b • Requires enforcement measures, to a lesser degree than b
DS3b	• Significantly reduced traffic in town • Positive environmental impact (air quality, noise, carbon etc) • Positive health, wellbeing and socio-distributional impact • Affordable, to a lesser degree than a • Good value for money • Good economic impact • Excellent fit with set objectives • Relatively high practical feasibility • Flexible option • Income generation potential	• Little traffic impact outside Bicester town • Politically challenging aspects of scheme (e.g. road closures, and speed restrictions) • Does not directly address vehicle severance from crossing closure • Would need to be fully supported by modal shift campaign and politically to gain level of benefit projected • Requires enforcement measures

Table 11: Summary of benefits and challenges of the options

8. Conclusions and Recommendations

This initial analysis of the options under consideration suggests that DS3b is the most favourable, and that DS2 would entail the most significant challenges, particularly in the instance of a tunnel option (excepting public acceptability). DS1, whilst bringing benefits to the town's peripheral routes, does not fully address the objective, and DS3a has only a relatively small-scale impact on the problem caused by the level crossing closure. However, the analysis has only considered the options in isolation, and has not reviewed potential impacts of combined options.

Considering the drawbacks identified of the most favourable option, it may be beneficial to consider the combined impact of DS3b and DS1 options in the next stages of analysis; these two options may complement each other, since DS1 brings benefit to the peripheral routes which DS3b does not, and improves network resilience, whilst DS3b addresses the traffic levels in town which are not improved by DS1. Of course, the road closures included in DS3b could impact on the traffic improvements shown in DS1, as additional vehicles may route around town instead of through it, but the overall traffic reductions should temper this potential impact, and the capacity improvements should also help to minimise impact of increased traffic. There would be a potential risk that a road scheme building capacity could reduce the modal shift impact of the sustainable package, but in this instance this is, again, likely to be minimised by the location of the road schemes impacting more significantly on external-Bicester trips which are not addressed by DS3b. Within this analysis it would also be helpful to consider the two constituent elements of DS1 in isolation (i.e. the South East Link Road provision and Eastern Peripheral road capacity improvements). Access to Launton Road for vehicular traffic approaching from the South side of Bicester being a challenge caused by London Road crossing closure (especially given the existence of car parks and businesses in this location), it may be that the benefit of the capacity improvements on Charbridge Lane alone alongside DS3b would be sufficient to alleviate the vehicular access challenges, whilst maintaining the modal shift benefits.

Since the severance issues caused by the closure of the level crossing are most significant for active travel modes, due to the times involved in re-routing creating longer journeys, there is a need for any

option to provide direct, attractive and high quality access for cyclists and pedestrians along this route.

It is also worth noting that given that Bicester's LCWIP has been endorsed by cabinet, it would be prudent to consider the combined impact of DS3a with any other options being progressed to the next stages of assessment. However, it should also be noted that DS2 is incompatible with elements of the DS3a and DS3b options, since both entail closure of the level crossing on London Road; as such, options would need to be tweaked to allow compatibility if DS2 is progressed further. To support this, it would be helpful to consider prioritisation of the cycle network and additional measures planned within the two DS3 options, to assess likely impact on modal shift projections if London Road Level crossing is replaced rather than being closed. This prioritisation would also support phasing of build on these options if only partial funding is initially obtainable.

The uncertainties or gaps identified in this analysis should also be addressed as far as possible in the next stages of work. In particular:

- Fuller cost estimates should be produced for options being progressed, as proxies and old costings were used to make estimates which may be inaccurate for more detailed analysis
- Maintenance, mitigation, land and enforcement costs need to be considered, as they have not been covered at all in some cases (maintenance, enforcement and mitigation) or fully in others (land)
- Consideration of likely income generation from enforcement of road closures and speed limits, and this compared against enforcement costs
- Value for money estimates should be revisited based on fuller information

The next stages of work should also include a greater degree of stakeholder engagement, including local businesses and residents who have not been consulted on the options.

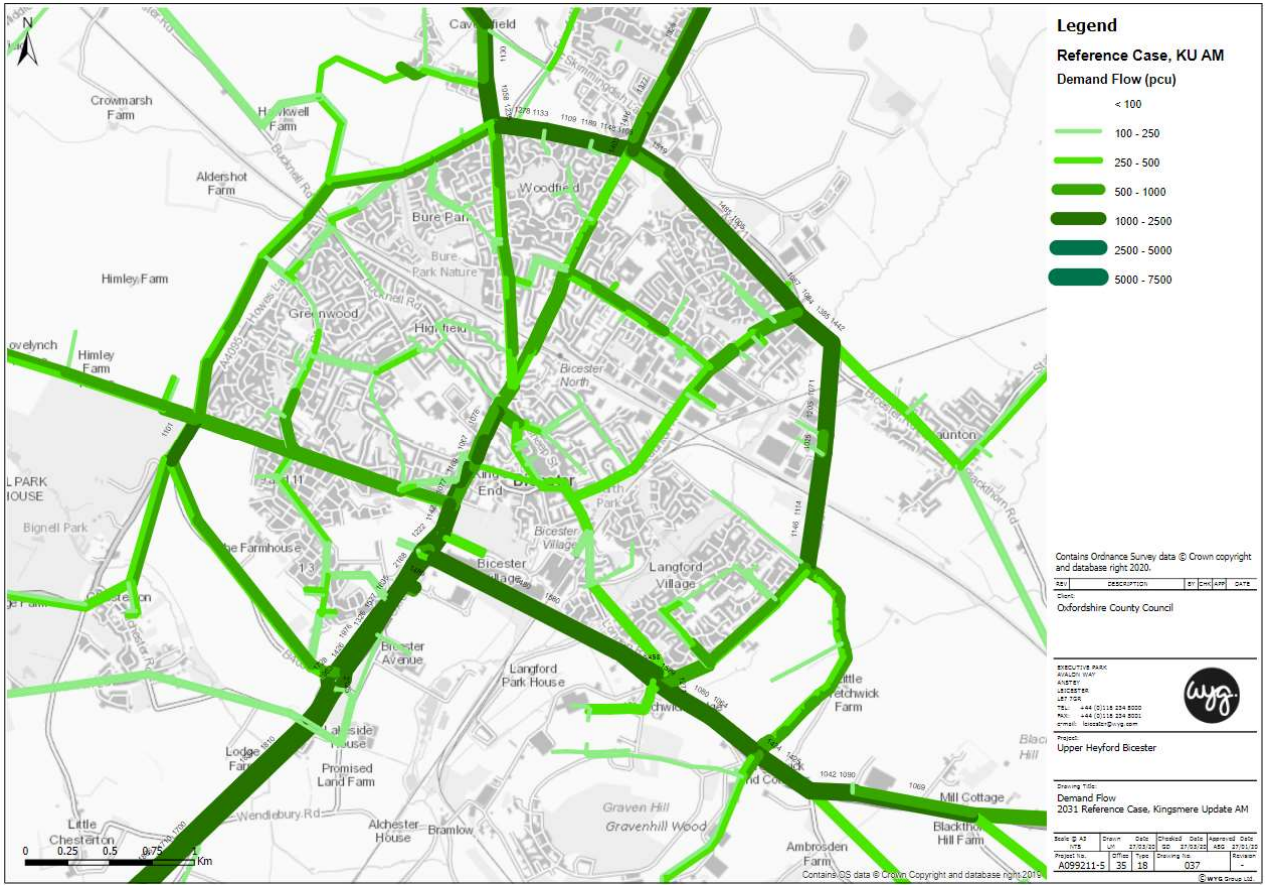
At this stage, it seems prudent to progress all 3 options and their sub-options to the next stages of work, rather than to rule any out, since the combination of different options could help to temper the negative impacts of the less favourable options when analysed together. As noted earlier in the document, further assessment should also re-examine the policy context for the options, given the changes which have come about since initial objectives were set, and the anticipated additional policy and

strategy documents during the first half of 2021, at national, regional and county levels. This may influence which options and option combinations are more fully analysed, so it is therefore recommended that this be considered before the more detailed analysis is undergone, as far as possible within the timescales involved.

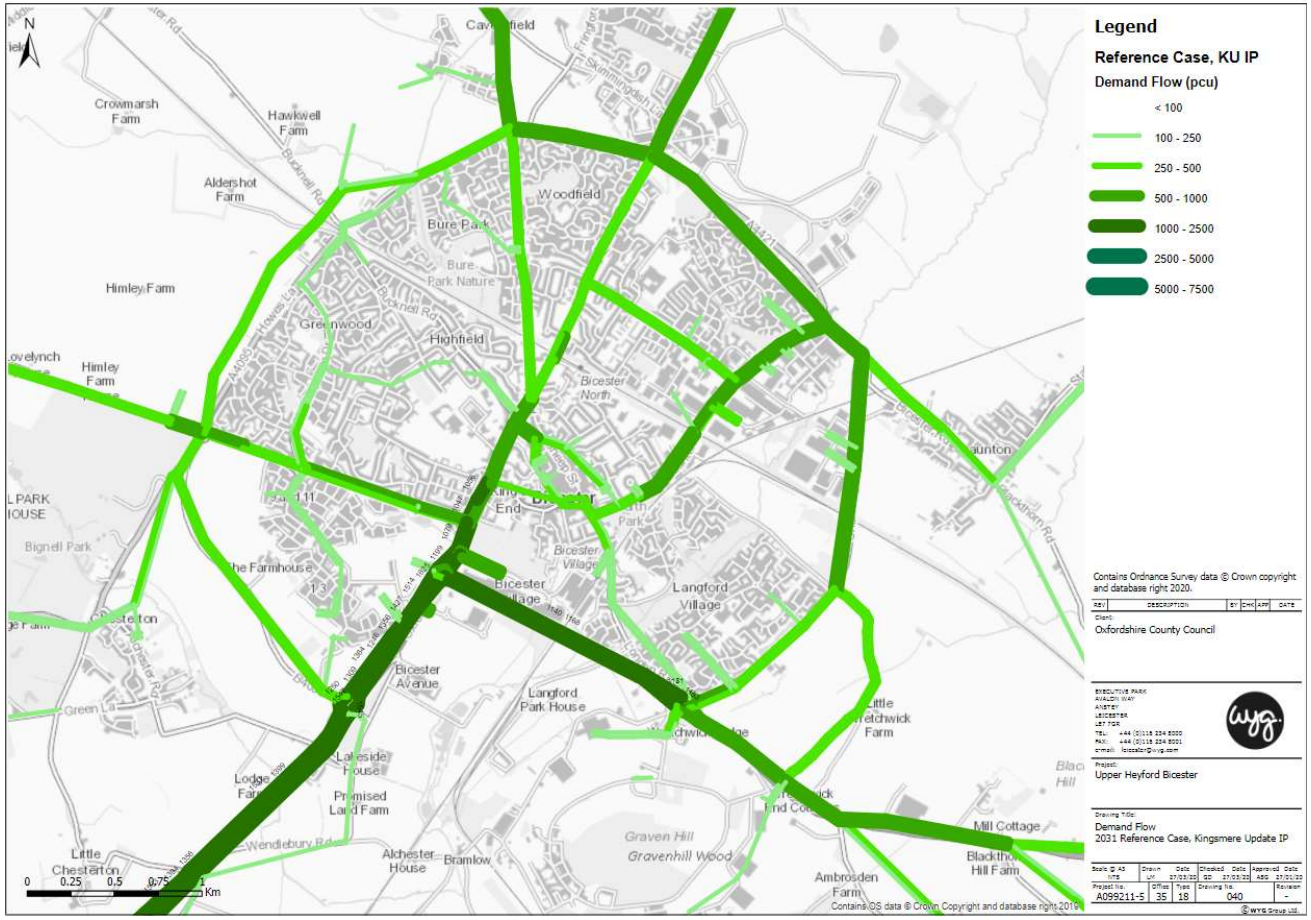
Appendix 1: Predicted flows from Bicester Traffic Model

2-way flows	AM						IP						PM					
Road Name	**DN**	**DM**	**DS1**	**DS2**	**DS3a**	**DS3b**	**DN**	**DM**	**DS1**	**DS2**	**DS3a**	**DS3b**	**DN**	**DM**	**DS1**	**DS2**	**DS3a**	**DS3b**
London Road (between the Launton Road junction and level crossing)	601.9	294.8	294.7	1062.6	282.9	270.1	507.0	219.5	219.3	938.4	207.4	194.6	865.4	295.9	294.8	1459.4	273.3	250.4
London Road (south of level crossing)	354.9	0.0	0.0	837.7	0.0	0.0	268.5	0.0	0.0	719.2	0.0	0.0	580.9	0.0	0.0	1108.3	0.0	0.0
A41 west of Graven Hill/London Rd	3059.9	3199.4	2280.4	2962.5	3041.3	3022.0	2307.5	2422.9	1768.0	2271.3	2302.2	2294.5	3059.5	3256.4	2601.9	3071.0	3066.1	3031.6
Charbridge Lane (at railway bridge)	2259.3	2417.6	2482.8	2012.4	2261.3	2173.7	1564.1	1672.7	1687.3	1344.5	1543.2	1524.4	2309.4	2581.1	2733.9	2105.9	2406.8	2329.5
Launton Road (just north of junction with London Road)	682.6	563.7	562.8	896.8	543.6	279.0	739.1	657.2	659.6	1029.7	634.9	209.9	887.4	687.0	626.7	1264.9	656.6	265.4
Launton Road (at railway bridge)	863.6	849.2	849.8	1031.6	774.1	697.8	1126.3	1102.1	1084.1	1343.7	999.9	951.9	1156.2	1090.7	1024.9	1426.8	985.0	844.9
Launton Road (north of Churchill Road)	1189.4	1262.3	1341.9	1062.4	1179.3	1083.1	1350.0	1450.7	1416.3	1144.9	1334.8	1186.9	1386.5	1568.4	1472.2	1235.1	1548.8	1365.6
A41 (between Bicester Village and Vendee Drive)	3773.7	3795.0	2828.6	3743.9	3689.2	3540.7	2890.7	2899.4	2201.8	2842.4	2835.0	2694.2	3771.2	3878.6	3142.4	3678.6	3729.2	3465.4
Market Square (both sides combined)	779.3	699.3	687.6	840.3	676.0	72.3	733.3	656.8	659.7	778.2	634.4	72.0	902.0	784.0	734.9	961.8	753.5	72.6
Kings End east of Queens Ave	491.5	583.6	573.0	463.7	569.5	192.8	428.9	487.1	491.7	403.1	486.8	120.3	478.5	586.5	584.7	442.0	554.5	208.1

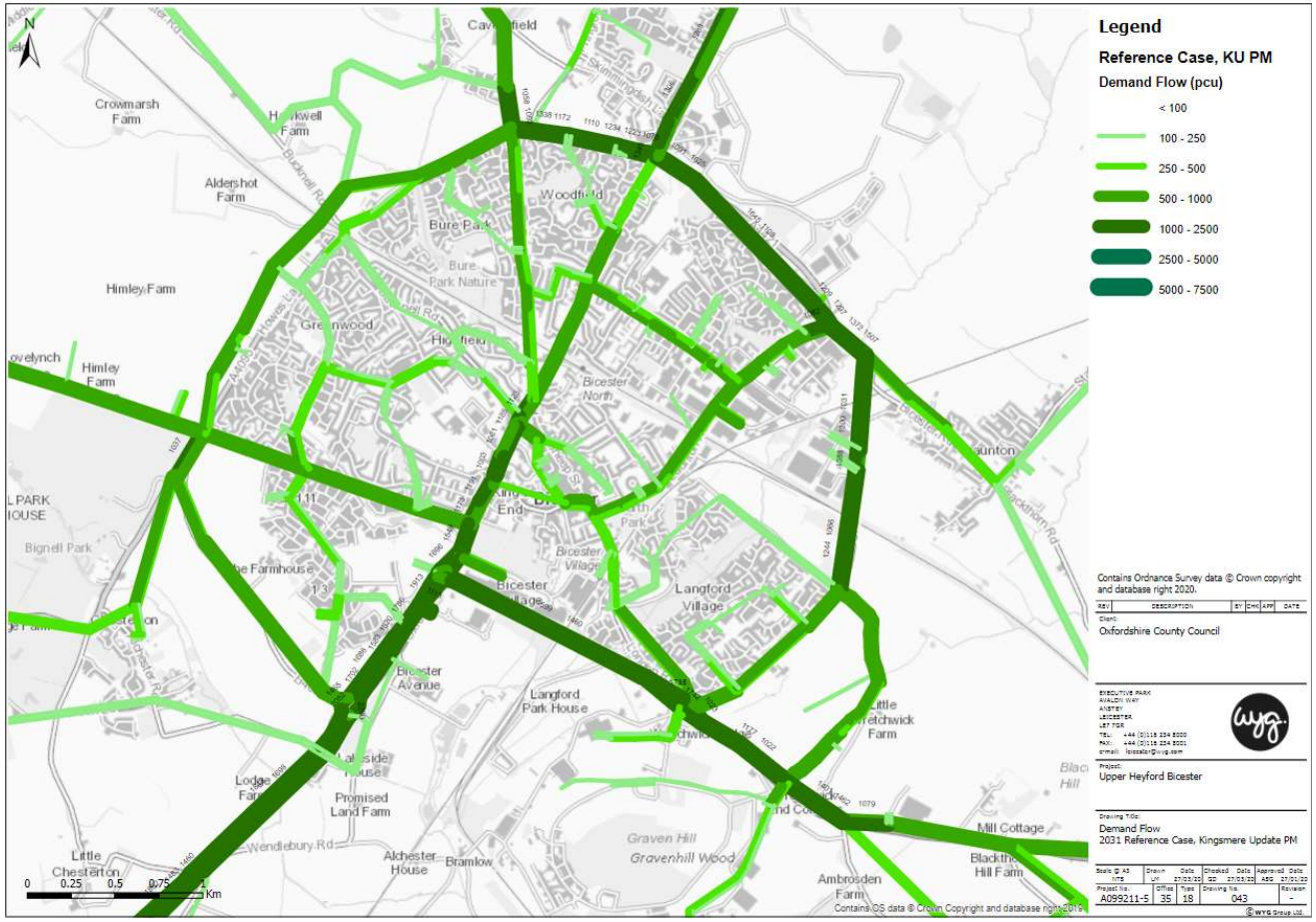
Appendix 2: Do nothing Demand Flow



Do nothing - AM PEAK



Do nothing - Inter-Peak



Do nothing – PM Peak

Appendix 3 – EAST summaries

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

Option Name/No.	**Underpass or Overbridge**	
Date	19/11/2020	
Description	Retention of London Road through construction of new underpass of overpass on or near the line of the existing road	
Strategic		
Identified problems and objectives	Increased traffic on London Road and lower part of Launton Road. Objective to directly replace level crossing, keeping the London Road open to all modes of traffic.	
Scale of impact	3	Directly addresses problem of level crossing closure; however, causes increased traffic flows in town.
Fit with wider transport and government objectives	2	Goes against environmental objectives - increases traffic in town, impacting on other modes. Conflicts with LCWIP for Bicester, which proposes closing the level crossing to support sustainable transport. However, potential for supporting freight by keeping the road open.
Fit with other objectives	2	Least good fit with objective set by stakeholders of all options - see OAR for details.
Key uncertainties		
Degree of consensus over outcomes	3	Some engagement has occurred. Preference of stakeholders is for the underbridge option due to lower landscape impact. Likely concerns around traffic impact in town, esp. on London Road, Launton Road and the town centre.
Economic		
Economic growth	**4. Amber/green**	Connectivity improved due to retaining route. Journeys more direct so could be quicker, though increased congestion levels in town may negate the more direct route benefit. Potential wider economic benefit from supporting more direct access to businesses in town (freight and delivery). Increases network resilience due to additional route availability compared to closure.
Carbon emissions	**2. Red/amber**	Increased traffic in town likely to have a negative impact on sustainable modes. Slightly more direct routes possible will marginally reduce carbon emissions, but increased congestion may off-set this benefit. Potentially significant carb emissions from construction, esp. for more complex underbridge.
Socio-distributional impacts and the regions	**4. Amber/green**	May negatively impact on non-car owners due to increased traffic levels. However, also potential for economic growth
Local environment	**1. Red**	Minor positive impact on AQMA traffic levels, but increased traffic in other areas may create other AQMA problems, so small benefit off-set. Noise likely to be an issue, esp. during construction and will impact on households. Negative impact on streetscape from increased traffic levels, which will also impact on heritage buildings in town negatively.
Well being	**3. Amber**	Increased traffic may increase incidents. Increased traffic may reduce physical activity since walking and cycling will be less attractive. Reduced severence however increases accessibility by car and improves resilience.
Expected VfM category	5. Poor <1	BCRs calculated by WYG in 2017 suggest overbridge has a higher BCR than the tunnel, likely due to lower cost of the scheme, but in both cases BCR <1. Cost estimates are £70M for the bridge and £100.5M for the tunnel, inc. 40% risk contingency and 44% uplift for optimism bias, with inflation added to bring to 2020 levels.
Managerial		

Implementation timetable	5. 2-5 years	2 year construction assumed; additional time for consultation, land acquisition, detailed design, likely to take to higher end of category
Public acceptability	3	Public acceptibility of tunnel higher than bridge, due to visual impact. However, households and businesses will be affected by construction and CPOs will likely be needed, reducing acceptibility. Some stakeholder engagement has occurred, but local businesses and residents have not been engaged.
Practical feasibility	2	Feasibility is low due to likely mitigation requirements, compulsory purchase orders needed, and engineering complexities. Likely that a tunnel is more practically infeasible than a bridge, though the bridge is less publicly acceptable.
What is the quality of the supporting evidence?	3	Prior studies from previous years considering different bridge and tunnel options. Some elements have not been considered and most recent evidence from 2017.
Key risks	Overbridge likely to be cheaper but more visually intrustive; gradient of latter to accommodate rail electrification also requires separate cycle/walking infrastructure which will increase timeline and cost. Underpass has higher cost risk	
Financial		
Affordability	2	Tunnel option high cost; maintenance costs likely to be signficant if regular pumping required to remove flood water
Capital Cost (£m)	06. 50-100	The tunnel option comes in very slightly over this category, by £0.5M, but given the small margin and bridge option falling within this category, the lower range has been chosen here.
Revenue Costs (£m)	01. None	
Cost profile	Costs don't include mitigations related to highways access matters (e.g. cost of property access during construction); CPO costs and maintenance also not factored - potentially high cost esp. for tunnel if flooding a problem. Land has also been removed from estimates for consistency with other options' costing.	
Overall cost risk	1.High risk	
Other costs	Disruption of rail services during construction, unknown services	
Commercial		
Flexibility of option	3	Flexibility of option chosen - bridge vs tunnel. Little other flexibility other than specific design.
Where is funding coming from?	Department for Transport	
Any income generated? (£m)	No	

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

Option Name/No.	**South East Link Road**	
Date	19/11/2020	
Description	Construction of new link road linking A41 south of town to A41 east of Graven Hill, plus improvements on Eastern Perimeter Road	
Strategic		
Identified problems and objectives	Large impact on existing A41 route; minimal impact on flows in rest of town. Objective to provide an alternative route for those displaced from the London road and reduce need for external traffic to route through Bicester town.	
Scale of impact	2	Little impact on traffic flows within town; reduces traffic on A41 quite considerably though. Impact not 100% in line with objective
Fit with wider transport and government objectives	3	Some small benefit to other modes of transport, no major conflicts though will not progress environmental objectives significantly.
Fit with other objectives	3	Supports most objectives set to some degree, but not fully in any instance.
Key uncertainties		
Degree of consensus over outcomes	4	Previous studies undertaken with similar conclusions re impact. Objections possible around ecological impact however.
Economic		
Economic growth	5. Green	Improves connectivity, as journeys will be quicker; journey time variability reduced; network resilience improved; supports housing delivery; potential for positive wider economic benefit as journey times reduced.
Carbon emissions	3. Amber	Minor benefits from improved journey times, minor support for active travel modes due to slightly lower traffic flows. Likely considerable embodied carbon during construction though, so benefits off-set.
Socio-distributional impacts and the regions	4. Amber/green	Makes active modes marginally more accessible by reducing traffic levels.
Local environment	2. Red/amber	Negative impact on AQMA. Noise likely exacerbated, but in areas away from housing. Potential for ecological and archaeological impact.
Well being	4. Amber/green	Minor positive impact on physical activity; traffic incidents may be reduced in some areas due to lower flows; makes leisure trips faster and more reliable slightly
Expected VfM category	3. Medium 1.5-2	Assumed cost c. £74M based on previous estimates.
Managerial		
Implementation timetable	6. 5-10 years	includes consultation, design, land acquisition and engineering works
Public acceptability	3	Link road included in Local Plan; some consultation previously taken place. Stakeholder engagement previously undertaken for EPR improvements.
Practical feasibility	4	Previous assessments of route options undertaken; no major practical barriers, traditional methods can be used, with some mitigations required for archaeological and ecological impact.
What is the quality of the supporting evidence?	3	Previous assessments from approx 4 to 5 years ago, so may be some changes; some work may need to be re-done.
Key risks	Potential for archaeological impact, flood issues and ecological impact - mitigation required.	

Financial

Affordability	3	build is relatively affordable, but additional costs for mitigation and maintenance may take cost up significantly.
Capital Cost (£m)	06. 50-100	Likely low end of category, just for building works. Based on previous estimates of £33.5M for the EPR improvements and £40.5M for the link road, with uplift added for inflation. Both estimates included 40% risk contingency, and a 44% optimism bias has been added.
Revenue Costs (£m)	01. None	
Cost profile	Covers engineering works, but not maintenance or consultation and land acquisition. These would take cost up.	
Overall cost risk	1.High risk	
Other costs	Maintenance, mitigation, land acquisition. NB likely site for SE link road on floodplain, and has ecological impact that needs mitigation	

Commercial

Flexibility of option	2	Could potentially phase EPR and SE link road separately to introduce some flexibility, but no flexibility beyond that.
Where is funding coming from?	Department for Transport	
Any income generated? (£m)	No	01. None

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

Option Name/No.	**Sustainable Package CAT C**	
Date	19/11/2020	
Description	Delivery of a comprehensive cycle network in Bicester, linking all areas and surrounding villages	

Strategic

Identified problems and objectives	Objective to reduce overall traffic by encouraging modal shift, so reducing problem of severence caused by level crossing closure; mainly only addresses internal-Bicester trips, so limited impact on peripheral routes.	
Scale of impact	2	Some benefit, but traffic flows still broadly similar to those of do nothing option
Fit with wider transport and government objectives	4	Meets environmental, health and transport objectives by increasing uptake of sustainable and active travel, but does not demonstrate doing more with less
Fit with other objectives	4	See 6.3 in OAR. Performs well against set objectives
Key uncertainties	Modal shift figures based on other locations doing similar programmes - may be inaccurate	
Degree of consensus over outcomes	3	

Economic

Economic growth	**4. Amber/green**	Likely to improve journey times and journey reliability due to modal shift, compared to LRLC reference case. Wider economic impact improves accessibility to employment areas. Supports housing and employment development
Carbon emissions	**4. Amber/green**	Modal shift to sustainable options will reduce carbon emissions, reducing vehicle-kms. The impact is relatively small, however. Some embodied carbon will be emitted through infrastructure delivery - outweighed by overall likely carbon savings
Socio-distributional impacts and the regions	**4. Amber/green**	May be soome benefits to poorer demographics, esp. those with no access to car
Local environment	**4. Amber/green**	Little impact on local environment - traffic levels overall slightly reduced means minor noise improvements; construction requirements should be minor (compared to road options) with little impact on landscape or historic environment. Reduced traffic levels will have minor positive impact on streetscape
Well being	**4. Amber/green**	Parts of Bicester have poorer life expectancy and healthy life expectancy than average, esp. for women. There is also some income deprivation, though most areas of Bicester are better than average UK. Unlikely to have significant impact on traffic incidents; it should be noted that in areas of deprivation though, that deaths for cyclists are higher than in less deprived areas, so increasing number of cyclists a small amount, but not enough to have a significant impact on car traffic could have a small negative result. Improved access to goods etc compared to 'do minimum', as cycle links improved. Severence reduced slightly due to improved cycle connectivity and associated benefits for pedestrians
Expected VfM category	1. Very High >4	22M assumed cost. BCR of 14.57 calculated for Causeway redesign work, as part of Active Travel Tranche 2. Likely comparable benefits to costs for a wider scheme of work within Bicester, given Causeway redesign encompassed in this scenario

Managerial

Implementation timetable	5. 2-5 years	Possibly longer if requiring land acquisition and public consultation. Engineering works likely 2 to 3 years

Public acceptability	4	Likely to be just a few aspects of political difficulty - e.g. introduction of reduced speed limits may be unpopular with some. Additional engagement and measures will also be needed for behaviour change required for modal shift target
Practical feasibility	4	Case studies of CAT C interventions have proven successful. Maybe some small practical challenges with fitting routes of optimum width in some locations. Requires identification of suitable crossing point for London Road Level Crossing for cyclists and pedestrians
What is the quality of the supporting evidence?	3	Based on evidence from other locations and modelling work. There may be aspects of Bedford as case study which differentiate from Bicester (e.g. size of town), but similarities are sufficient to suggest reasonable comaprability. Modelling work based on figures generated from case study analysis, so if case stusyd incorrect, modelling also incorrect.
Key risks	Modal shift is not as expected either because case study not compatible, or because supportive measures not able to be put in place. Bedford initially experienced low increase rates due to slow progress with supportive measures. Political will needs to be secured to ensure supportive measures put in place; good public engagement and promotion to ensure public support and encourage modal shift required.	

Financial

Affordability	4	Option can be split down into constituent parts and planned according to budget available over time; expected cost significantly lower than other options considered
Capital Cost (£m)	04. 10-25	£22M estimate - based on costs from Baxter (2015), previous estimate for pedestrian/cycle crossing of London Road (2016) and Oxford schemes in the main - some considerable level of uncertainty due to factors still to be decided and full auditing work needed to assess levels of requirements for cycle path improvements (widening, resurfacing etc), which has not yet been completed, as such 40% added to costs for more defined elements to factopr up for likely additional costs. 44% also added to etimates for optimism bias to help adjust for likely under-estimation
Revenue Costs (£m)	02. 0-5	Costs for promotional campaign to support cycling
Cost profile	Estimates don't include enforcement and maintenance costs	
Overall cost risk	2	
Other costs	Enforcement and maintenance costs. Possible disruption of rail services during construction of cycle/foot crossing point.	

Commercial

Flexibility of option	5. Dynamic	Because it is a package of measures, it can easily be scaled according to funding available. It could also be amended to fit with changing circumstances (e.g. which aspects are prioritised)
Where is funding coming from?	Department for Transport	
Any income generated? (£m)	Yes	Don't know

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

Option Name/No.	**Sustainable Package CAT B**	
Date	19/11/2020	
Description	Delivery of a comprehensive cycle network in Bicester, linking all areas and surrounding villages, plus additional measures to re-desigate space to active and sustainable modes and supportive soft and policy measures	

Strategic

Identified problems and objectives	Objective to reduce overall traffic by encouraging modal shift, so reducing problem of severence caused by level crossing closure; mainly only addresses internal-Bicester trips, so limited impact on peripheral routes.	
Scale of impact	4	Considerable benefit in town, though does not address peripheral routes. Will only have this scale if supportive measures put in place and modal shift targets reached
Fit with wider transport and government objectives	4	Meets environmental, health and transport objectives by increasing uptake of sustainable and active travel, but does not demonstrate doing more with less
Fit with other objectives	5. High	See 6.3 in OAR. Performs very well against set objectives
Key uncertainties	Modal shift figures based on other locations doing similar programmes - may be inaccurate. Assumptions also made on reducing speed limits on some roads to discourage rat-running. Full explanation of roads included in OAR.	
Degree of consensus over outcomes	3	

Economic

Economic growth	**4. Amber/green**	Likely to improve journey times and journey reliability due to modal shift, compared to LRLC reference case. Wider economic impact improves accessibility to employment areas. Supports housing and employment development. Road closures to car may slightly increase some car journey times through distance travelled increasing slightly though.
Carbon emissions	**5. Green**	Modal shift to sustainable options will reduce carbon emissions, reducing vehicle-kms reasonably significantly (though slightly off-set by some journeys by car being marginally longer due to road closures). Some embodied carbon will be emitted through infrastructure delivery - these are outweighed by the overall carbon savings.
Socio-distributional impacts and the regions	**4. Amber/green**	May be some benefits to poorer demographics, esp. those with no access to car
Local environment	**5. Green**	Positive impact on local environment by taking traffic away from town centre locations - traffic levels overall reduced means noise improvements; construction requirements should be minor (in comparison to road schemes), with little impact on landscape of historic environment. Reduced traffic levels and removal of traffic from some areas will have positive impact on streetscape. Historic buildings clustered in centre of town will benefit.
Well being	**4. Amber/green**	Parts of Bicester have poorer life expectancy and healthy life expectancy than average, esp. for women. There is also some income deprivation, though most areas if Bicester better than UK average. Decreased traffic levels should improve traffic incidents slightly. Improved access for sustainable modes to goods and services, compared to 'do minimum' due to improved network. Severance also reduced for sustainable mode users, though slightly increased for car users due to road closures.
Expected VfM category	1. Very High >4	Expected cost c. £32M. BCR for Causeway redesign >14. Given this scheme encompasses Causeway closure, likely similar BCR

Managerial

Implementation timetable	5. 2-5 years	Possibly longer if requiring land acquisition and public consultation. More likely to need greater levels of consultation than CAT C package. Engineering works likely 3 to 5 years, though some elements quicker to deliver
Public acceptability	3	Likely to be some aspects of political difficulty - e.g. introduction of reduced speed limits and road closures including the central corridor may be unpopular with drivers. However, recent surveying in Bicester does show good support for measures to promote active travel. Additional engagement and measures will also be needed for behaviour change required for modal shift
Practical feasibility	4	Case studies of CAT B interventions have proven successful. Maybe some small practical challenges with fitting routes of optimum width in some locations. Requires identification of suitable crossing ppint for London Road Level Crossing for cyclists and pedestrians; traffic filters will need to be bus gates to allow buses along the central corridor.
What is the quality of the supporting evidence?	3	Based on envidence from other locations and modelling work. There may be aspects of Oxford as a case study which differentiate from Bicester (e.g. size). Modelling work based on figures generated from case study analysis, so if study incorrect, modelling also incorrect.
Key risks	Modal shift is not as expected either because case study not compatible, or because supportive measures not able to be put in place. Political will needs to be secured to ensure measures undertaken; good public engagement and promotion to ensure public support and encourage modal shift required - to a greater degree than CAT C intervention package.	

Financial

Affordability	4	Affordable compared with road options. Can also be potentially split down over time for cash flow purposes. (NB reducing down completely would mean becoming CAT C intervention, and would lose benefit)
Capital Cost (£m)	05. 25-50	Estimates based on costs from Baxter (2015), previous London Road ped/cycle crossing estimate (2016) and Oxford schemes in the main - some considerable level of uncertainty due to factors still to be decided and full auditing work needed to assess levels of requirements for cycle path improvements (widening, resurfacing etc), which has not yet been completed - 40% has been added on to estimates of more defined elements to cover likely additional costs. 44% optimism bias also added to estimates to reach £32M, to help adjust for likely under-estimation
Revenue Costs (£m)	02. 0-5	Supportive measures - promotions etc
Cost profile	Does not include maintenance and enforcement costs	
Overall cost risk	2	
Other costs	Maintenance and enforcement. Possible rail delays during construction of cycle/pedestrian crossing for London Road	

Commercial

Flexibility of option	5. Dynamic	Because it is a package of measures it can be adapted; however, reducing package down would reduce benefits. Exact contents could be adapted to suit changing needs, prioritisations etc.
Where is funding coming from?	Department for Transport	
Any income generated? (£m)	Yes	Don't know

[i] *Bicester Profile – 2011 Census (Oxford City Council)*
[ii] https://www.rte.ie/news/2020/0730/1156506-dublin-pedestrianisation/