A40 Smart Corridor

Duke's Cut

Option Assessment Report (OAR)

Oxfordshire County Council

July 2021

Quality information

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1	07/01/2021	Draft	SG	Sarah Guest	Project Director
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1.1 Background

1.1.1 The A40 corridor in the county of Oxfordshire is a predominantly single carriageway road connecting towns and villages in the district, such as Witney and Eynsham, with the historic city of Oxford (Figure 1-1). The A40 serves a much wider purpose of connecting Oxfordshire with neighbouring counties and regions including Cheltenham, Gloucester and South Wales to the west, and Buckinghamshire, Greater London and the M40 to the east. In the west of the county, the A40 is comprised of a single carriageway road, except the section from Witney to Minster Lovell which is a Dual Carriageway. The section between Witney and Oxford is currently operating above capacity, with daily congestion issues affecting all road users.

1.1.2 Increased commuting into the City of Oxford, and a reliance on private vehicles for travel has led to the worsening levels of congestion on the highway network across much of Oxfordshire. One reason for increased commuting into Oxford from surrounding districts and counties is the high housing costs with Oxford among the most expensive places in the country (see section 3.3). The A40 is also an important freight corridor.

1.1.3 These issues are considered significant barriers to economic growth and prosperity in the county and would be further exacerbated by the additional traffic generated by planned development (see section 1.1.4), dictating the need for intervention.

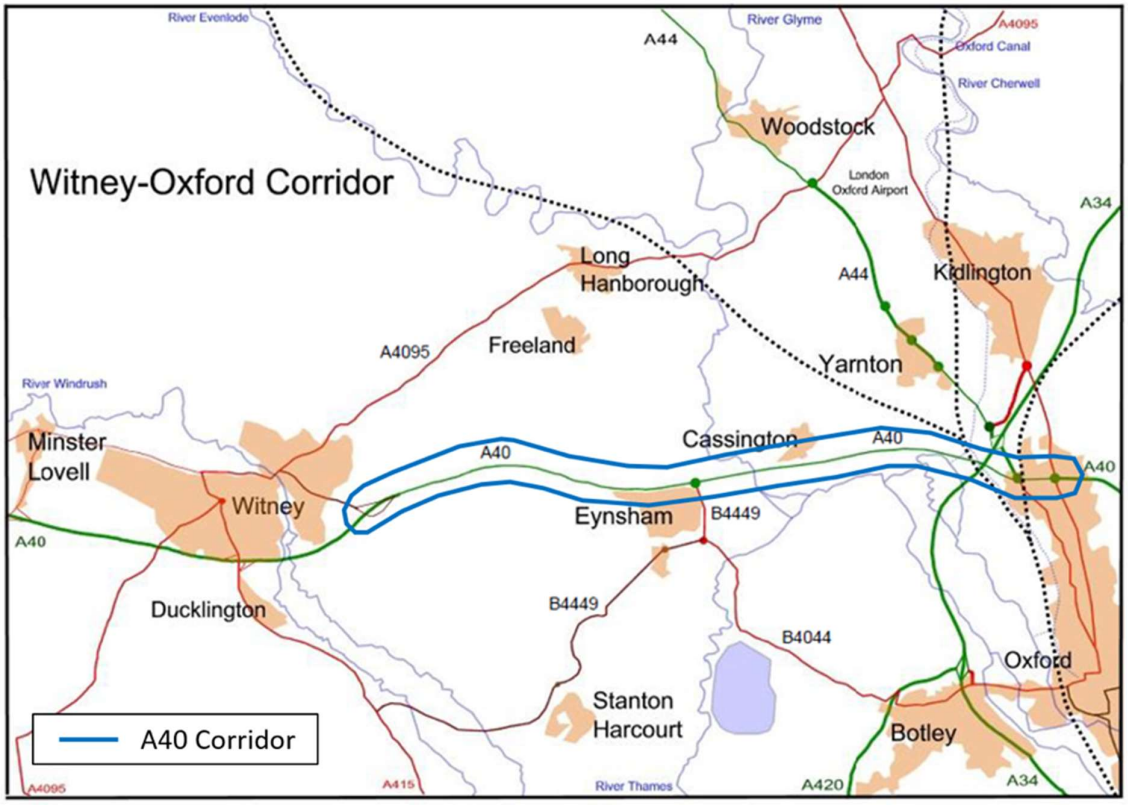


Figure 1-1 A40 Corridor
Source: A40 Science Transit Phase 2 – Option Assessment Report (OCC, 2017)

1.1.4 Oxfordshire is a prosperous and vibrant county, combining a successful, thriving economy with a high-quality environment. Oxfordshire has committed to the delivery of 100,000 new homes between 2011 and 2031 as identified within the 2014 countywide Strategic Housing Market Assessment and the five districts' Local Plans.

1.1.5 The West Oxfordshire District Council Local Plan 2031, which covers the section of the A40 between Witney and the outskirts of Oxford, was adopted in September 2018 and commits to delivering West Oxfordshire's housing need (13,200 homes in the period 2011-2031), as well as assisting Oxford City in meeting its unmet housing need (2,750 homes in the period 2021-2031), totalling at least 15,950 new homes in the West Oxfordshire District up to 2031.

Promoting Use of Sustainable Transport on the A40 Corridor

1.1.6 A substantial amount of work has been undertaken in order to ascertain the best method to promote the use of sustainable transport on the A40 Corridor. A brief overview of the steps undertaken thus far are outlined below.

1.1.7 The **Oxfordshire Local Transport Plan 4** (LTP4), titled Connecting Oxfordshire, was adopted by Oxfordshire County Council (OCC) in 2015 and updated in 2016. It was developed with three over-arching transport goals in mind:

i. To support jobs and housing growth and economic vitality;

ii. To reduce emissions, enhance air quality and support the transition to a low carbon economy; and

iii. To protect and enhance Oxfordshire's environment and improve quality of life (including public health, safety and individual wellbeing).

1.1.8 The overall strategy in the Local Transport Plan 4 to 2031 acknowledges that predicting and providing fully for increased demand for road travel by car and freight vehicles in the form of highway capacity improvements is neither affordable nor desirable from an environmental or economic perspective. The plan states the need to make the best use of existing capacity. Journeys made by low-occupancy private vehicles must reduce and make up a smaller proportion of transport mileage in the future and that more journeys are made by means of transport that take up less road capacity, taking advantage of smarter means of travel, and fully accounting for the potential of any additional road capacity to generate additional car traffic.

1.1.9 A Baseline Statement for the OCC **A40 Witney-Oxford Corridor Route Strategy** was prepared in September 2014. It identified that the A40 has long standing issues of congestion and leading to extended journey times and high journey unreliability (see section 3.3). The problems and challenges for the Witney-Oxford corridor were summarised as:

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

1.1.10 There are few alternative means of travel from this part of West Oxfordshire: the alternative road routes also suffer from heavy congestion; there is no convenient rail or other fixed link connection; buses have no alternative but to use the congested roads (such as A40 between Witney and Oxford).

1.1.11 In informing the development of an **A40 Corridor Strategy** a range of potential options were identified as potential improvement solutions including:

- Park and Ride
- Bus lanes
- Tidal Flow bus lane
- Rail line re-opening
- Guided busways and Trams
- Non-conventional rapid transit (people movers/automatic light rail/monorail)
- Dual Carriageway
- Tidal Flow lanes

1.1.12 Through 2015 and 2016 an assessment evaluating alternative strategies for the corridor was undertaken followed by public consultation. In May 2016 the OCC adopted a road-based improvement strategy as the most viable, affordable alternative that could be delivered within a relatively short timescale. The A40 corridor strategy which seeks to encourage greater use of public transport and cycling for trips between West Oxfordshire and Oxford includes section of road dualling, the provision of a new Park and Ride site, fully-segregated bus lanes between Eynsham and Oxford Ring Road and improved cycle route provision from Witney along the A40 to Oxford.

A40 Corridor Improvement Programme

1.1.13 Funding has been secured from government to deliver a number of projects that will deliver the A40 strategy and which form the A40 Corridor Improvement Programme:

- **(1) A40 Science Transit 2 (A40 STP2) scheme**: This scheme is to be funded from the Department for Transport (DfT) Local Growth Fund (LGF):
    - A new 850 space Park and Ride site in Eynsham, and associated highway improvements including junction improvements[1];
    - A full eastbound (towards Oxford) bus lane from the Park and Ride to Duke's Cut; and some short sections of westbound bus lane from the Park and Ride to Duke's Cut.
    - Footway and Cycleway improvements between Eynsham and Duke's Cut
- **(2) A40 Smart Corridor schemes**: Funding has also more recently been secured from Homes England's Housing Infrastructure Fund 2 (HIF) for three further schemes that will complement the STP2 scheme:
    - An extension of the A40 dual carriageway between Witney and Eynsham;
    - A full westbound bus priority lane from Duke's Cut to the Eynsham Park and Ride site; and
    - A40 capacity and connectivity improvements at Duke's Cut canal and railway bridges that will widen the existing A40 bridges over the railway and canals and/or provide new pedestrian/cycle bridges adjacent to these existing A40 bridges. These works will create space for a new eastbound bus lane and an improved cycleway along this section of the A40. It further includes a cycleway link between the A40 and the National Cycle Network (NCN) 5.

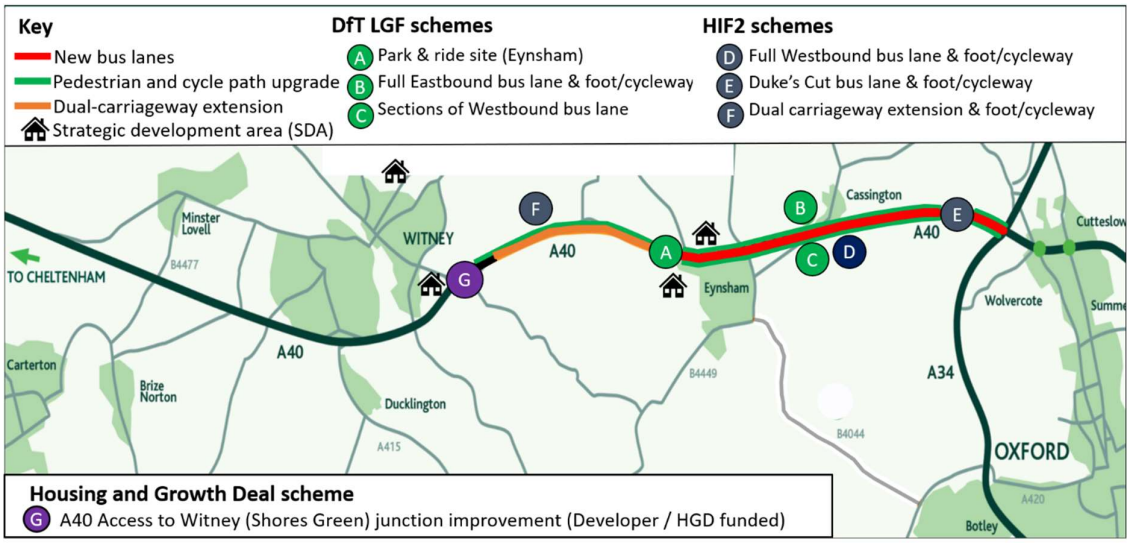


Figure 1-2 A40 Corridor Schemes
Source: Adapted from A40 STP2; Oxfordshire CC - © Crown copyright and database right 2020

1.1.14 The A40 Smart Corridor scheme was originally envisioned to be delivered as a second phase of works after the completion of A40 STP2. However, following the award of the HIF funding OCC is now proposing to combine elements of the STP2 and Smart Corridor Schemes. This will ensure scheme benefits are maximised; deliver cost and programme efficiencies and minimise disruption during construction.

1.1.15 Figure 1-3 shows the evolution of the A40 Corridor Strategy and Schemes. A key scheme within the A40 corridor improvement programme is the Duke's Cut scheme, consisting of the following elements:

- Capacity and connectivity improvements over the four structures at Duke's Cut (Earls Culvert, Duke's Cut Canal Bridge, Wolvercote Canal Bridge and Wolvercote Railway Bridge) to facilitate the extension of an eastbound bus lane over the bridges;

[1] *See Appendix B for further information on the proposed Eynsham Park and Ride*

- Eastbound and westbound bus priority lane are extended by widening the A40 Duke's Cut canal and railway bridges, prioritising bus rapid transit at this "pinch point"; and
- Cycling infrastructure, which will provide a safe and easy means for cyclists to access the National Cycle Network (NCN Route 5) from the A40 Eynsham-Oxford cycleway, providing a direct, off-road cycling route between Oxford city centre and Witney.

1.1.16 The Duke's Cut scheme is likely to be implemented in parallel with the other A40 corridor schemes set out above.

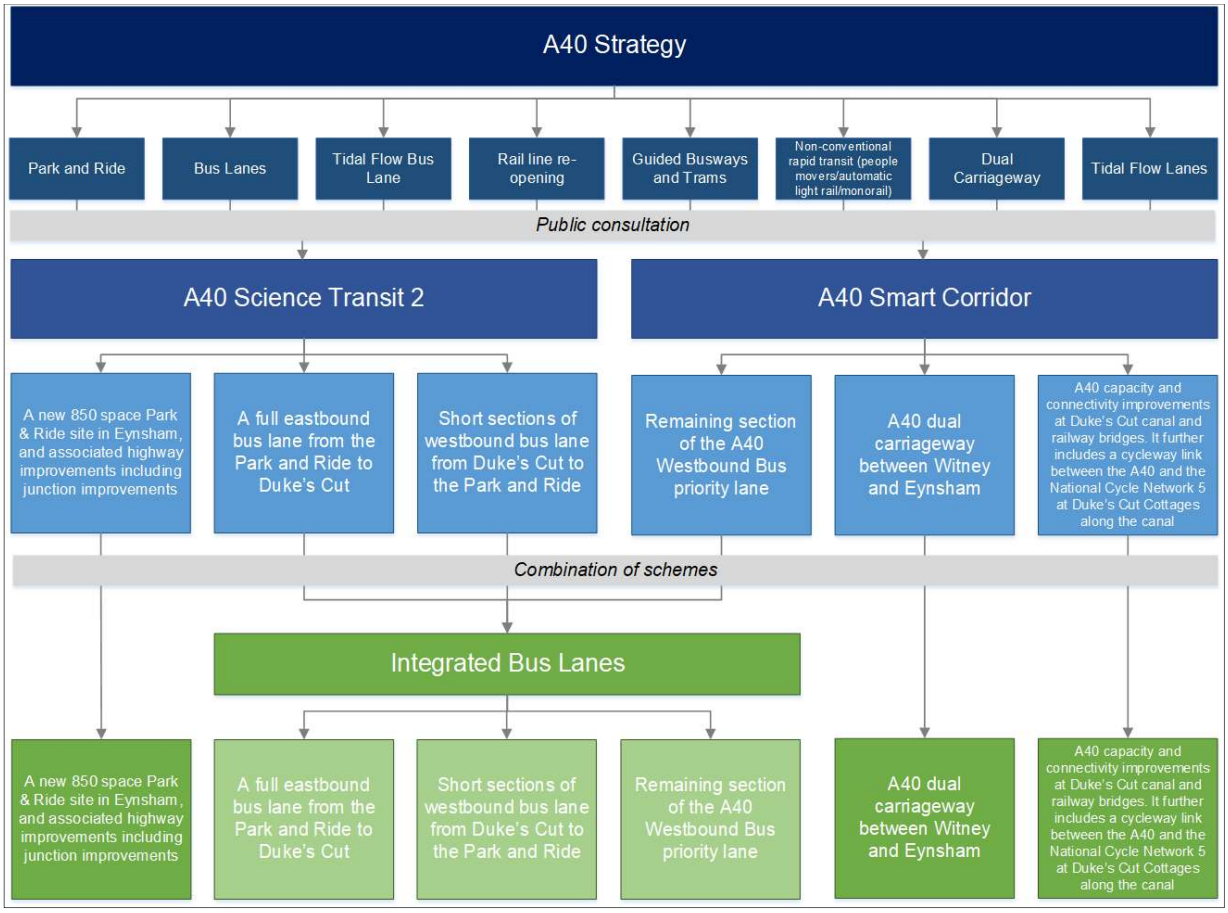


Figure 1-3 A40 Strategy and Scheme Evolution

1.2 Scheme Development

1.2.1 AECOM has been commissioned by Oxfordshire County Council (OCC) to carry out an optioneering exercise of design options to deliver the Duke's Cut scheme and help recommend a preferred option to take forward to preliminary design. An addendum to this OAR has been developed to document the optioneering of the shared use facility to link the A40 with NCN5 (included in Appendix F). In addition, two further optioneering exercises have been commissioned for following the A40 Smart Corridor schemes:

- The Integrated Bus Lanes scheme; and
- An extension of the A40 dual carriageway between Witney and Eynsham.

1.2.2 These optioneering exercises will be presented as three Option Assessment Reports (OARs). These reports will include option development and sifting in accordance with Department for Transport (DfT) Early Assessment and Sifting Tool (EAST) Guidance.

1.2.3 The Park and Ride scheme will be delivered in parallel with the other A40 corridor schemes.

1.2.4 The impact of COVID-19 includes uncertainty in travel demand, public transport usage, active travel mode share and others. Some of the impacts are likely to be short term but others may alter the overall travel pattern over the long term. To account for these uncertainties relevant/recent COVID-19 related policies and literature have been reviewed briefly and their relevance considered to the A40 schemes, such as the DfT's Gear Change: A bold vision for cycling and walking report (2020)[2] and its implications on schemes design.

1.3 Report Purpose

1.3.1 This Option Assessment Report describes the option development process of the Duke's Cut scheme, setting out the decision-making process that was used to reach the shortlisted options to be taken forward to public consultation and for further assessment.

1.3.2 This report sets out the study context; provides details of the adopted approach; discusses current and future conditions, and objectives for the study; provides details of the long list of options to address issues on the A40 corridor; sets out the criteria for the initial sifting of the long list; and summarises the results of the initial sifting (which will be updated over time based on workshops, consideration of stakeholder views, and updated modelling).

1.4 Report Structure

1.4.1 This Option Assessment Report follows the DfT Transport Appraisal Guidance (TAG), as illustrated in DfT's Transport Appraisal Process (TAP)[3] (Figure 1-4). It provides a summary of steps one to six in Stage 1 of the appraisal process – Option Development – including the review and summary of the work to date.

[2] DfT (2020). https://www.gov.uk/government/publications/cycling-and-walking-plan-for-england
[3] Department for Transport (2018) Transport Analysis Guidance: The Transport Appraisal Process. *https://www.gov.uk/government/publications/webtag-transport-appraisal-process-may-2018*

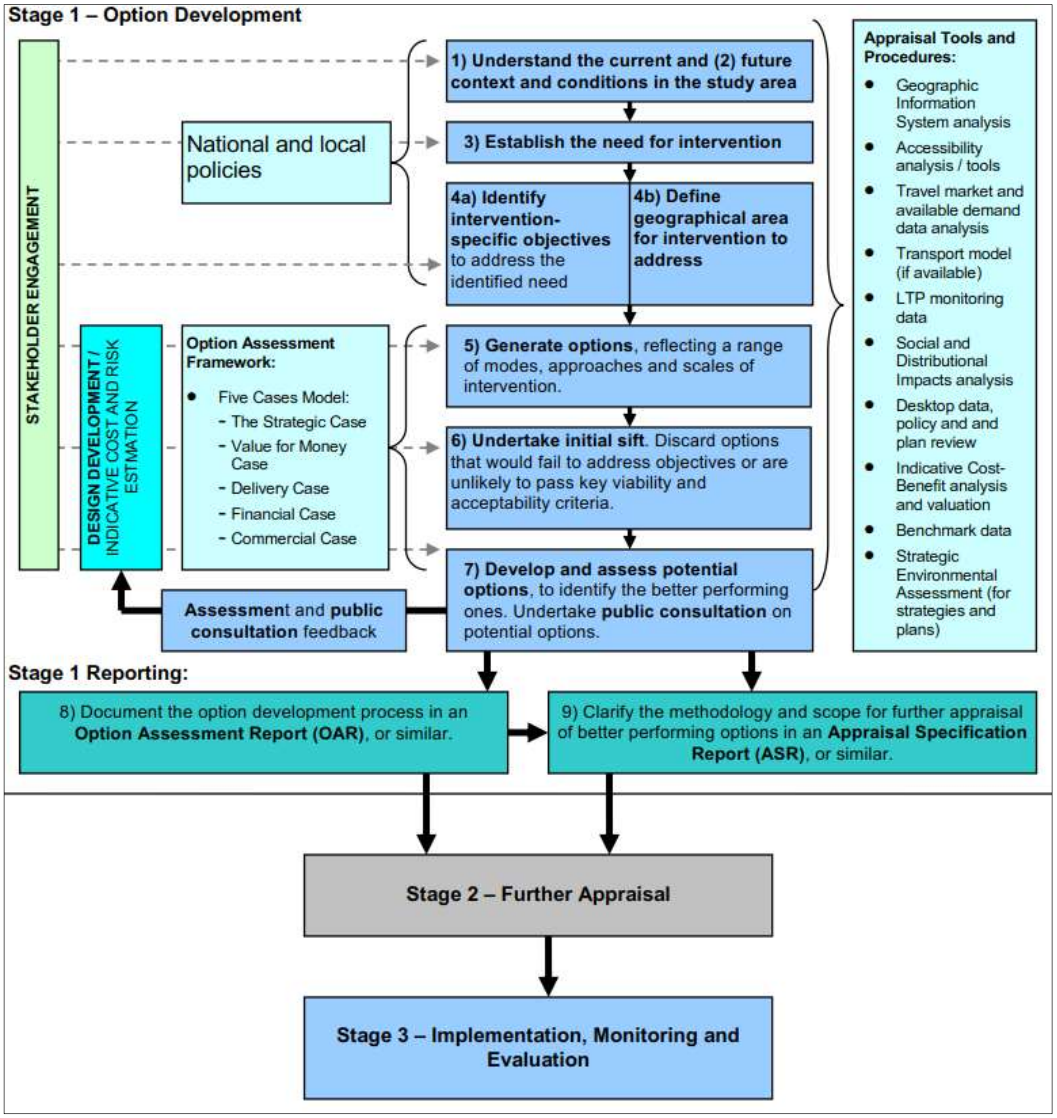


Figure 1-4 DfT's Transport Appraisal Process
Source: Transport Appraisal Process (DfT, 2018)

1.4.2 Following this introductory chapter, this report is structured as follows:

- Chapter 2: Policy Context
- Chapter 3: Current and Future: Context and Conditions
- Chapter 4: Development of Scheme Objectives
- Chapter 5: Option Development and Sifting
- Chapter 6: Detailed Sift
- Addendum for the NCN5 Link (Appendix F)

2 Policy Context

2.1 Introduction

2.1.1 A review of relevant national, regional and local policies (Table 2-1) was undertaken to ensure the proposed scheme aligns with broad policy goals and to confirm whether existing policies and programmes are in favour of interventions in these circumstances, and of a similar type and scale. This review has informed the development of the scheme objectives (see Chapter 4).

Table 2-1 Some of the key reviewed policy documents

National			
National Planning Policy Framework, Ministry of Housing, Communities & Local Government	Industrial Strategy White Paper, Department for Business, Energy & Industrial Strategy	Transport Investment Strategy; Gear Change: A bold vision for cycling and walking report; A Better Deal for Bus Users; Decarbonising Transport, Department for Transport	Housing White Paper – Fixing Our Broken Housing Market, Department for Communities and Local Growth
Regional			
Strategic Economic Plan for Oxfordshire 2016, Oxfordshire Local Enterprise Partnership	Connecting Oxfordshire: Local Transport Plan 2015-2031, Oxfordshire County Council	Oxfordshire Infrastructure Strategy, Oxfordshire County Council	
Local			
West Oxfordshire Adopted Local Plan (2011-2031), West Oxfordshire District Council	Oxford Transport Strategy; Bus and Rapid Transit Strategy; Active and Healthy Travel Strategy; A40 Corridor Strategy, Oxford Park and Ride Strategy. Oxfordshire County Council	Oxfordshire Cotswolds (Salt Cross) Garden Village Area Action Plan; Salt Cross Village Transport Strategy; Eynsham Neighbourhood Plan; and other local housing developments related policies.	

2.2 National Policies

2.2.1 At a national level, Government policy endeavours to balance the need to deliver economic growth for a growing population, increased housing demand and increasingly congested transport networks with a longer-term vision of a sustainable and carbon neutral economy, making better use of available capacity and technology. These are reflected in the National Planning Policy Framework (NPPF), Industrial Strategy White Paper, the Housing White Paper, and the DfT's Transport Investment Strategy.

2.2.2 The **NPPF** seeks to promote sustainable transport and states that significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes.

2.2.3 There are currently proposals to create a **Major Road Network (MRN)**[4], and the A40 corridor would be part of this network. The proposals outline five central policy objectives: reduce congestion, supporting economic growth and rebalancing, support housing delivery, support all road users, and support the Strategic Road Network (SRN). The MRN would create a new funding stream to raise the standards of economically and regionally important roads in England (such as the A40 corridor) and seamlessly connect and complement the SRN. The Duke's Cut scheme, through removal of key pinch points on the A40, will enable the route to become a key asset to the MRN.

2.2.4 The **Industrial Strategy** states that the availability of high-quality infrastructure is essential for continued growth and prosperity. The Strategy's vision for a transformed economy is centred around productivity, and infrastructure is identified as one of the five foundations of this, such as the Duke's Cut scheme which is aimed to prioritise bus travel.

2.2.5 The **Housing White Paper** – Fixing Our Broken Housing Market (2017) sets out initiatives that strive to reach a step-change in housing supply in England. There are four key proposals contained within the housing strategy:

- Planning for the right homes in the right places;
- Building homes faster;
- Diversifying the market; and
- Helping people now.

[4] Proposals for the Creation of a Major Road Network (https://www.gov.uk/government/consultations/proposals-for-the-creation-of-a-major-road-network, 2017)

2.2.6 The role of transport in supporting local growth is highlighted in the **DfT's Transport Investment Strategy**, which states that transport investment must seek to create a better and more reliable transport network in order to build a stronger, more balanced economy, enhance productivity and respond to local growth priorities. Its objectives are to:

- Create a more reliable, less congested, and better-connected transport network that works for the users who rely on it;
- Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities;
- Enhance the global competitiveness by making Britain a more attractive place to trade and invest; and
- Support the creation of new housing (the Housing White Paper recognises transport infrastructure as one of the keys to unlocking development and delivering places where people want to live).

2.2.7 The **Gear Change: A bold vision for cycling and walking** report (2020) aims to see a step-change in cycling and walking in the coming years. The report notes that increasing cycling and walking can help tackle some of the most challenging issues faced by society: improving air quality, combatting climate change, improving health and wellbeing, addressing inequalities and tackling congestion. This will help create better connected, healthier and more sustainable communities. This document is accompanied by the DfT's new 'Cycle Infrastructure Design: Local Transport Note 1/20'. Whilst the 'Gear change' sets out the DfT's aims and vision for the future, the more detailed LTN 1/20 document provides the practical advice to achieving the stated policy aims. The main shift between LTN 1/20 and previous design guidance is the establishment of core design principles (20 design principles). This is especially pertinent in light of the COVID-19 restrictions and its future impacts on travel pattern (which profoundly affected the way individuals live, work and travel and increased the desire to be more active). As the Duke's Cut scheme includes cycling infrastructure to access NCN Route 5 from the A40 cycleway, this design guidance will be referred to.

2.2.8 **A Better Deal for Bus Users**[5] highlights the key role which bus play in the transport system and sets aside £220 million to provide bus services which meet the needs and demands of the public. As part of this, bus priority is identified as a key tool to improve bus services. All new road investments in England which receive central government funding will now be required to either support bus priority measures or explain why bus priority is not necessary. There will be further support for local authorities to ensure they have the information they need to effectively prioritise buses.

2.2.9 **Decarbonising Transport: Setting the Challenge**[6] identifies that climate change is the most pressing environmental challenge of our time, and to meet the target to achieve 'net zero' greenhouse gas (GHG) emissions by 2050, transport has a vital role to play. As such, the Transport Decarbonisation Plan (TDP) will set out in detail how the significant reductions in emissions needed across all modes of transport to achieve carbon budgets and net zero emissions across every single mode of transport by 2050. There have been previous strategies to reduce GHG emissions in individual transport modes, the TDP will take a coordinated, cross-modal approach to deliver the transport sector's contribution. The report looks at both how private vehicles can achieve low emissions, but also looks at the role of freight. This is needed in parallel to the rapid development and deployment of clean technology. The TDP is to be released in Spring 2021. This policy document further recognises the importance of planning for sustainable communities and providing a transport system which promotes increased levels of sustainable and active travel, which the Duke's Cut scheme assists with.

2.3 Regional Policies

2.3.1 OxLEP's **Strategic Economic Plan** (SEP) for Oxfordshire (2016) sets out a vision for Oxfordshire to be a vibrant, sustainable, inclusive, world leading economy, driven by innovation, enterprise and research excellence. Whilst being strong in many areas, including innovation, enterprise and research, the SEP also refers to challenges around the lack of affordable housing, increasing congestion, sustainability and inclusion, and the need for greater resilience. The SEP is clear that the overall priority for Oxfordshire's places is to plan simultaneously for both jobs and housing growth, putting in place the infrastructure required for both, whilst also protecting and where possible enhancing environmental quality and social inclusion. These priorities are consistent with Government policy and the objectives set out in the DfT Transport Investment Strategy but adapted to suit Oxfordshire's own socio-economic and environmental challenges.

2.3.2 In terms of connectivity, the SEP sets out key actions, a number of which are relevant to the A40 corridor, in particular:

- Support for the implementation of the Oxfordshire Local Transport Plan 2015-2031 to address congestion and to identify ways to avoid exacerbating existing problems due to growth;
- Ensure, through the planning process, that connectivity improvements are linked to the scale and location of planned growth; and
- Implement the Oxfordshire Active and Healthy Travel Strategy.

[5] A Better Deal for Bus Users (https://www.gov.uk/government/publications/a-better-deal-for-bus-users/a-better-deal-for-bus-users, 2020)
[6] Decarbonising Transport: Setting the Challenge (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/932122/decarbonising-transport-setting-the-challenge.pdf, 2020)

2.3.3 OxLEP has also produced the **Oxfordshire Local Industrial Strategy (LIS)** and accompanying **Oxfordshire Investment Plan**. The LIS responds to the government's UK Industrial Strategy and sets out a bold and ambitious vision for Oxfordshire to be one of the top three global innovation systems by 2040. The LIS aims to deliver clean and sustainable transformative growth across Oxfordshire, through focussing on innovation, people (the Oxfordshire Social Contract) and improvements to the physical, digital, financial, knowledge and social infrastructure. The Oxfordshire Investment Plan takes forward the ambitions set out in the LIS, translating policy ideas and commitments to a transformational programme for action and delivery. In the LIS, the severe congestion on the A40 is noted as a key constraint holding Oxfordshire back. In addition, the Oxfordshire Investment Plan identifies the A40 Science Transit and A40 Smart Corridor as part of the 'Infrastructure Pillar' and as such are critical to the success of the county. Therefore, across these two interlinked documents there is a clear and consistent support for the Duke's Cut scheme.

2.3.4 The **Oxfordshire's Housing and Growth Deal**[7] is an agreement between the national government and in the Oxfordshire area councils (Cherwell District Council; Oxford City Council; Oxfordshire County Council; South Oxfordshire District Council; Vale of White Horse District Council; West Oxfordshire District Council) and the Local Enterprise Partnership (OxLEP), to plan and support the delivery of 100,000 new homes between 2011 and 2031. The A40 Smart Corridor supports this ambition by unlocking Local Plan housing growth, which contributes to the Oxfordshire Housing and Growth Deal (HGD).

2.3.5 The **Oxfordshire Infrastructure Strategy** (OXIS) recognises the A40 corridor as a Growth Corridor with key strategic sites along it. The OXIS highlights infrastructure requirements to 2040 and identifies the need to a prioritise and develop a long-term strategy to address congestion on the A40. The Duke's Cut scheme will help prioritise bus travel along the A40.

2.3.6 The **Connecting Oxfordshire Local Transport Plan 4** (LPT4, 2016), is the overarching local plan for transport in Oxfordshire. As part of the plan it includes the Science Transit Strategy, Rail Strategy, Bus and Rapid Transit Strategy and the Active & Healthy Travel Strategy, the latter two of which are discussed further below. The LTP4 is part of the Connecting Oxfordshire series of documents, which includes the A40 Strategy, comprising the A40 Science Transit Phase 2 scheme and the A40 Smart Corridor schemes. LTP4 identifies the problem of "acute traffic congestion" on the A40, and the need for improved public transport. Without improvements to improve public transport infrastructure, the LTP4 predicts that traffic conditions will deteriorate significantly. Chronic A40 congestion, which will likely improve through the proposed scheme, is identified as a means of reducing delays. LTP4 promotes the use of low and zero emission forms of transport including trials of electric buses and supports further pilots, where appropriate. It is expected that new public transport vehicles will conform to high environmental standards.

2.4 Local Policies

2.4.1 The **Oxford Transport Strategy** (OTS) sets out OCC's transport vision and strategy up to 2035 for Oxford as part of the LTP4. The OTS identifies that the number of vehicles entering the city centre is forecast to grow by over 40% if left un-checked, putting substantial strain on the historic core. The OTS identifies a number of road links and junctions that experience substantial delays, including the A40, particularly during the morning peak period. It states that it is necessary to intercept car trips further away from the city and identifies a number of Park and Ride sites including at Eynsham. It is proposed in the OTS to introduce a city-wide Workplace Parking Levy (WPL) to gain control of the use of private cars as a means of travelling to work, which may help to achieve a greater use of public transport and the A40 Smart Corridor scheme. The OTS vision for mass transit, rail, rapid transit and buses and coaches is to provide '*residents and visitors with a connected, modern mass transit network which provides a cheaper, faster and more reliable travel option than the private car for the majority of journeys to and between destinations in the city*'. The Duke's Cut scheme will lead to improvements in bus journey time and reliability, and therefore encourage use of public transport.

2.4.2 The **Bus and Rapid Transit Strategy** (2016) has been developed to complement the LTP4 and the main elements of the strategy include integration of the bus network and provision of accessible, high quality infrastructure. The strategy also includes development of a mass rapid transit system and routes between Oxford and proposed Park and Ride sites; aims to tackle congestion and delays; and development or upgrade of new high quality premium urban and interurban services. The **Oxford Park and Ride Strategy** (2016) is located within the Bus and Rapid Transit Strategy, in which it is identified that Oxford's Park and Ride system is a key element affecting the City and County's bus system and changes to the Park and Ride strategy and system will have a considerable impact on the planning operation and attractiveness of the public transport network. The Duke's Cut scheme is in line with these two policies, by extension of the bus lane through prioritising bus travel.

2.4.3 The **Active and Healthy Travel Strategy** (2016) also builds on the LTP4 with the aim to 'contribute to reducing pressure on the road network, contribute to economic growth and the reduction of emissions, quality of life and health, and link active travel with bus and rail options by enabling sustainable door to door journeys combining cycling or walking with public transport'. The strategy outlines that cycling alone cannot replace the car for long journeys but does state that the combination of cycling and public transport can create more door-to-door sustainable trips. There is also encouragement of walking and to prioritise funding available for the best value for money investments for walking. The Duke's Cut scheme will improve active travel infrastructure.

2.4.4 **West Oxfordshire District Council** (WODC) adopted their **Local Plan (2011 – 2031)** in 2018, noting it was underpinned by a general presumption in favour of 'sustainable development'. Once adopted, applications for planning permission must be determined in accordance with the plan unless material considerations indicate otherwise; and that they would work with OCC (as the highways authority), developers, local councils, bus and rail operators and other voluntary and community sectors to:

- Increase the use of bus, rail and community transport through the provision of improved services, facilities and information including specific schemes identified in the Local Transport Plan (Connecting Oxfordshire) and Infrastructure Delivery Plan (IDP); and
- Provide safe and convenient travel within and between the network of towns and villages in West Oxfordshire, particularly for pedestrians, cyclists and other vulnerable road users, users of public and community transport including specific schemes identified in the Local Transport Plan and IDP.

2.4.5 The Local Plan highlights the need to provide access to high quality public transport facilities and focus on new developments in areas that have good access to sustainable transport. As part of the Local Plan, the West Oxfordshire District Council IDP has been adopted which identifies the infrastructure which is needed to support future growth in West Oxfordshire until 2031. The A40 Smart Corridor scheme is included in the IDP (under the names A40 Science Transit and A40 Longer Term Strategy).

2.4.6 The Local Plan contains several Core Policies which are related to the Duke's Cut scheme:

- The West Oxfordshire Local Plan identifies transport in West Oxfordshire as an issue of critical importance. It is recognised that the level of commuting between West Oxfordshire and Oxford is putting significant pressure on the A40 resulting in daily occurrences of congestion;
- The Local Plan states that A40 problems are a major constraint to inward investment into the District, and relieving congestion through investment in transport infrastructure is important in terms of public amenity and air quality, and essential to unlocking future housing provision and sustainable economic growth. The commitment to deliver the Local Plan is underpinned by critical infrastructure delivery. The A40 Smart Corridor scheme is defined as "critical" within the Local Plan IDP;
- The Local Plan's Policy T1 states that the council will continue to work in partnership with Oxfordshire County Council in relation to securing improvements to the A40 between Witney and Oxford. This will include longer term improvements, including the provision of a westbound bus lane from Oxford to Eynsham and dualling of the A40 between Witney and Eynsham[8];
- Highway Improvement Schemes, which includes West Oxfordshire District Council's commitment to work in partnership with OCC;
- Oxfordshire Cotswolds (now called Salt Cross) Garden Village: Strategic Location for Growth (this is A40 Smart Corridor dependent development); and
- Eynsham-Woodstock Sub-Area Strategy: anticipates delivery of over 5,500 homes in the sub-area. It recognises transport as a key issue in the sub-area, specifically the significant congestion between Eynsham and Oxford during peak hours[9].

2.4.7 Furthermore, WODC's Local Plan seeks to provide for at least 15,950 homes and identifies four Strategic Development Areas (SDA), of which three are along the A40 Corridor and the Duke's Cut scheme will help support these (Figure 2-1):

- East Witney (450 homes; SDA site);
- North Witney (1,400 homes; SDA site);
- Oxfordshire Cotswolds (now called Salt Cross) Garden Village (2,200 homes)[10];
- West Eynsham (1,000 homes; SDA site);
- A further 100 homes would be delivered at two large sites within Carterton; and
- Overall the A40 corridor in West Oxfordshire will see an increase of around 10,000 homes.

[7] Oxfordshire Housing and Growth Deal (2018, https://www.gov.uk/government/publications/oxfordshire-housing-deal)
[8] HIF2 Business Case Submission, OCC (2019)
[9] *Eynsham P&R modelling report_with_appendices_18032019.pdf*; https://www.westoxon.gov.uk/media/1912795/eynsham-woodstock-sub-area.pdf
[10] Oxfordshire Cotswolds (now called Salt Cross) Garden Village is proposed as a 'Strategic Location for Growth' (SLG) in the WODC Local Plan.

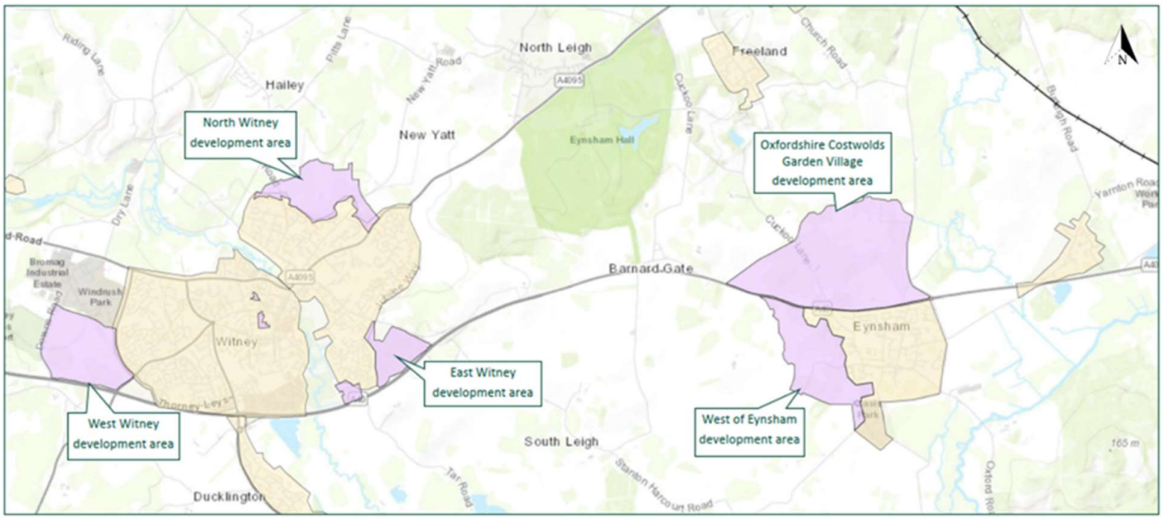


Figure 2-1 Key Strategic Development Areas at Eynsham and Witney
Source: A40 Strategy – Consultation (OCC, 2019)

2.4.8 Furthermore, as part of the 2019 **HIF Bid** for the A40 Smart Corridor scheme it was demonstrated that the A40 Smart Corridor, which includes the Duke's Cut scheme, has a clear alignment with local planning policies. For example, it is highlighted that the scheme will help achieve the policies, and housing targets, identified in the WODC Local Plan. The scheme is also in alignment with county-wide policies, such as the LTP4 and OXIS. The HIF Bid provided solid and clear justification for the scheme, which as mentioned above, led to funding being awarded for the A40 Smart Corridor, which includes the Duke's Cut scheme.

2.4.9 **The Salt Cross Garden Village Area Action Plan (AAP)** (pre-submission draft, August 2020) establishes a vision for Salt Cross and will be used alongside the Local Plan and Eynsham Neighbourhood Plan to determine future development proposals. WODC have published the final pre-submission draft version of the AAP which has been submitted to the Secretary of State for independent examination.

2.4.10 The Salt Cross Garden Village AAP also states that sustainable travel options are required to enable delivery of the strategic housing and employment development sites proposed along the A40 corridor in the West Oxfordshire's Local Plan, including Salt Cross. In addition, modelling undertaken in support for the AAP demonstrates that development at Salt Cross will have an impact on the A40 and surrounding routes and that there will be remaining problems on the network during peak periods. Therefore, it is imperative that development at Salt Cross supports the 'Connecting Oxford' plans and encourage modal shift.

2.4.11 It is highlighted as part of the AAP that Salt Cross will benefit from the sustainable transport infrastructure along the A40 Corridor including eastbound and westbound bus lanes; improved cycling and walking connections; capacity improvements between Witney and Eynsham; and a new Park & Ride site located within the garden village site which will form the focus of a new 'Sustainable Transport Hub'. It is important to ensure that the active and healthy travel initiatives associated with Salt Cross are effectively integrated with the A40 Corridor schemes. The A40 Corridor improvement schemes are included in the policies of the Salt Cross AAP, as outlined below:

- Policy 14 – Active and Healthy Travel
    - Upgraded A40 footway/ cycleway
    - A40 Duke's Cut Bridge works
- Policy 15 – Public Transport
    - A40 Eastbound bus lanes: Between Eynsham Park & Ride and Wolvercote roundabout (including widening and/ or strengthening works to the bridge structures at Duke's Cut).
    - A40 Westbound bus lanes: Between Eynsham Park & Ride and Duke's Cut Bridges.
    - Adjustments to A40 junctions and the provision of bus gates to give priority to buses joining the general traffic lane where continuous bus lanes cannot be provided.
    - Improved bus stop provision.
- Policy 17 – Road Connectivity and Access
    - Extension of the existing A40 dualling (between Witney and the new Park & Ride access junction).

- Improvements to the Lower Road/ A40 roundabout.
- Highway and junction capacity improvements along the A40 as part of the A40 Corridor improvements.
- Provision of enhanced facilities at the proposed Eynsham Park & Ride.

2.4.12 **A Salt Cross Garden Village Transport Strategy** (July 2020) has been developed as part of the Salt Cross Area Action Plan. The SCGV acknowledges that car dependent settlements based around the needs of car users must be avoided as this undermines the benefits of the A40 corridor schemes and results in rat running through the Garden Village and surrounding villages. In order minimise this car use, opportunities to achieve a modal shift towards active travel and public transport need to be created. This will be done through creating movement and connectivity that achieves the following:

- A sustainable community where walking and cycling are the prime modes of choice;
- Digitally connected developments that enable work from home or work from local hub;
- Development which by its best practice design principles, facilities and encourages active and healthy travel;
- Development that supports the A40 Corridor improvements; and
- A future proofed settlement that can respond to technological and societal changes.

2.4.13 The A40 Corridor Improvements are outlined as part of the Transport Strategy, highlighting the importance of the improvements for the Salt Cross Garden Village. The Garden Village can support the A40 Corridor Improvements, and the A40 Corridor Improvements will provide the Garden Village with enhanced sustainable travel options. The Garden Village Development will require a new roundabout (the 'Western Development Roundabout') to be delivered, located on the A40 to the west of the proposed Park & Ride access junction. This development required infrastructure will need to be fully integrated with the A40 Dualling scheme, one of the three A40 Corridor Improvement schemes.

2.4.14 In addition, the **Eynsham Neighbourhood Plan 2018-2031**[11] (2020) notes that the Eynsham village is the fourth largest community in West Oxfordshire, which makes it bigger than some small nearby towns. It highlights the congestion along the A40 in peak periods. Policy ENP7 Sustainable Transport, supports WODC Policy T1 outlines that new development shall have safe access to local transport networks by private car and public transport. This includes a preference for developments to be accessed by vehicles by existing main roads (A40, B4044 and B4449) and not using Eynsham village roads. Furthermore, encouragement shall be given to the use of alternatives to private cars, such as the proposed Eynsham Park and Ride. Importance is placed on improved connectivity to and within the village, as well as reducing the severance caused by the A40. In addition, policy ENP5 Sustainability: Climate Change highlights the particular support will be given for proposals that help meet the intentions of the Climate Change 2008. This reaffirms the policy goals of the WODC Local Plan to address the climate emergency.. Overall, it is clear that there is alignment with the Duke's Cut scheme and the Eynsham Neighbourhood Plan as it will provide enable improved bus services to operate along the A40 through the Duke's Cut pinch point, encouraging use of the proposed Eynsham Park and Ride thereby reducing congestion along the A40 north of Eynsham.

2.4.15 A table showing the alignment of each policy document considered above and the Duke's Cut scheme can be found in Appendix E.

Relevance to the Duke's Cut scheme

The policies largely focus on infrastructure investment, promoting sustainable travel, delivering homes and jobs, reducing congestion, improving air quality and health.

The investment in the Duke's Cut scheme will prioritise bus travel and help support the Integrated Bus Lane scheme along the A40. This will improve bus journey times, journey time reliability, increased capacity and support sustainable transport. This will help support housing and economic growth along the A40 corridor. It is a key piece of infrastructure in Oxfordshire, especially if brought forward in conjunction with the Integrated Bus Lanes scheme and the A40 Dualling scheme. As such it will help achieve many of the strategic goals as outlined in the OCC LTP4 and the WODC Local Plan. The provision of a cycle path connection to NCN Route 5 will also encourage active travel between Eynsham and Oxford, which will have health benefits. Local Plan allocations show there to be a significant amount of proposed development along the A40 Corridor, which need to be considered in conjunction with suitable transport schemes and mitigation. For example, the emerging planning documents related to the Salt Cross Garden Village highlight the importance of sufficient transport capacity along the A40 Corridor and highlight the importance of the Duke's Cut scheme specifically. Overall, across the local, regional and national policies

[11] https://eynsham-pc.gov.uk/variable/organisation/173/attachments/Eynsham-Neighbourhood-Plan-2018-2031-Referendum_FINAL.pdf

considered there is expected to be strong support for the Duke's Cut scheme as it will help achieve many of these policies.

3 Current and Future: Context and Conditions

3.1 Introduction

3.1.1 This chapter of the report provides a summary of key contextual factors influencing the local area and a review of the current and forecast conditions. It reviews the existing data and previous work conducted in order to identify key challenges in the study area, which would help develop the scheme objectives and, subsequently, a suitable scheme to meet those objectives. The scheme objectives (see Chapter 4) will be critical in later stages to assess and sift options, as well as becoming a key component against which the final proposed solution will be appraised and, following implementation, evaluated.

3.1.2 Appendix A lists the existing studies, strategies and data that have been used to understand the local context. Given the significant amount of work already undertaken to understand and assess current and future issues in the area, as well as potential solutions, only a summary of the most pertinent points are presented in this chapter.

3.2 Geographic Context

3.2.1 West Oxfordshire is one of the five districts which make up the county of Oxfordshire. Its largest settlement is Witney but other significant centres in the district include Carterton and Chipping Norton. The district spans the area between the Oxford Green Belt and the Cotswolds Area of Outstanding Natural Beauty. Its southern boundary is marked by the River Thames and a number of the Thames' major tributaries (e.g. the Glyme, Windrush and Evenlode) flow through the district (as shown in Figure 1-1 in Chapter 1).

3.2.2 The A40 forms a major east-west route across the south of the district. It forms the Primary Route between Oxford and Cheltenham as well as being part of the long-distance route between London and south-west Wales. The road passes close to Witney and Carterton as well as the smaller settlements of Eynsham and Burford. The A40 is also signed as the advisory route for lorry traffic between Oxford and Eynsham to encourage these vehicles to avoid the Air Quality Management Area in Chipping Norton (located to the north of Witney on the A44).

3.2.3 The A40 forms the most direct transport link between Oxford and Witney although there are less suitable alternatives using A4095/A44 and A415/B4449/B4044; the A4095/A44 also forms an alternative route for bypassing the A40 and Oxford and accessing the M40 for longer distance traffic. The B4044 passes over the Swinford Toll Bridge which has limited capacity and is subject to queues at peak hours; the A4095 passes through the centre of Witney where there are long-standing capacity and environmental issues. Currently nearly all public transport connections between Oxford and Witney also use the A40, at least on the section between Witney and Eynsham. Some vehicle traffic between Carterton and Oxford travels via Bampton (B4449/A415) to the A420 to avoid the A40.

3.3 Current Conditions

3.3.1 As part of the initial stage of option development, it is important to understand the current and future context and conditions in the study area, including the main issues and the proposals that have been put forward in recent years to address these.

3.3.2 The local context and, where appropriate, current and future trends for the following are discussed in this section:

- Socio-economic context;
- Existing highways and public transport infrastructure;
- Cycle routes and public rights of way;
- Travel patterns and modal share;
- Collisions;
- Traffic flows and congestion issues; and

- Environment.

Socio-economic Context

3.3.3 Selected socio-economic indicators are presented in Table 3-1. West Oxfordshire has a population of 110,600, constituting approximately 16% of Oxfordshire's population.

3.3.4 The district has higher levels of employment compared to the averages in Oxford, Oxfordshire, the South East and England. The ratio of jobs to population is 0.86, which is comparable to the region and England as a whole, while being significantly lower than the employment opportunities provided in Oxford. This indicates a requirement for out-commuting to the regional centre or further afield for residents in the district, thus transport infrastructure schemes (such as the Duke's Cut) could help improve accessibility and agglomeration benefits.

3.3.5 While the proportion of the population with qualifications at NVQ4 and above is slightly lower than the average in Oxford, it is higher than the averages in the county, the South East region, and England.

3.3.6 Weekly pay in West Oxfordshire is approximately 8% higher than the England average. However, house prices are approximately 28% higher than the England average, although lower than the county average.

Table 3-1 Socio-economic Metrics

Metrics		West Oxfordshire	Oxford	Oxfordshire	South East	England
Population (2019)	All people (2019)	110,600	152,500	691,700	9,180,100	56,287,000
	Population aged 16 – 64	59.8%	69.6%	62.5%	61.2%	62.4%
	Qualifications at NVQ4 and above	53.7%	57.9%	50.9%	43.4%	40.0%
Employment (Jul 2019 – June 2020)	Economically active – in employment	79.8%	79.5%	82.5%	79.3%	76.2%
	Economically active – unemployed	2.8%	3.3%	2.5%	3.4%	4%
	Economic inactivity*	17.7%	16.5%	15.2%	17.8%	20.5%
	Part time proportion	34.8%	33.1%	32.3%	33.2%	32%
Job Density (2018)	Ratio jobs: population aged 16-64	0.86	1.33	0.67	0.88	0.87
Employee Jobs (2019)	The 2 largest employment sectors	15.2%	28.9%	15.7%	16.4%	15.4%
		Wholesale And Retail Trade; Repair Of Motor Vehicles And Motorcycles	Education		Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	
		10.9%	17.4%	14.6%	12.8%	12.8%
		Manufacturing; Accommodation and Food Service Activities	Human Health and Social Work Activities	Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	Human Health and Social Work Activities	
Gross Weekly Pay (by residence) 2020	Full-Time Workers	£632.10	£666.60	£662.00	£631.80	£589.80
	Ratio compared to England	1.07	1.13	1.12	1.07	1.00
House Prices	Average House Price (Dec. 2020)**	£289,676	£391,738	£309,142	£271,016	£224,650
	Ratio compared to England	1.29	1.74	1.38	1.21	1.00

Source: NOMIS, unless stated otherwise

**Student, Looking after family/home, Temporary sick, Long-term sick, Discouraged, Retired, Other*

***UK House Price Index: Average price for first-time buyers*

3.3.7 Figure 3-1 shows the indices of Multiple Deprivation at a Lower Layer Super Output Area (LSOA) around the A40 corridor. Generally, the A40 corridor bypasses areas that would not be considered either the most or least deprived areas in the country. However, the A40 corridor does connect some of the least deprived neighbourhoods nationally, such as neighbourhoods within the wards of Witney East in Witney; Eynsham and Cassington in Eynsham; and Wolvercote and Summertown in Oxford. Similarly, the A40 corridor also connects some of the most deprived neighbourhoods, such as neighbourhoods within the wards of Northfield Brook and Carfax in Oxford. A range of domains are driving this deprivation, such as crime, health, and education.

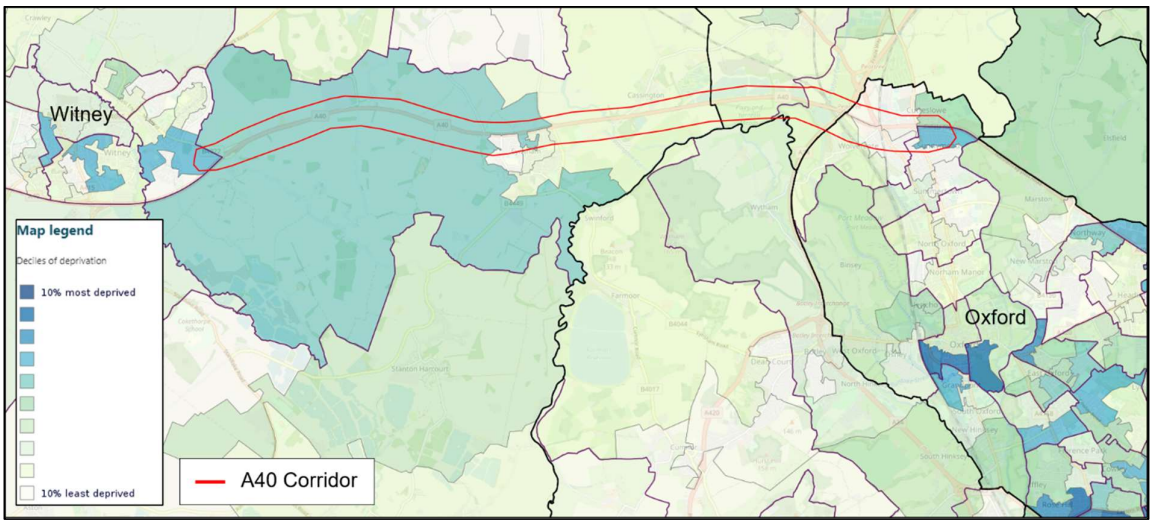


Figure 3-1 Indices of Multiple Deprivation

Source: Ministry of Housing, Communities & Local Government (2019)

Existing Highways and Public Transport Infrastructure

3.3.8 Figure 3-2 shows the road network in the area around the A40 corridor. The A40 is an important long-distance route linking central and east England with the south west and south and west Wales. It is also the main arterial route in West Oxfordshire linking the growing towns of Witney and Carterton with Oxford and the wider country. The A40 corridor connects with several B roads that provide alternative routes between the towns and villages in West Oxfordshire, such as the B4044 between Eynsham and Oxford.

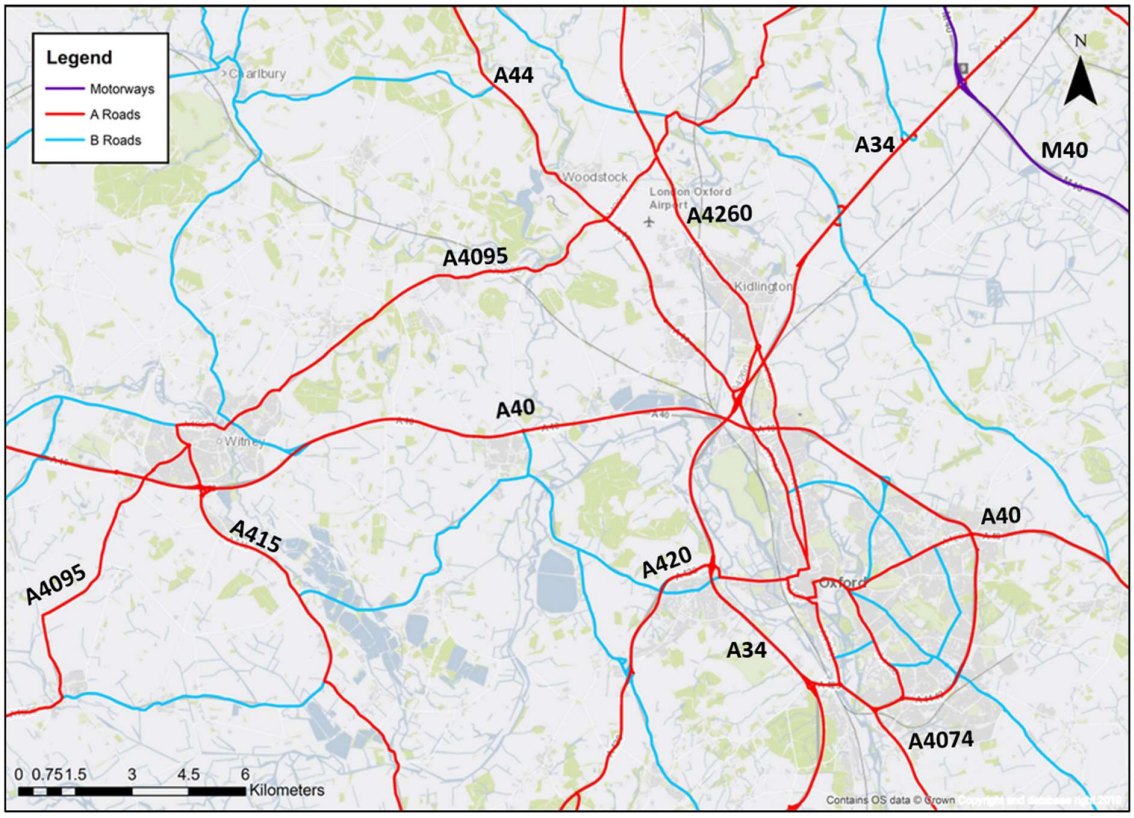


Figure 3-2 Road Network

Source: AECOM © Crown copyright and database right 2020

3.3.9 Table 3-2 outlines the characteristics of the A40 between Witney and Duke's Cut, and the surrounding road network, including details of carriageways and footways.

Table 3-2 Information on Local Road Network

Road	Speed Limit (mph)	Single/Dual	Footways/Cycle
A40	National Speed Limit (60mph)	Single (section between Witney Shores Green and Hill Farm is Dual)	Both sides of carriageway from Eynsham to Duke's Cut.
Lower Road	National Speed Limit (60mph)	Single	No existing footways
Cuckoo Lane	National Speed Limit (60mph)	Single	No existing footways
A4095	Varies Along Route	Single	Varies along route but generally provided in villages
Witney Road	30mph	Single	Both sides of carriageway
B4449	50mph	Single	No existing footways on northern section, one footway on southern link
B4044	50mph (and 40mph at Farmoor)	Single	Generally provided on one side

Source: Oxfordshire Cotswolds Garden Village Transport Assessment (Stantec, 2020)

3.3.10 The regional rail network is demonstrated in Figure 3-3. Several rail stations are in the vicinity of the A40 corridor, all with services connecting to Oxford. The Oxford – London service operated by Chiltern Railways connects Oxford, Oxford Parkway, and Islip with London Marylebone. Using this service, it takes around 1 hour 20 minutes to travel from Oxford to London Marylebone during weekday morning peaks. CrossCountry runs a service between Bournemouth and Manchester that stops at Oxford station. Great Western Railways also serves stations in the area, specifically Oxford, Hanborough, and Combe. Using the GWR routes, these stations can be connected with Hereford, Reading and London Paddington, among other locations. During weekday morning peaks, it takes around an hour to travel between Oxford and London Paddington.

3.3.11 As part of the Salt Cross Garden Village AAP, it is identified that Hanborough Station is the closest to the Garden Village, and therefore the opportunity is presented to encourage modal shift and increase use of the station through provision of active travel links. There is a vision for Hanborough Station which is that by the end of the Local Plan period in 2031, it will be a modern and efficient transport and mobility hub for West Oxfordshire. This could increase the number of trains to four per hour, with a train every 30 minutes to London and Worcester.

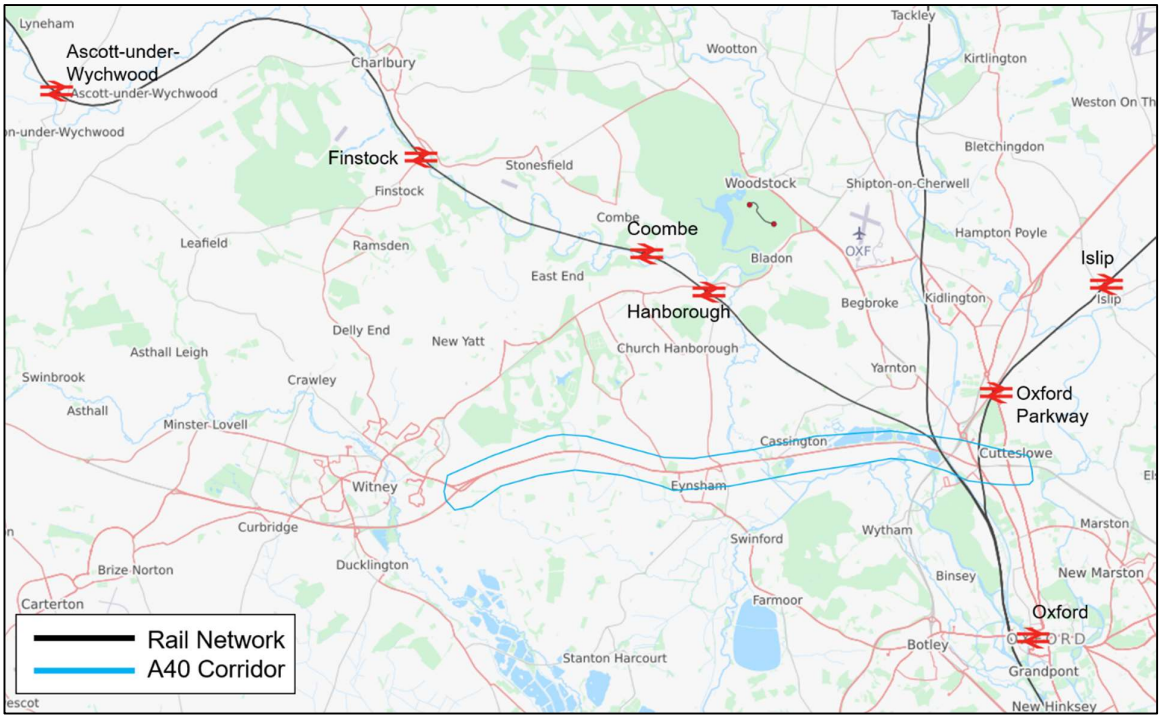


Figure 3-3 Rail Network along the A40 Corridor
Source: OpenStreetMap (2020)

3.3.12 Bus services along the A40 Corridor are shown in Figure 3-4. The Witney – Oxford corridor is served by three main bus services:

- S1/NS1 - which runs between Oxford, Witney and Carterton via Botley, Farmoor, Eynsham (village) and Curbridge (4 buses per hour through the day with additional services running in peak hours plus out of peak and night services);
- S2/NS2 which runs between Oxford and Witney & Carterton via Wolvercote, Cassington, Eynsham (A40) and Minster Lovell (2 buses per hour through the day plus out of peak and night services);
- H2 (formerly the S7) which runs between Oxford, Witney and Carterton via Oxford Brookes University, John Radcliffe Hospital, Summertown and Eynsham (1 bus per hour Monday to Saturday, with a limited service on Sunday); and
- 11 which runs between Oxford and Witney via Botley, Farmoor, Eynsham (village), Long Hanborough, Freeland and North Leigh (1 bus per hour between 0600 and 1800).

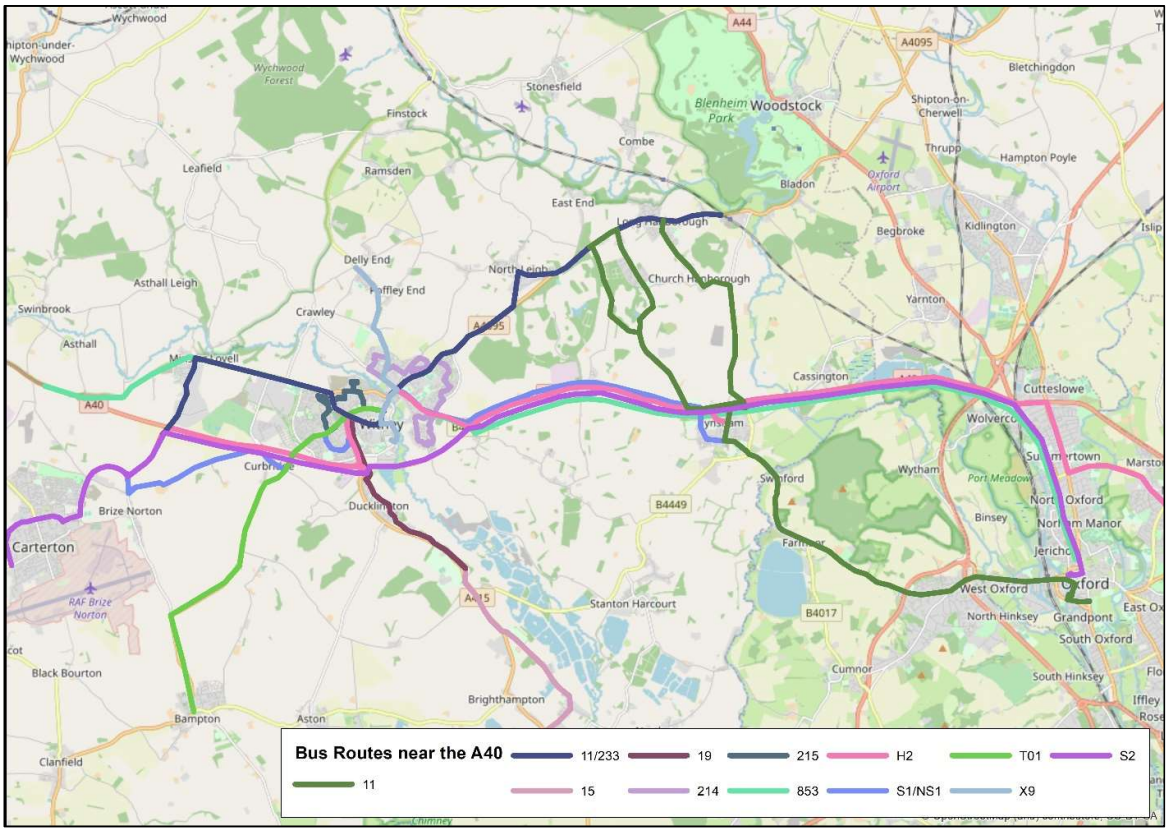


Figure 3-4 Bus Network along the A40 Corridor
Source: OpenStreetMap (2020)

3.3.13 The 853 bus route provides a long-distance service along the A40 between Cheltenham and Oxford. This service is infrequent, running four times a day Monday – Saturday, and takes approximately 1 hour 45 minutes.

3.3.14 In addition, the S7 runs a limited, out of peak hours only service between Witney and the John Radcliffe Hospital in Headington along the A40. Discussions with Stagecoach (the bus operator) have suggested that they are unable to run services during the peak because of concerns around operating to a reliable timetable during these hours[12]. A transport scheme (such as the Duke's Cut scheme and others) should help improve journey time along the A40 and further and would lead to an increase in bus patronage and modal shift.

3.3.15 The existing bus infrastructure varies along the A40 corridor. At present, there is no bus lane provision along the A40 Corridor. Along the A40 corridor there are six bus stops, three in each direction. Both the Cassington Turn and Evenlode Bus stops (both directions) have a bus shelter and a bus flag and are situated in a layby. The A40 Slip Road bus stops (Witney) provide a layby and a bus flag, but no bus shelter.

3.3.16 Currently, the S1/NS1, S2/NS2 and S7 are both run by luxury Gold double-decker buses which includes WiFi on board, extra legroom and leather seats. The 11 service is operated by a single decker bus service.

Pedestrian and Cycle Infrastructure Provision and Use

3.3.17 Active travel infrastructure is available along most of the A40 corridor. A landscaped safety strip is provided on the carriageway verge which separates the carriageway from the footway (Figure 3-5 and Figure 3-6). A footway/cycleway is available on the northern side of the A40 between Witney and Eynsham, and on both sides of the A40 between Eynsham and Oxford. From Shores Green to Cuckoo Lane the footpath path is between 1m-1.5m in width, reducing to under 1m through Eynsham[13]. From Cassington to Duke's Cut the footpath path is 1m wide.

3.3.18 An uncontrolled staggered crossing with dropped kerbs, tactile paving and a central refuge island with railings, is located adjacent to the Tesco Express / Petrol Filling Station, and an informal uncontrolled crossing with dropped kerbs is located approximately 300m to the west of Eynsham Roundabout. Further, a staggered signalised crossing is located on the eastern arm of the A40 / Witney Road signalised junction. The active travel infrastructure, as part of the Duke's Cut scheme, should help expand this network and provide safer crossing points along the A40.

[12] A40 Science Transit Phase 2 – Option Assessment Report (OCC, 2017)
[13] This is likely to be wider but due to a lack of maintenance the verges either side have encroached on the cycleway to leave these widths.

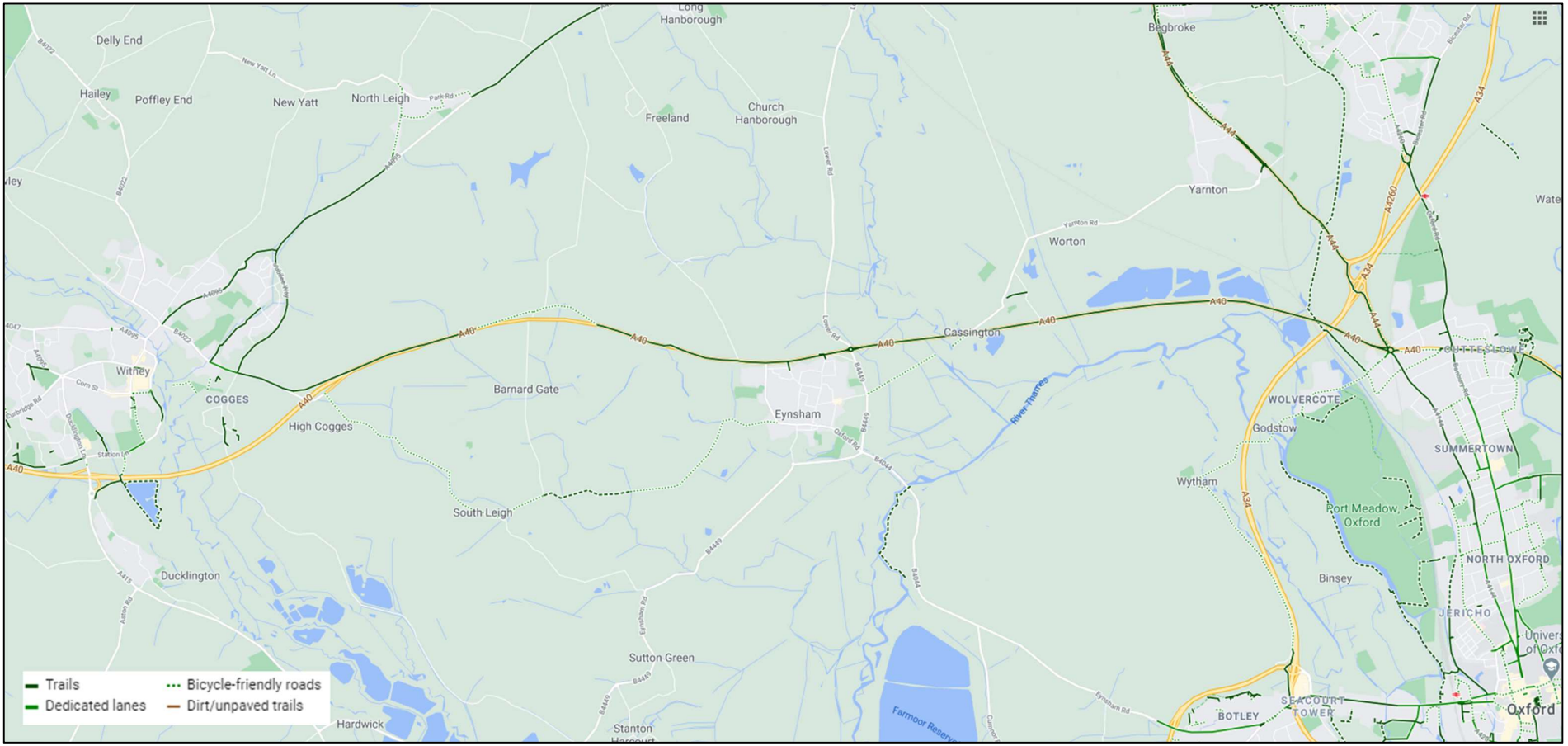


Figure 3-5 Cycle Infrastructure on the A40 Corridor

Source: Google Earth Pro™ imagery in the form of Google Map™ and Google Streetview™ have been used, unmodified, within this document. This imagery has been used within the extents of the AECOM license agreement with Google

Figure 3-6 A40 Footway/Cycleway between Eynsham and Cassington

Source: Google Earth Pro™ imagery in the form of Google Map™ and Google Streetview™ have been used, unmodified, within this document. This imagery has been used within the extents of the AECOM license agreement with Google

3.3.19 In the OCC A40 Corridor – Witney to Oxford North Future Walking and Cycling Provision (June 2020) report an assessment of the existing and future active travel network and volumes along the A40 was undertaken. Figure 3-7 and Figure 3-8 show the typical weekday 24-hour two-way flows for pedestrian and cyclists respectively. This data was collected in November 2017, as AECOM reviewed camera surveys undertaken from Sunday 19th November 2017 to Saturday 25th November 2017. Figure 3-7 shows that use of the paths alongside the A40 varies dependent on location, with the sections of the path near to Eynsham and Cassington having higher footfall than more rural sections. In Eynsham, it appears pedestrians use the A40 to access the bus stops near the Evenlode pub. Similarly, in Cassington there are higher pedestrian flows near bus stops on the A40. In many rural locations there are no crossing facilities available for pedestrians in the vicinity of bus stops.

3.3.20 Figure 3-8 suggests that from west to east between Eynsham and Cassington, the number of cyclists using the A40 doubles as volumes join at Cassington Road. This is likely because further east is closer to Oxford and therefore a shorter cycle. In Eynsham there are some cyclists travelling westbound towards Witney.

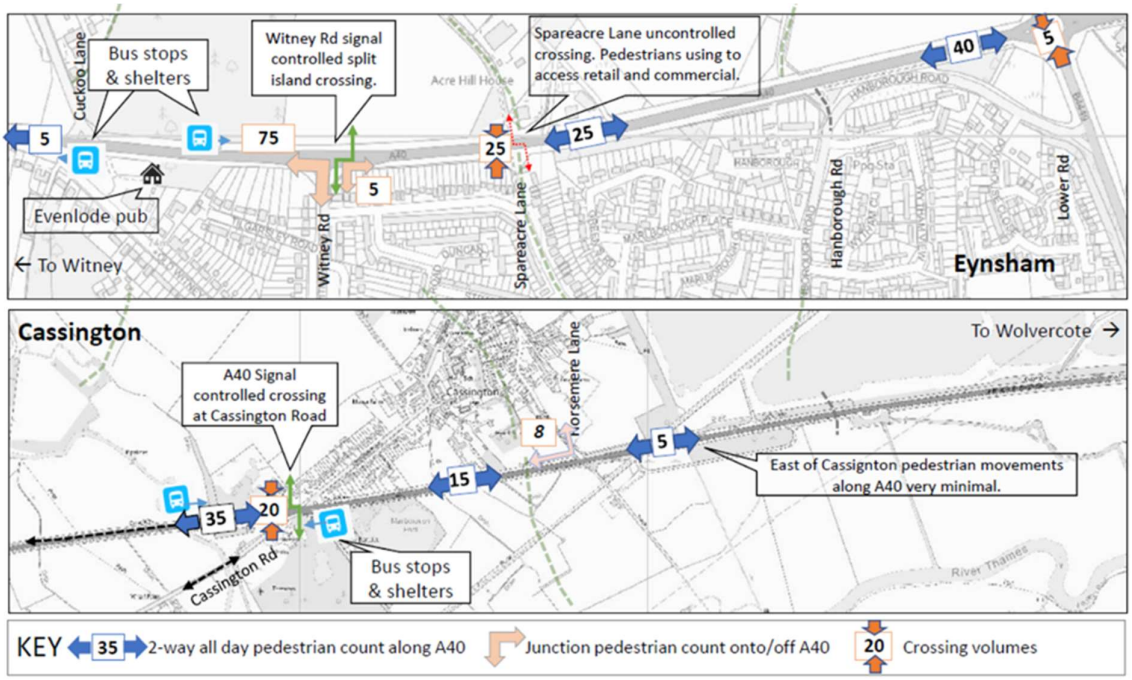


Figure 3-7 Typical Weekday 24hr 2-Way A40 Pedestrian Count

Source: A40 Corridor – Witney to Oxford North Future Walking and Cycling Provision

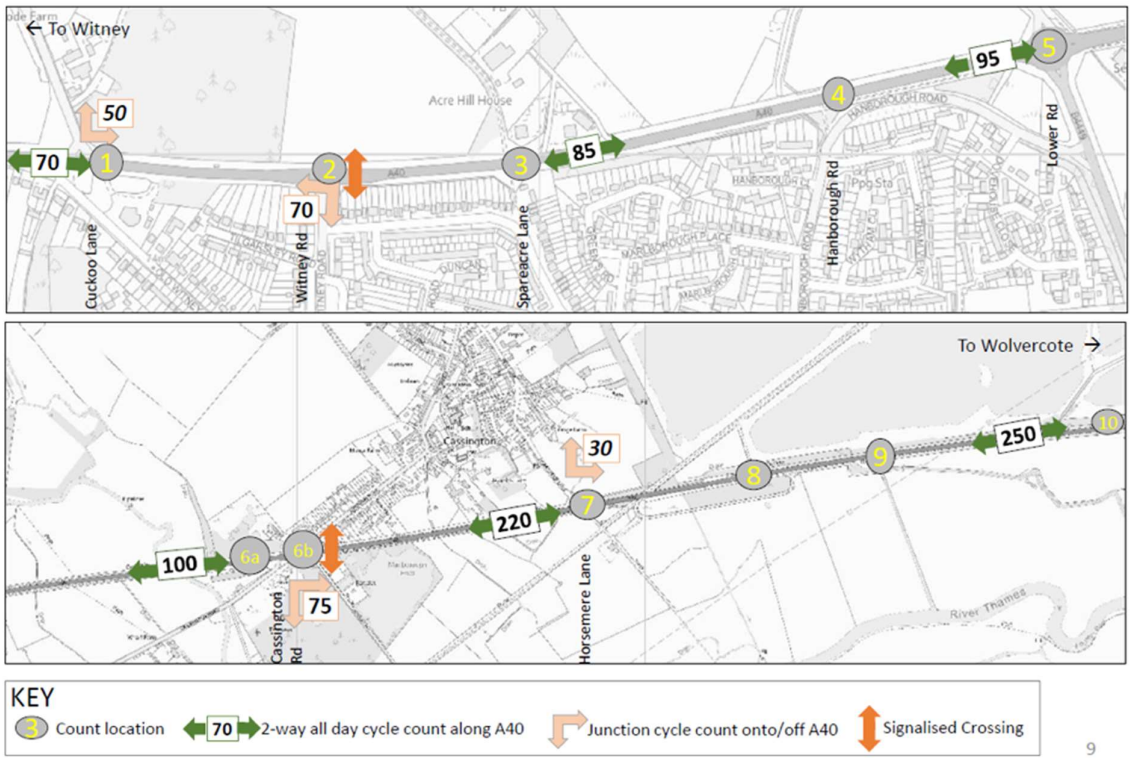


Figure 3-8 Typical Weekday 24hr 2-Way A40 Cyclist Count
Source: A40 Corridor – Witney to Oxford North Future Walking and Cycling Provision

3.3.21 Figure 3-7 and Figure 3-8 above, Figure 3-9 below shows the weekday cycle totals on the A40 shared use path, split by whether the north side or south side path was used.

3.3.22 Figure 3-9 shows that 75% of cycle traffic between Cassington Road and Duke's Cut use the South Side path, and this increases to over 85% for only westbound flows. West of Witney Road there is no south side path. Between Witney Road and Lower Road there is a balance in the use of north and south side pathways, and these are used by both pedestrians and cyclists.

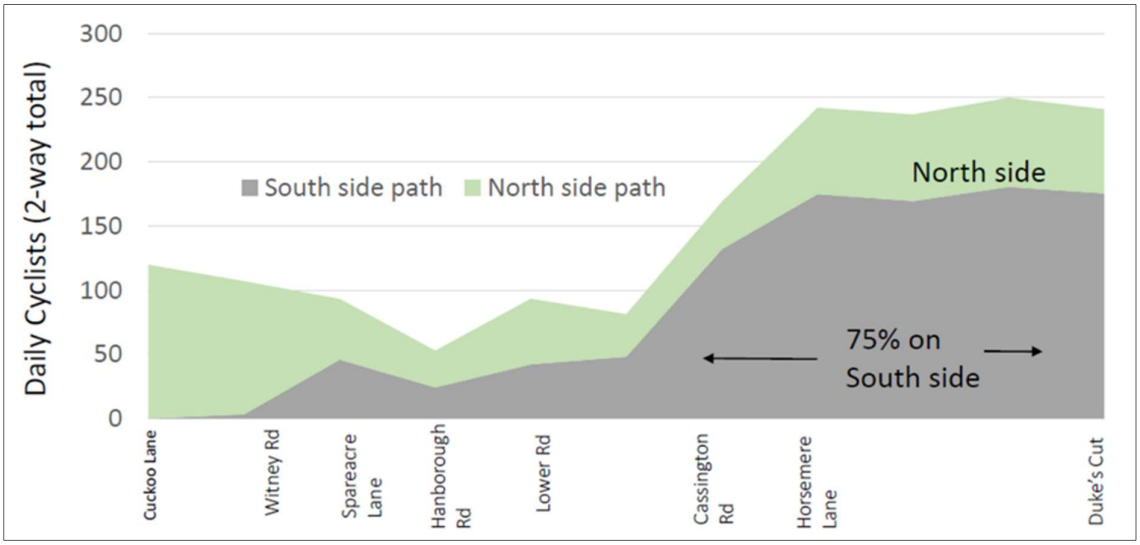


Figure 3-9 Weekday Cycle Totals at Count Points (counts as of November 2017)
Source: A40 Corridor – Witney to Oxford North Future Walking and Cycling Provision

3.3.23 Figure 3-10 shows the hourly cycle flow by direction along the A40. This shows there is a tidal flow of cyclists along the A40, with the predominant flow in the morning peak eastbound towards Oxford and the predominant flow in the evening peak being westbound towards Witney. In addition, this shows there are increased levels of cycling in June when the weather is warmer and clearer, and there is increased daylight.

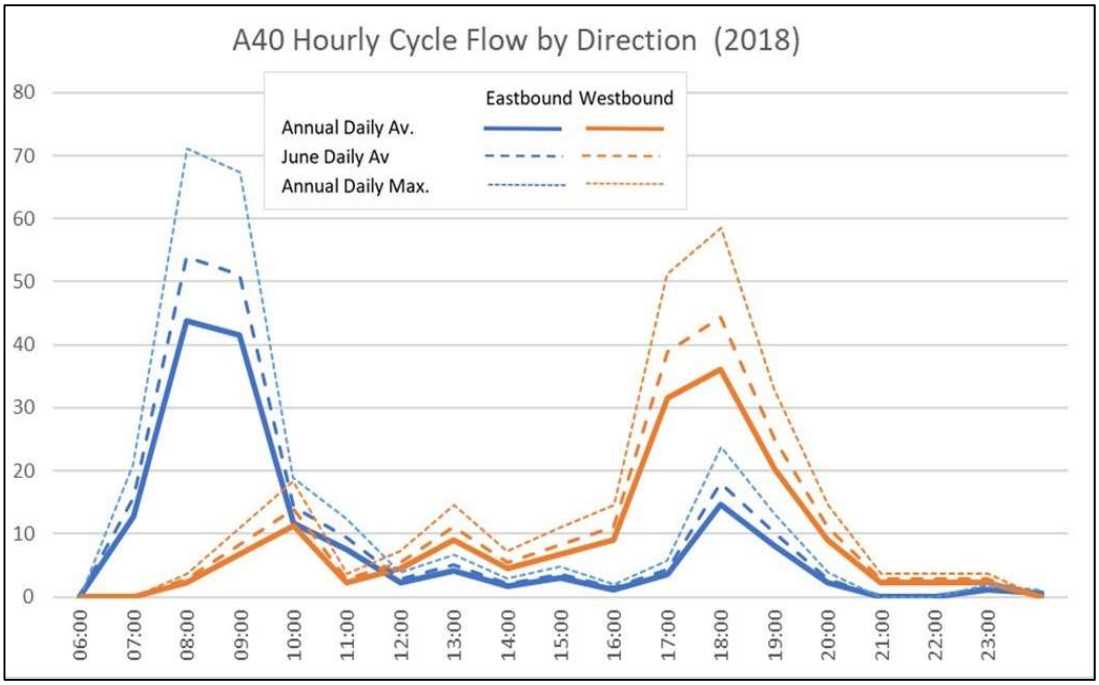


Figure 3-10 A40 Hourly Cycle Flow by Direction (2018)

Source: OCC

3.3.24 Figure 3-11 shows the recorded daily cycle flow on the A40 East of Cassington, towards Oxford between 2005 – 2018. Over this period, the number of cyclists along the A40 have increased significantly, more than doubling. This shows that in 2018 whilst the average number of cyclists per day was 278, this increased to 364 in June, and the highest daily maximum being 461 cyclists. This shows there is potential to further increase the number of cyclists using the A40, given the current usage levels.

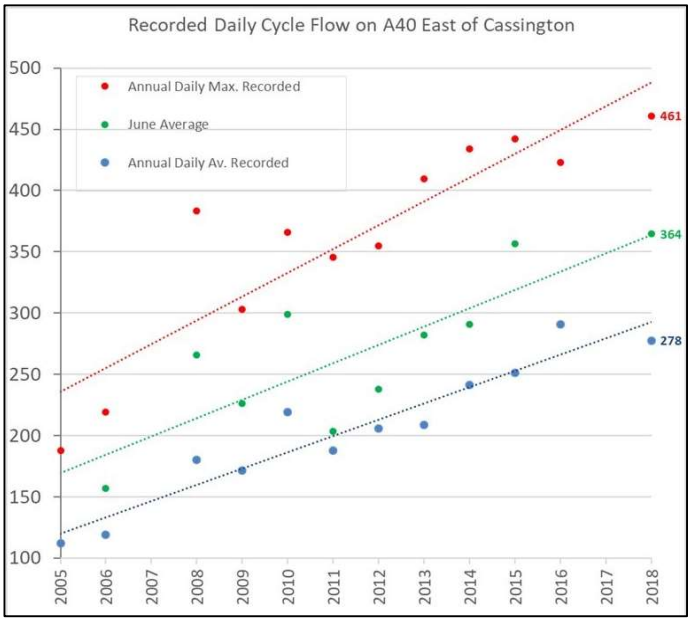


Figure 3-11 Recorded Daily Cycle Flow on A40 East of Cassington

Source: OCC

3.3.25 Figure 3-12 shows the distribution of weekday cycling by time of day. This shows that there is a highly peaked pattern aligned to the weekday commuter peak periods. As would be expected, the dominant movement in the AM peak is eastbound, and in the PM peak the dominant movement is westbound.

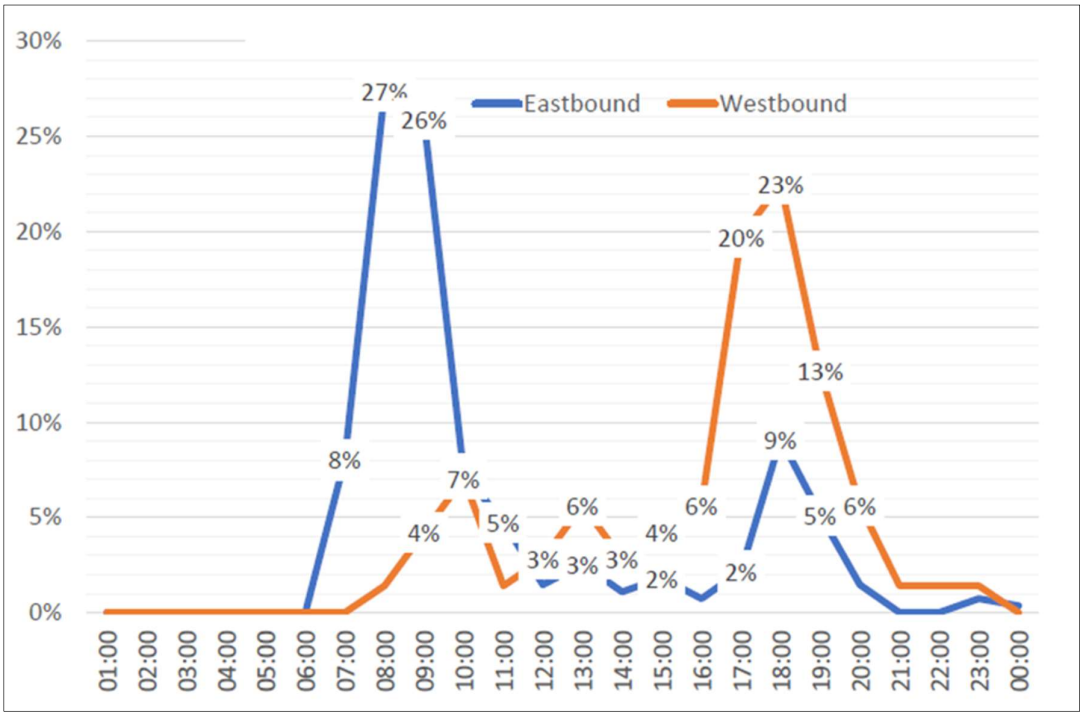


Figure 3-12 Distribution of Cycle Flow by Time of Day
Source: A40 Corridor – Witney to Oxford North Future Walking and Cycling Provision

3.3.26 The Propensity to Cycle Tool (PCT) has been used to demonstrate cycling commuting demand in the area. It should be noted that the tool is based on 2011 Census data. Figure 3-13 shows the PCT estimate of cyclist flows on the A40 align well with the observed cycle count data as discussed above.

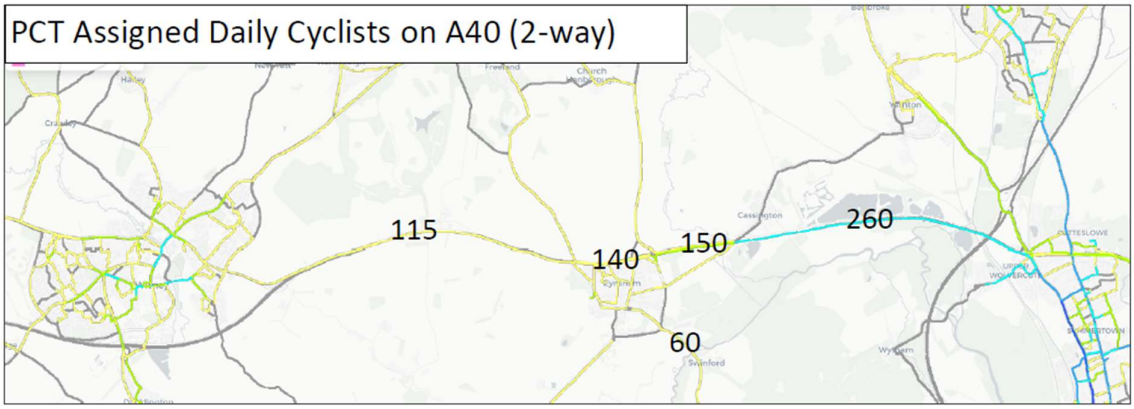


Figure 3-13 PCT Assigned Daily Cyclists on A40 (two-way), 2019
Source: A40 Corridor – Witney to Oxford North Future Walking and Cycling Provision

3.3.27 As seen in Figure 3-14, the PCT at a LSOA level indicates that there is limited cycling commuting demand along the A40 corridor and in Witney (4-6%), whereas the general Oxford area shows significantly higher levels of demand, ranging between 15-29%. The figure also shows the location of strategic housing allocations, highlighting the potential to increase the percentage of commuters cycling to work across the A40 Corridor. It is to be noted that the PCT provides an indicative O-D pattern of commuting trips only and it doesn't include non-commuting trips such as leisure trips.

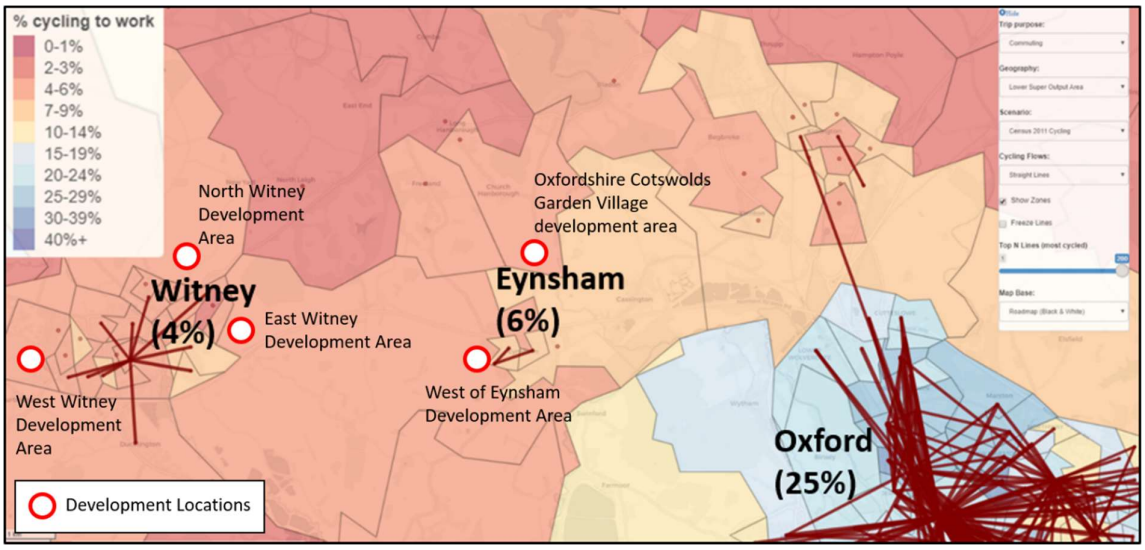


Figure 3-14 Census 2011 Cycle to Work Demand (LSOA Level)
Source: Propensity to Cycle Tool

3.3.28 The Propensity to Cycle Tool (PCT) has been used to demonstrate the high cycle demand under different scenarios. Figure 3-15 demonstrates the potential cycle demand in the area around the A40 corridor in the "Go Dutch" scenario; the propensity to cycle if the area had the same infrastructure and cycling culture as the Netherlands (but retained its hilliness and commute distance patterns)[14]. Cycle commuting demand significantly increases in the area, now at around 15-29%, although there are still no O-D desire lines along the A40 corridor as there were none in the baseline. It is possible that the distance between the urban centres along the A40 corridor, such as between Witney and Oxford (around 18km), is a deterrent (according to Google Maps travel planner, it would take around 45 minutes to cycle between Witney and Duke's Cut using the A40). The substantial housing proposed along the A40 corridor (as discussed in previous sections) will generate new cycling trips along sections of the A40 corridor (such as from new development at Eynsham and Witney to Oxford).

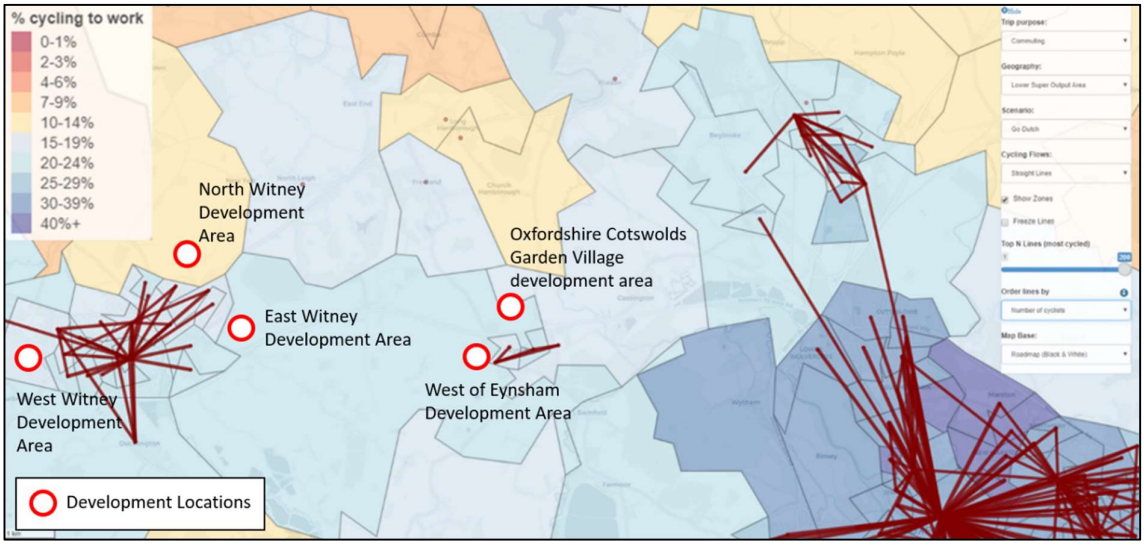


Figure 3-15 Potential Cycle to Work Demand: Go Dutch Scenario (LSOA Level)
Source: Propensity to Cycle Tool

[14] Lovelace, R., Goodman, A., Aldred, R., Berkoff, N., Abbas, A. and Woodcock, J. (2016). The Propensity to Cycle Tool: An Open Source Online System for Sustainable Transport Planning. *Journal of Transport and Land Use*, 10(1). Center for Transportation Studies. Available at: https://arxiv.org/abs/1509.04425

3.3.29 There are a number of public rights of way routes in the area, including the promoted route running south of the A40 corridor and connecting Oxford, Wytham, Swindon, Eynsham, and South Leigh (Figure 3-16). Footpaths connect Witney with High Cogges, providing crossing over the A40 via the Stanton Harcourt Rd bridge. Footpaths also connect South Leigh with the A40 at Hill Farm. In Eynsham, there are two promoted crossings over the A40: one uncontrolled crossing with a protected island just west of Tesco Express; and one uncontrolled crossing with no pedestrian facilities about 350 metres west of Eynsham Roundabout. There are no controlled crossings along this stretch of the A40. As part of the Duke's Cut scheme, there will be a new cycle route provided for cyclists to access the NCN Route 5 from the A40 Eynsham-Oxford cycleway. This route will create a more comprehensive and useable network of walking and cycling routes along the A40 Corridor and therefore should encourage greater use of active travel.

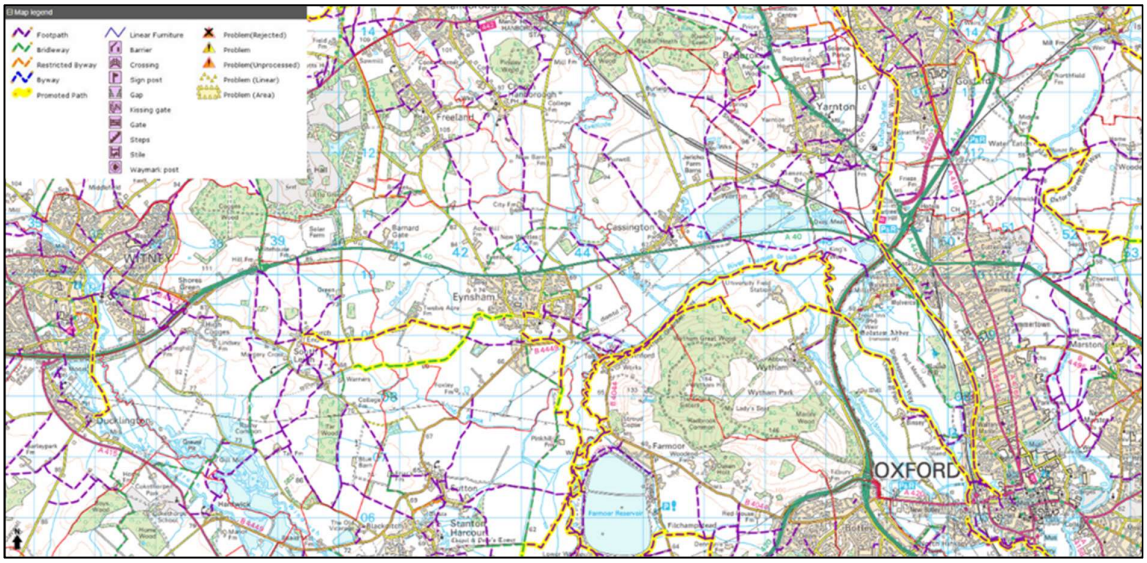


Figure 3-16 Public Rights of Way
Source: OCC (2020)[15]

Travel/Traffic Patterns and Modal Share

3.3.30 Table 3-3 shows the modal share of commuting trips in Oxfordshire and West Oxfordshire from the 2011 Census. This analysis highlights that West Oxfordshire has almost 10% more residents driving to work than in comparison to Oxfordshire as a whole. Furthermore, in West Oxfordshire fewer people use the bus to get to work, with 7.1% of people using the bus in West Oxfordshire compared to 4.3% in Oxfordshire. Similarly, fewer people cycle to work in West Oxfordshire (3.0%) compared to Oxfordshire (4.9%).

3.3.31 The existing mode share split of West Oxfordshire identifies that over 60% of residents use a car to commute to work. Therefore, these individuals will certainly benefit from the Duke's Cut scheme which will remove a clear pinch point along the A40 and improve capacity.

Table 3-3 Modal Share of Commuting Trips in Oxfordshire and West Oxfordshire

Method of travel to work	Oxfordshire	West Oxfordshire
Work mainly at or from home[16]	7.2%	8.0%
Train	3.0%	1.9%
Bus, minibus or coach	7.1%	4.3%
Taxi	0.3%	0.1%
Motorcycle, scooter or moped	0.9%	0.8%
Car	61.6%	70.0%
Bicycle	7.1%	4.1%
On foot	12.3%	10.3%
Other method of travel to work	0.6%	0.5%

Source: Census 2011

[15] OCC Countryside Access Map: https://publicrightsofway.oxfordshire.gov.uk/Web/standardmap.aspx
[16] Usually this is not included, however considering the current COVID-19 impacts it is shown here to provide a context.

3.3.32 Figure 3-17 shows that 41% of car commuters (about 9,000 people) from the southern wards of West Oxfordshire travel to destinations which will or could use the section of A40 between Witney and Oxford. Commuting to Oxford makes up 16% of all car commutes from these wards (3,600 people), as seen in Figure 3-17. Car commuters from West Oxfordshire to Oxford have destinations across the city, reflecting the city's employment patterns, with concentrations in the city centre, Headington and Cowley areas.

3.3.33 Commuters' journeys using bus and coach services from southern West Oxfordshire, as seen in Figure 3-18, are more locally focused with 56% (980 people) travelling to other parts of Oxfordshire and 60% (1,050 people) in total travelling to destinations which could involve travel along the A40 between Witney and Oxford. Commuting to Oxford makes up 52% of all bus commuting from these wards (900 people). Bus commuting to Oxford is concentrated in the city centre with lesser numbers in West Oxford and Headington, reflecting bus service destinations.

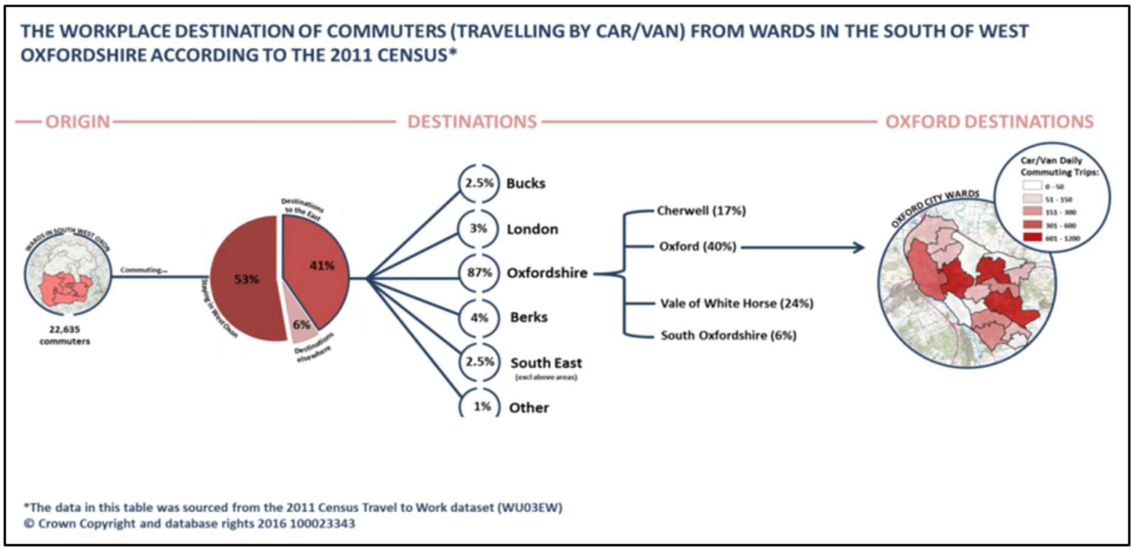


Figure 3-17 Car Commute Destinations of Southern West Oxfordshire Origins
Source: A40 Science Transit Phase 2 – Option Assessment Report (OCC, 2017); Census 2011 data

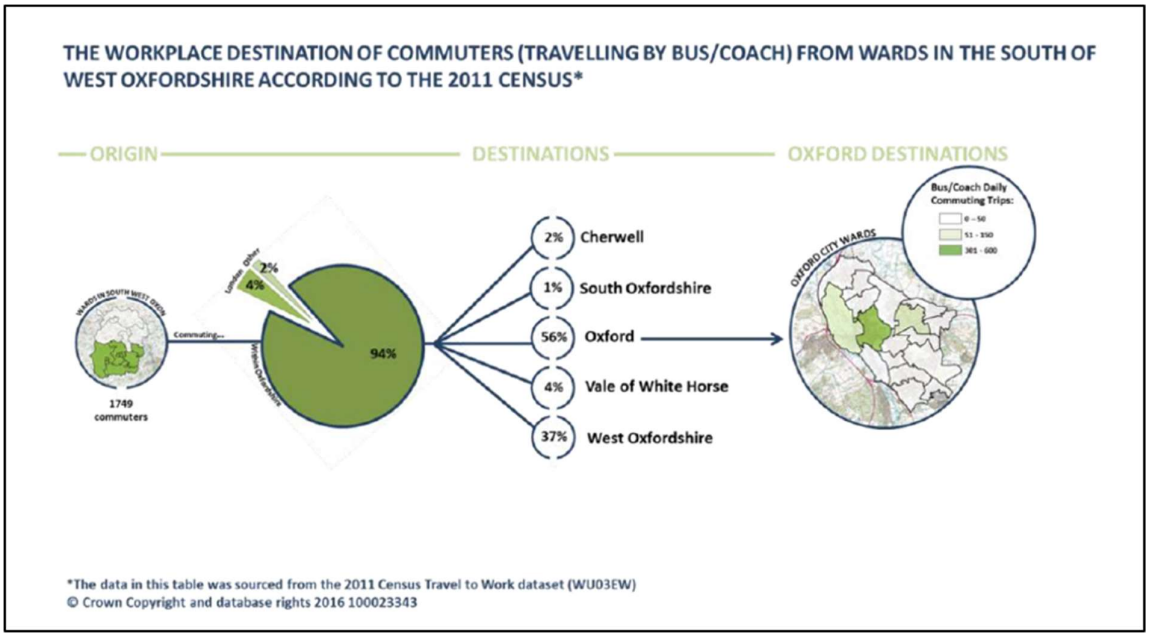


Figure 3-18 Bus Commute Destinations of Southern West Oxfordshire Origins
Source: A40 Science Transit Phase 2 – Option Assessment Report (OCC, 2017); Census 2011 data

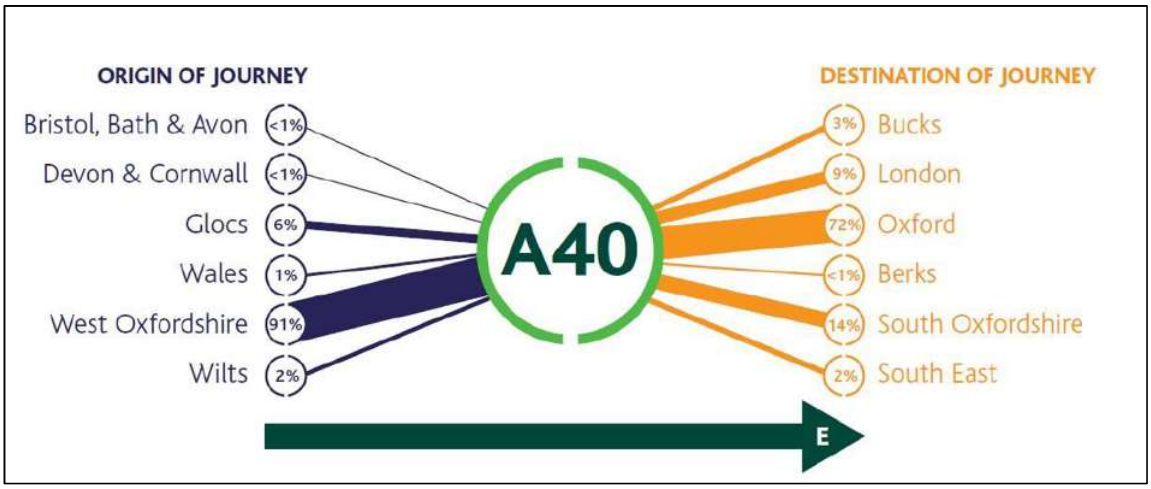


Figure 3-19 Origins and Destinations of A40 Traffic

Source: A40 Science Transit Phase 2 – Option Assessment Report (OCC, 2017); Oxfordshire Strategic Traffic Model (2013 Base Year)

3.3.34 ANPR surveys undertaken in February 2020 have been used to assess the travel patterns along the A40 corridor in the AM and PM peak periods. Figure 3-20 below shows the results of Site 1 which is located west of Eynsham. This shows that eastbound in the AM peak, 51% traffic from west of Witney continues along the A40 to Duke's Cut. At the Lower Road roundabout (Eynsham), 10% of vehicles turn off the A40 to travel north towards the A4095, A44, Bladon village and Hanborough station, and 15% travel south onto the B4449 which provides access to Eynsham as well as onwards connections towards Botley and Oxford. Further along at the Cassington signals, 9% bear left onto Eynsham Road into Cassington village. Figure 3-21 shows that from the A40 near Wolvercote, 21% of trips travel south at the Wolvercote Roundabout along the A4144. A further 58% of traffic continues along the A40 towards Cutteslowe, with 26% continuing along the A40 to Wheatley.

3.3.35 The recent ANPR surveys reaffirm that a significant number of trips originate or end in West Oxfordshire.

- Therefore, any intervention focused on the A40 from Witney to Oxford will benefit the residents of West Oxfordshire; specifically, the Duke's Cut scheme will remove existing capacity constraints along the A40 and prioritise bus travel. This will provide benefits to the residents of West Oxfordshire such as improving travel times, reducing congestion and others.

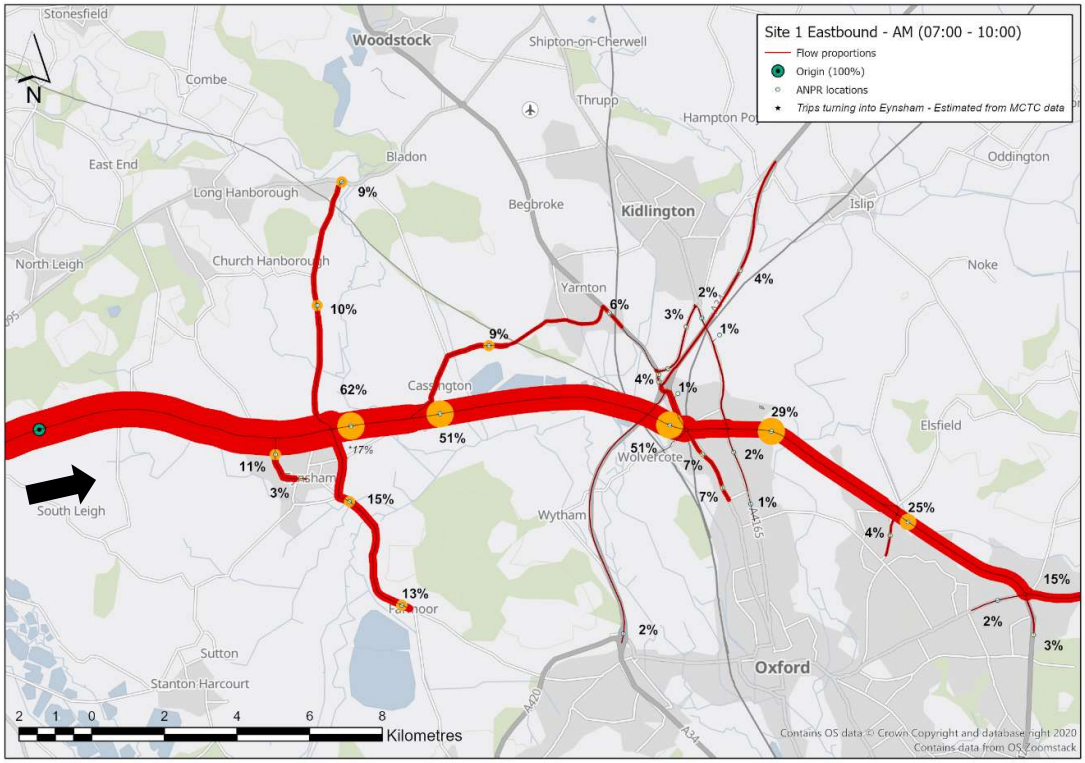


Figure 3-20 Traffic Patterns along the A40 from west of Eynsham – Eastbound in the AM peak period
Source: AECOM analysis based on ANPR surveys undertaken in February 2020

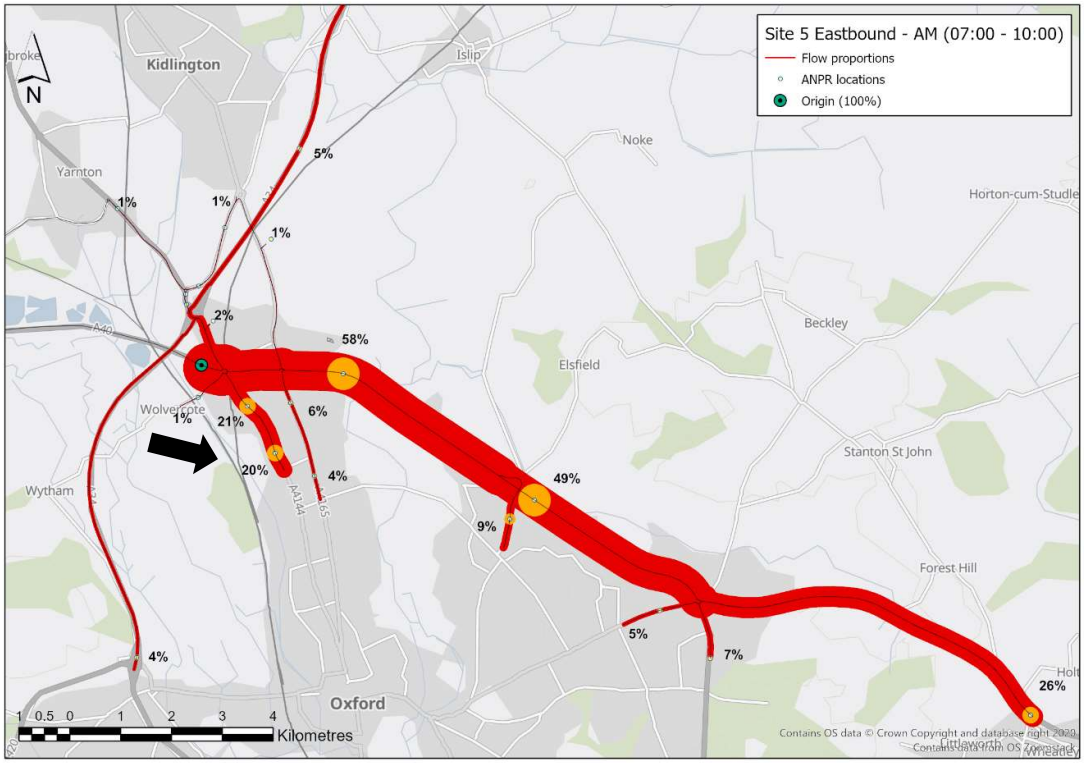


Figure 3-21 Traffic Patterns along the A40 from Oxford – Eastbound in the AM peak period
Source: AECOM analysis based on ANPR surveys undertaken in February 2020

Journey Times, Traffic Flows and Congestion Issues

3.3.36 Figure 3-23 and Figure 3-24 show the journey time variability along the A40 in the AM and PM peak hours (Figure 3-22 shows the locations mentioned in these two figures). Figure 3-23 shows the journey time variability eastbound along the A40 in the morning travelling towards Oxford. This shows that there is greater variability towards the west of the study area, especially between Hill Farm and Lower Road and between Cassington Road and Wolvercote. In the PM peak, as Figure 3-24 shows, the variability has a significant range, and the greatest variation is between Wolvercote and Cassington Road where journeys can vary from 3.5 minutes to 18.5 minutes. This data shows that there is poor journey time reliability along the A40 between Witney and Oxford.

3.3.37 Poor journey time reliability on the A40 also negatively affects bus service reliability, and as a result can discourage operators from running services along this vital route. Through implementation of the A40 Corridor schemes, journey time reliability along the A40 will dramatically improve and as a result, unlock more frequent and faster bus services. This will then encourage greater use of the bus and lead to mode shift to more sustainable modes along the A40 Corridor.

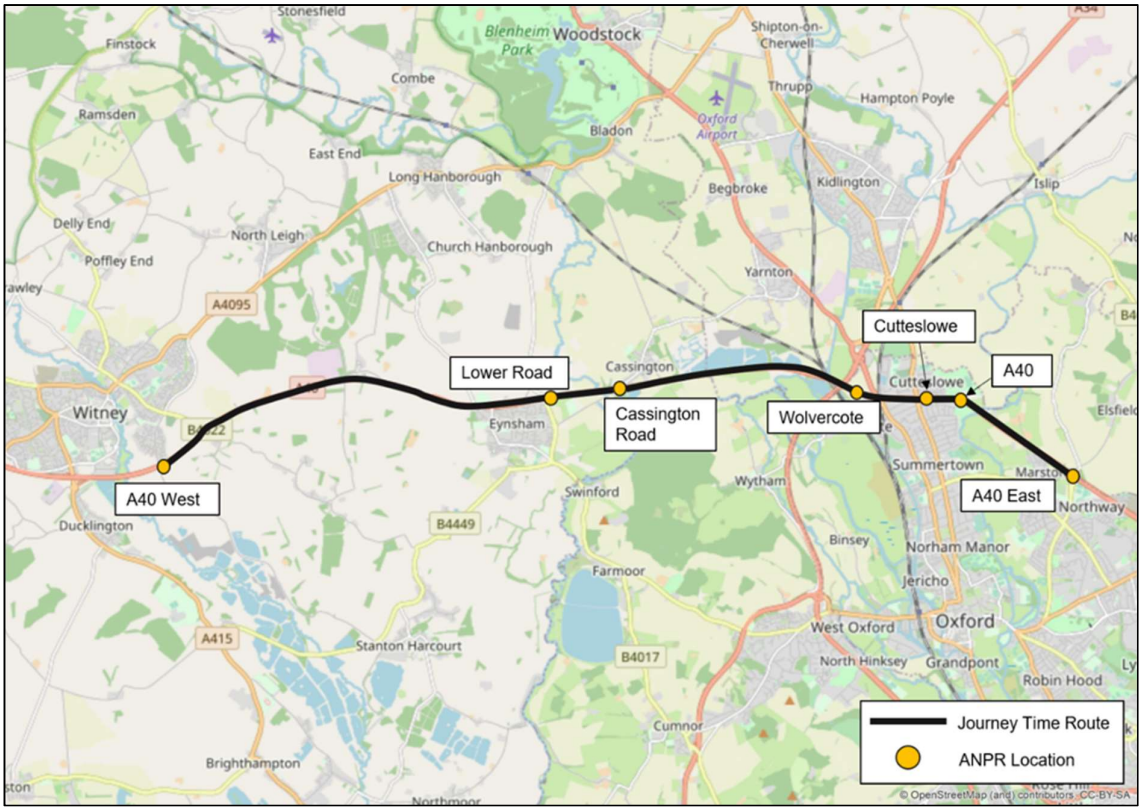


Figure 3-22 Journey Time Route – A40

Source: Adapted from OCC 2020 survey

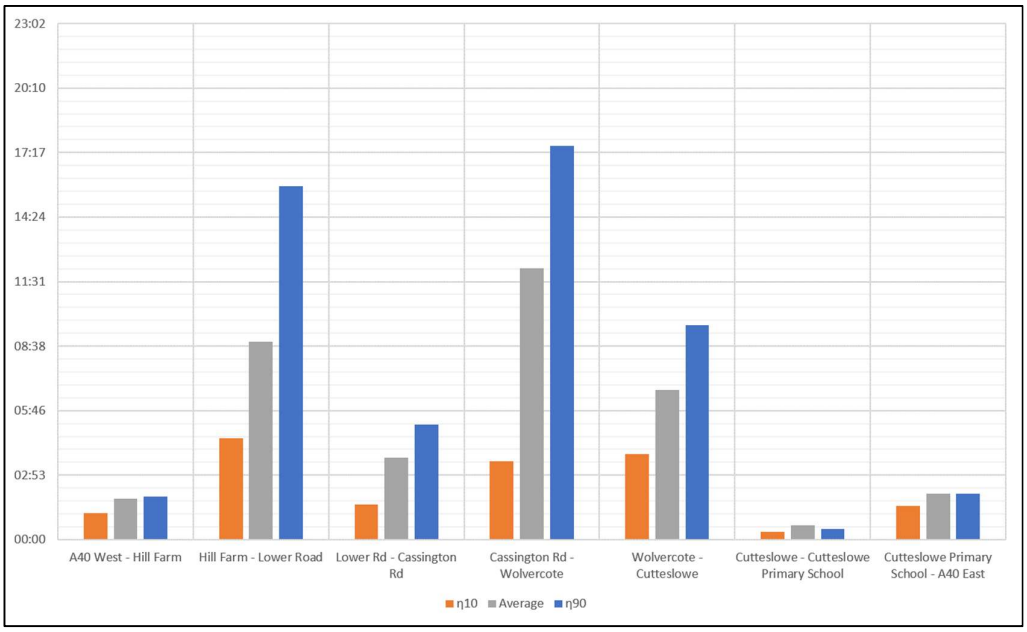


Figure 3-23 Journey Time Variability along the A40 in the AM Peak Eastbound
Source: AECOM analysis based on ANPR surveys undertaken in February 2020

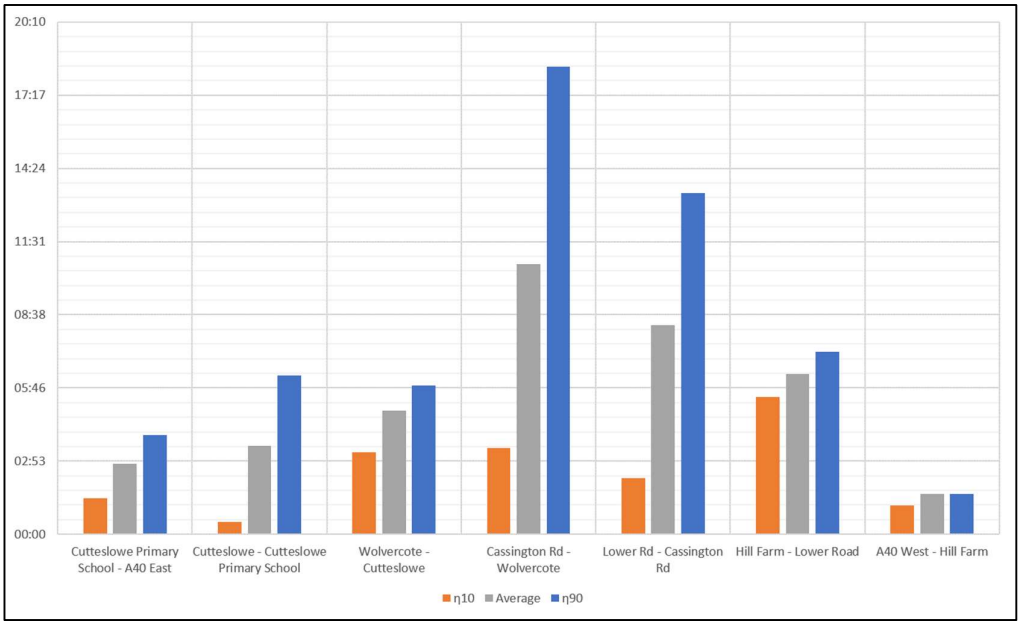


Figure 3-24 Journey Time Variability along the A40 in the PM Peak Westbound
Source: AECOM analysis based on ANPR surveys undertaken in February 2020

3.3.38 Figure 3-25 and Figure 3-26 below show the average congestion along the A40 in the AM and PM peaks respectively. In the AM peak, slow traffic builds up along the A40 at the Wolvercote Junction and this leads to queuing and congestion to Duke's Cut and beyond. A similar picture can be seen in the PM peak, however a longer queue forms. Slow traffic is also found on the A40 north of Oxford, and along both the A4144 and Banbury Road (pre-COVID).

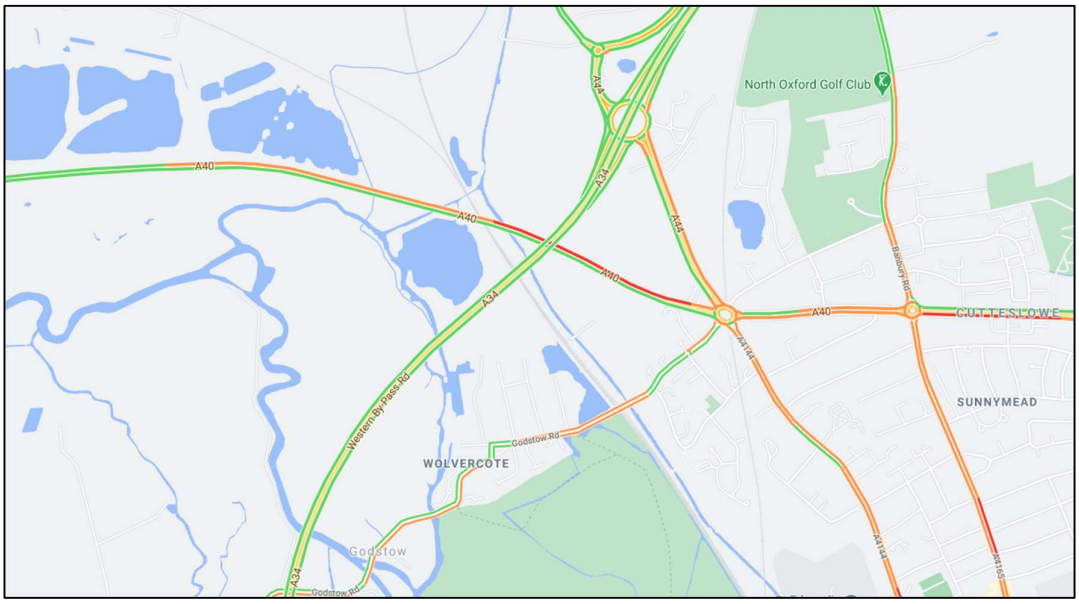


Figure 3-25 Congestion near Duke's Cut, average weekday AM Peak (8:30am; February 2020)
Source: Google Earth Pro™ imagery in the form of Google Map™ and Google Streetview™ have been used, unmodified, within this document. This imagery has been used within the extents of the AECOM license agreement with Google

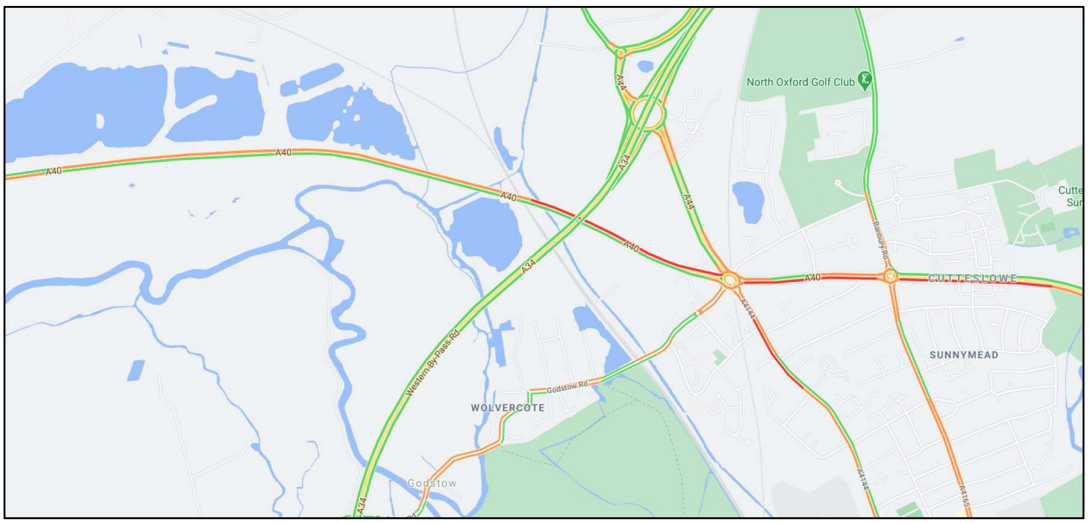


Figure 3-26 Congestion near Duke's Cut, average weekday PM Peak (4:25pm; February 2020)
Source: Google Earth Pro™ imagery in the form of Google Map™ and Google Streetview™ have been used, unmodified, within this document. This imagery has been used within the extents of the AECOM license agreement with Google

3.3.39 As shown in **Error! Reference source not found.**, the traffic volumes and HGV percentages have been examined on the A40 and surrounding road network. This information is taken from Oxfordshire Cotswolds Garden Village Transport Assessment (2020). It is based on Automatic Traffic Counts (ATCs) undertaken as part of the SCGV TA and is centred on Eynsham. It should be noted that the count at A40 (Central) was a Radar Survey rather than an ATC and was therefore unable to obtain the percentage of HGVs.

3.3.40 Table 3-4 **Error! Reference source not found.**shows that East of Eynsham, in 2017 there were over 30,000 vehicles travelling along the A40. The average daily traffic along the A40 increases west to east towards Oxford, and this pattern is reflected in the AM and PM peaks.

Table 3-4 Traffic Flows on A40 and Surrounding Roads

Name	Source	Year	AM (08:00 - 09:00) Two-Way Traffic	PM (17:00 - 18:00) Two-Way Traffic	Daily Traffic Two-Way Traffic
A40 West (near Hill Farm)	AECOM	2020	1,455	2,460	27,123
Lower Road	AECOM	2020	642	693	-
A40/Lower Road Roundabout	AECOM	2020	1,423	1,434	23,878
A40/Eynsham Road (Cassington)	AECOM	2020	881	854	19,076
A40 East (near Duke's Cut)	AECOM	2020	881	771	18,835
A4095	AECOM	2020	1,187	1,297	-
Witney Road	AECOM	2020	501	462	-
B4044 at Swinford Toll Bridge	AECOM	2020	1,013	1,152	-

(- denotes daily two-way traffic was not available)

Source: AECOM analysis based on February 2020 ANPR Surveys

3.3.41 Based on a above analysis and local understanding of the congestion issues along the A40 corridor, these issues are caused by a combination of:

- Junction capacity limits at Wolvercote Roundabout, Eynsham Roundabout, Cassington traffic lights, and Witney Road traffic signals. Queueing can be observed at these junctions throughout the day; and
- Underlying link capacity issues. At present these are masked to a great extent by the junction capacity issues but are witnessed in the PM peak for westbound traffic between Eynsham and Shores Green.

Collisions

3.3.42 A Collision Investigation Study[17] was undertaken by AECOM. The study shows a decrease in the number of year-on-year collisions over the five years between 2015 and 2019. Overall, 53 personal injury collisions occurred during the 60-month study period from 01/01/2015 to 31/12/2019. A single collision resulted in a fatality, 14 collisions resulted in serious injury severity and 38 collisions resulted in slight injury severity. The findings from the Collision Investigation Study found that the overwhelming majority of collisions were due to road user behaviour factors (around 93.3%) and not road geometry or environment factors, (which accounts for around 5.5%).

3.3.43 Figure 3-27 and Figure 3-28 show the location of crashes along the A40 and surrounding road network for the past 5 years (2015-2019), extracted from the online CrashMap tool. This shows that there are more collisions to the east of Eynsham towards Duke's Cut. There does not appear to be a pattern to the severity of the accidents along the A40, however more severe accidents tend to occur at junctions. There are several clusters of accidents along the A40 which could be considered a hot spot. There is a clear hot spot of accidents near Hill Farm, east of Witney, most likely due to the road layout transitioning from a dual carriageway to a single carriageway and vehicles having issues while merging. Additionally, north of Eynsham at the Cuckoo Lane junction and Lower Road roundabout there is a hotspot for collisions. This could be due to the lack of signalisation at these junctions resulting in less traffic regulation and increasing the likelihood of queues. Along the eastern section of the A40 (from Eynsham to Duke's Cut) collisions are spread across the length of the road which may be caused by the extensive queueing along this section. There has been a recent collision that resulted in multiple fatal casualties that occurred on the Wolvercote Rail bridge at Duke's Cut in October 2020, There are no details at present. More information may be released following the inquest which will be held in March 2021.

3.3.44 The Duke's Cut Scheme (in conjunction with other A40 schemes) will result in new layouts therefore this will provide an opportunity to implement a safe design option to help reduce the collisions (such as by following design guidelines including Design Manual for Roads and Bridges and DfT's 'Cycle Infrastructure Design: Local Transport Note 1/20').

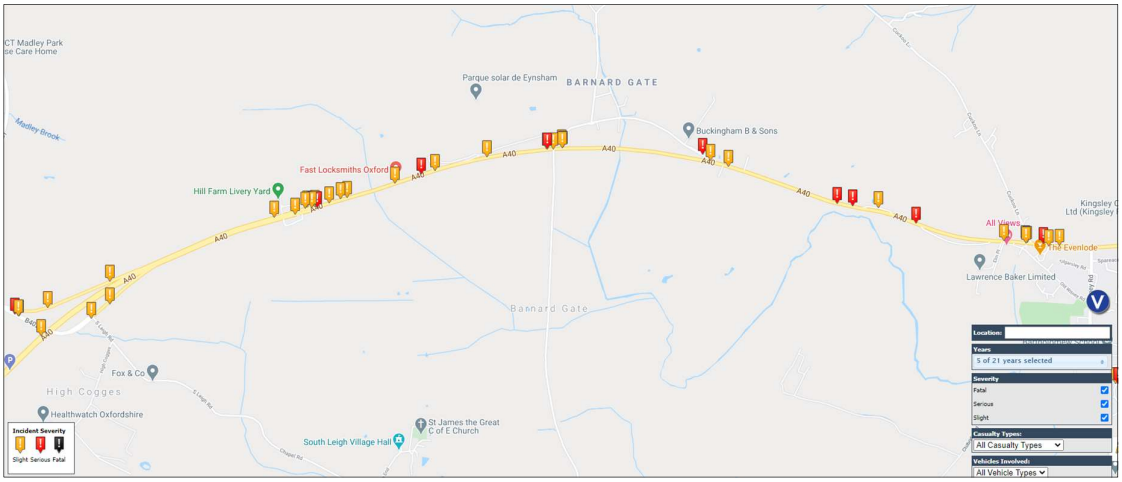


Figure 3-27 Location of Collisions along the A40 between Witney and Eynsham, 2015-2019
Source: Export from https://www.crashmap.co.uk/Search

[17] 2019, as part of the A40 Park and Ride and Bus Lane Scheme Transport Assessment

Figure 3-28 Location of Collisions along the A40 between Eynsham and Duke's Cut, 2015-2019

Source: Export from https://www.crashmap.co.uk/Search

3.3.45 Figure 3-29 and Figure 3-30 below show collisions along the A40 where the vehicle involved was a cyclist for the period 2015 – 2019. This shows that there are a fairly low number of collisions involving cyclists, and collisions tend to occur at junctions rather than along the main carriageway. There are a cluster of collisions at the roundabout just east of Duke's Cut, and one of these was fatal. Over the past five years there has been one serious accident at the Lower Road roundabout and one serious accident at the Shores Green slip roads. The majority of collisions along the A40 involving cyclists have been slight in nature.

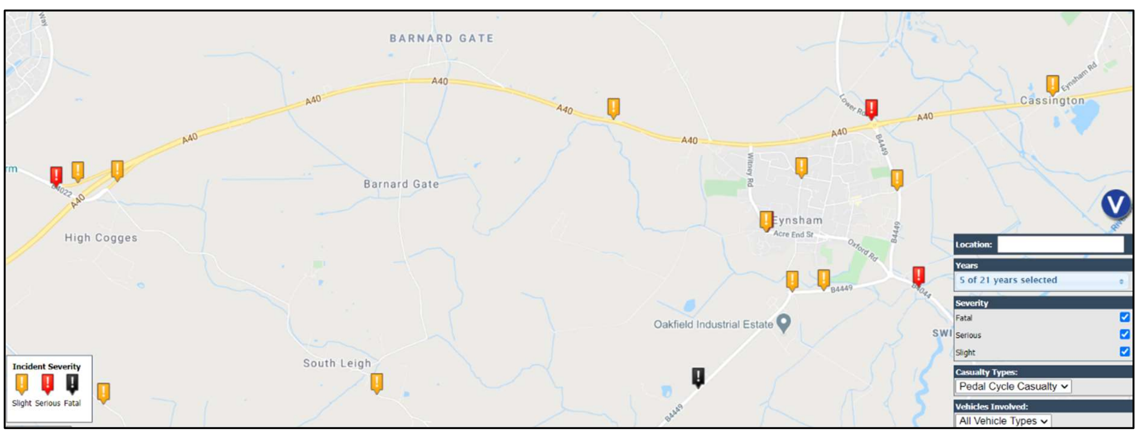


Figure 3-29 Location of Collisions involving Cyclists along the A40 between Witney and Eynsham

Source: Export from https://www.crashmap.co.uk/Search

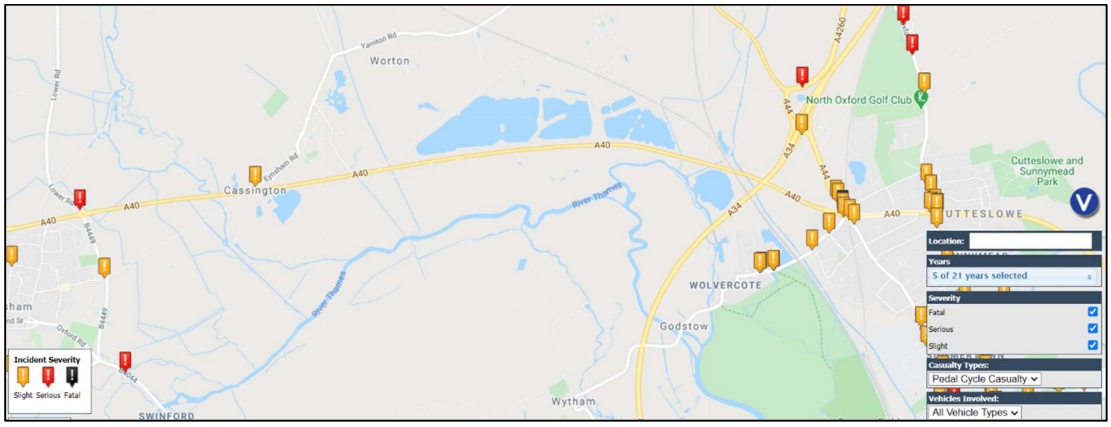


Figure 3-30 Location of Collisions involving Cyclists along the A40 between Eynsham and Duke's Cut
Source: Export from https://www.crashmap.co.uk/Search

3.3.46 As shown in Figure 3-31 there have been very few collisions involving pedestrians over the period 2015 – 2019. There were no collisions east of Eynsham towards Witney hence why the map focusses on Eynsham to Duke's Cut. Notably, there has been one fatal collision involving a pedestrian along the A40 between Cassington and Duke's Cut. However, other factors were given as to the circumstances around the fatal accident that are not related to the road geometry or the environment. (A passenger of a parked vehicle, following an altercation with the driver, exited the vehicle under the influence of alcohol and stepped in front of a passing motorist) There have been no further collisions involving pedestrians along the A40. This could be due to low numbers of pedestrians using the shared path alongside the A40, but nonetheless the fatal collision highlights that it is paramount that the safety of the shared path needs to be improved.

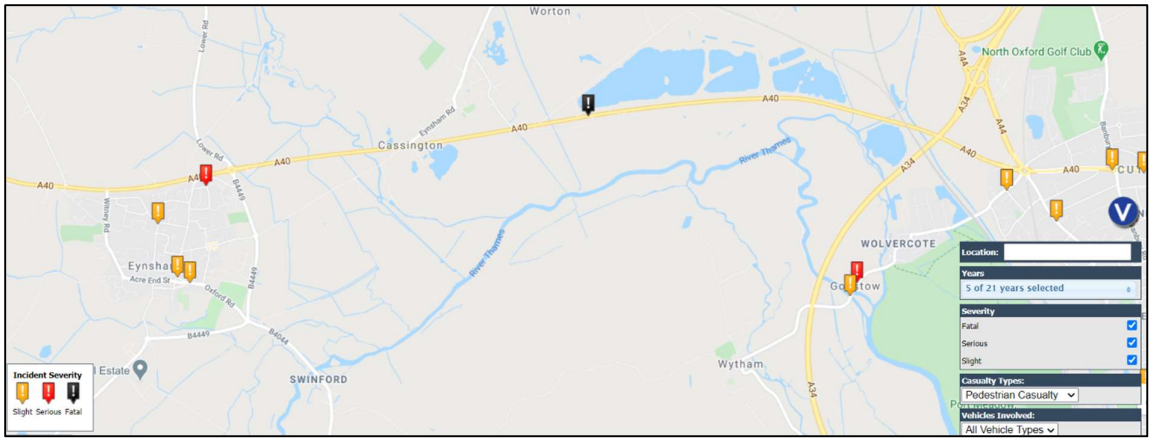


Figure 3-31 Location of Collisions involving Pedestrians along the A40 between Eynsham and Duke's Cut

Environment

3.3.47 The A40 corridor is partly located in an environmentally sensitive area, with an Air Quality Management Area (AQMA), Noise Important Areas, the Oxford Green Belt, and other ecological/landscape designations, such as the Special Areas of Conservation.

3.3.48 Figure 3-32 and Figure 3-33 outline the ecological designations in the wider area around the A40 corridor. Of special significance is the AQMA the whole of Oxford City (Figure 3-33). An AQMA is an area where, based on review and assessment of air quality, the local authority has judged that it is unlikely to achieve the national air quality objectives. As a result of exceedances of the annual mean Limit Value for nitrogen dioxide (NO_2), an AQMA was designated in Oxford in 2010.

3.3.49 Another ecological designation of significance is the Special Area of Conservation (SAC) located south of the A40 corridor around Duke's Cut and Lower Wolvercote (Figure 3-32). SACs are sites that have been adopted by the European Commission, and formally designated by the national government, to protect the habitats and species in the area. The level of protection afforded by the SAC status means that encroachment into the designated area by any transport improvement is unlikely to be permitted. In addition, the flora in this area would be potentially affected by air pollution from the A40.

3.3.50 Near to the proposed Duke's Cut scheme, there are some locations which are likely to be impacted by changing air quality levels. These are as follows:

- Residential properties close to the A40 in Wolvercote;
- Residential properties close to the A40 in north Oxford;
- Existing properties near to Duke's Cut;
- Oxford Canal;
- Oxford Meadows SAC; and
- Oxford AQMA.

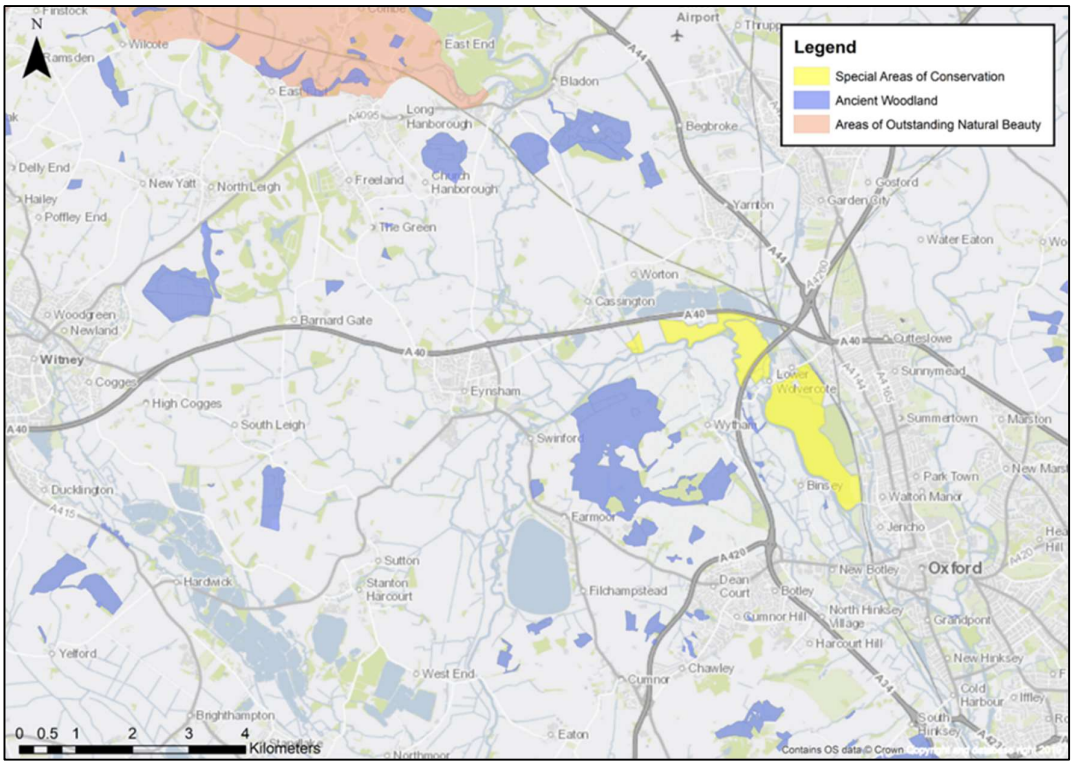


Figure 3-32 Special Areas of Conservation, Ancient Woodland, and Areas of Outstanding Natural Beauty
Source: Natural England Open Data (2019); DEFRA (2019); AECOM © Crown copyright and database right 2020

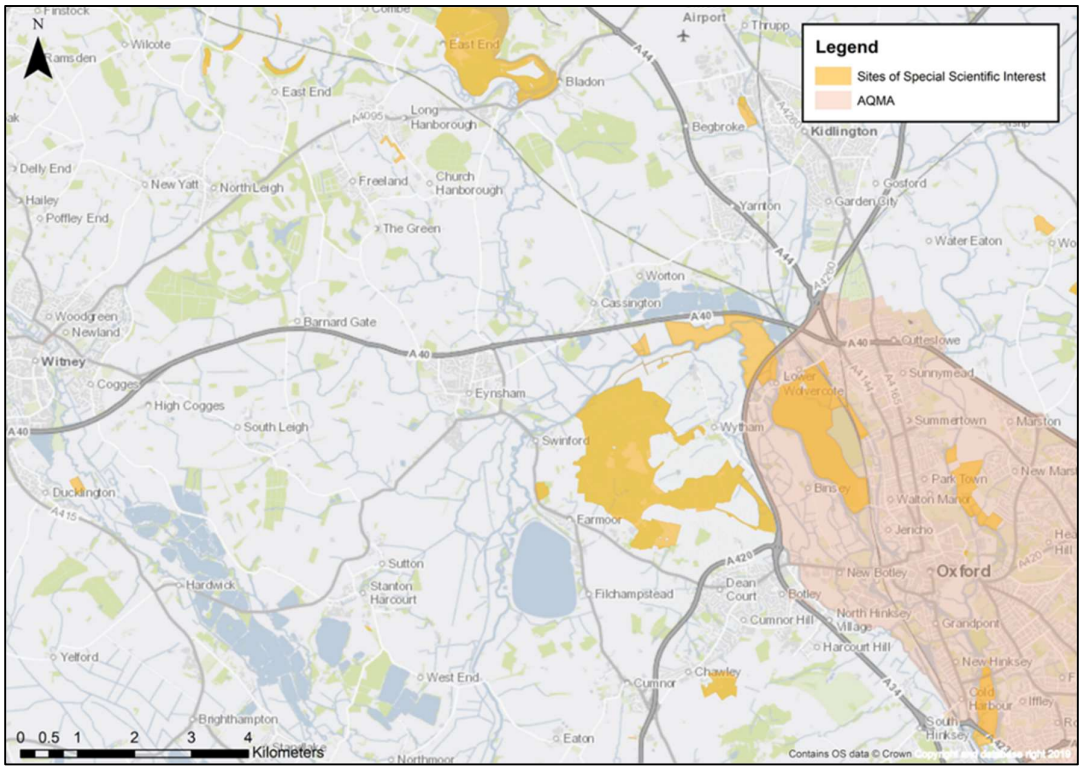


Figure 3-33. Air Quality Management Area and Sites of Special Scientific Interest
Source: Natural England Open Data (2019); DEFRA (2019); AECOM © Crown copyright and database right 2020

3.3.51 Noise Important Areas are the noise hotspots where the 1% of the population that are affected by the highest noise levels from major roads are located, according to the results of strategic noise mapping. Figure 3-34 demonstrates that several noise important areas are present along the A40 corridor, including in Eynsham and between Wolvercote Roundabout and Cutteslowe Roundabout. The Defra Noise Action Plan: Roads (2019) sets out that the relevant highway authorities are responsible for examining Noise Important Areas and forming a view about what measures, if any, might be taken in order to assist with the implementation of the Government's policy on noise.

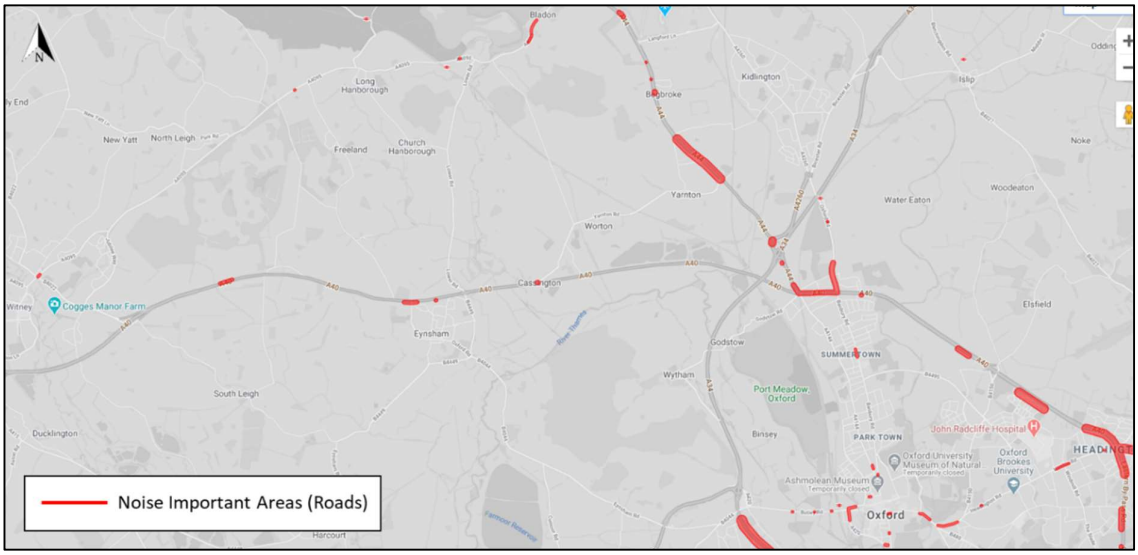


Figure 3-34. Noise Important Areas (Roads)
Source: www.extrium.co.uk

3.3.52 Furthermore, it is important to highlight any noise sensitive receptors along the A40 which may be impacted by changing noise levels due to the Duke's Cut scheme. This includes:

- Residential properties close to the A40 in Wolvercote;
- Residential properties close to the A40 in north Oxford;
- Existing properties near to Duke's Cut;
- Oxford Meadows SAC;
- NCN Route 5 near Duke's Cut;
- Oxford Canal.

3.3.53 Figure 3-35 shows the flood risk from rivers or sea along the A40. This shows that the majority of flood risk along the A40 is near and east of Eynsham towards Oxford. Near to Duke's Cut, there are areas of medium and high flood risk, due to the proximity to the River Thames. This flood risks needs to be considered as part of the design of the A40 Dualling, as it could lead to challenges with the design.

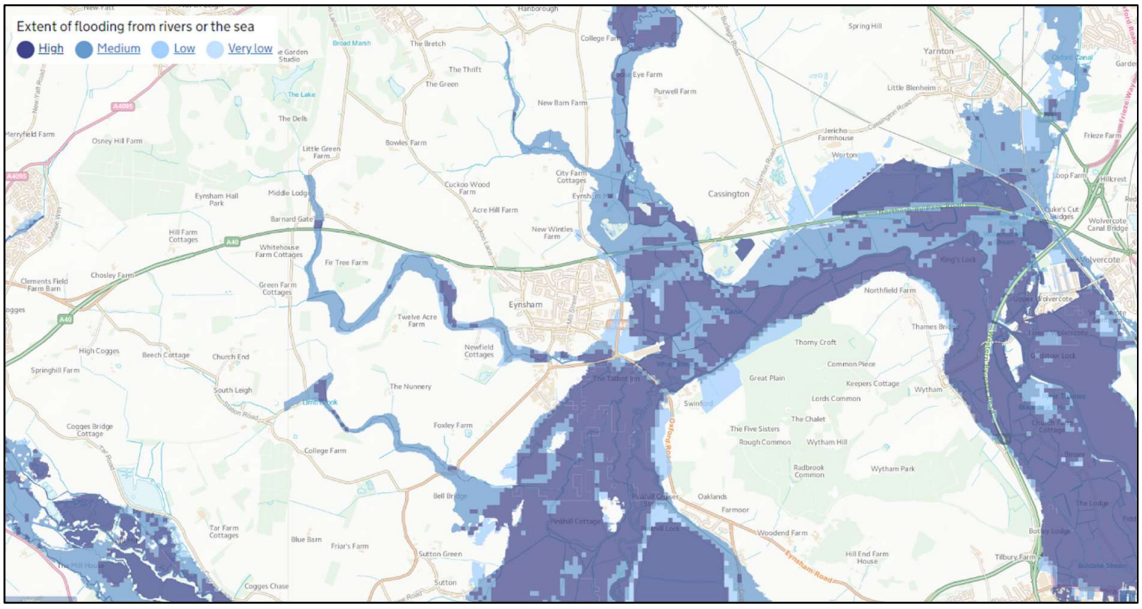


Figure 3-35 Flood risk along A40

Source: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

3.3.54 The visual impact of the proposed Duke's Cut improvements on local receptors should also be considered. It is likely the alignment of the Duke's Cut scheme will have visual impacts upon:

- Residential properties close to the A40 in Wolvercote;
- Residential properties close to the A40 in north Oxford;
- Existing properties near to Duke's Cut;
- Oxford Canal; and
- Footpaths near to Duke's Cut, including NCN Route 5 near the Oxford Canal.

3.3.55 Additional environmental constraints around the A40 corridor include:

- The entire length of the A40 from Eynsham Roundabout to the Oxford Ring Road lies within the Oxford Green Belt. This includes the village of Cassington;
- Immediately to the west of the A34 there are a series of bridges over the Oxford Canal, Oxford-Banbury/Worcester railway and Duke's Cut (a canal link connecting the Oxford Canal and River Thames) where the verge is limited to that necessary for the provision of the footway/cycleway (0.7 km). Any on-line improvement to the route would need these bridges to be either widened, supplemented or replaced. This would add considerably to the cost and engineering complexity of such a scheme;
- The Cassington Gravel Works form the northern boundary of the A40 for most of the section of road between Cassington and Duke's Cut. The current workings, including the materials processing plant, are to the western end of the site around the line of the old Oxford-Witney railway, which has been converted into a haul road for the site. The gravel works (current and worked out) cover the entire area between the A40 and the Cotswold rail line and could present an important constraint to any off-line transport improvements; and
- It is believed that there is the site of a medieval village adjacent to the A40 in this area, although its exact location is not known.

3.3.56 Addressing these issues will need to take into account Policy 1 of OCC's LTP4, which states that the county will work to ensure that the transport network supports sustainable economic and housing growth in the county, whilst protecting and where possible enhancing its environmental and its creative, cultural, heritage and tourism assets, and supporting the health and wellbeing of its residents.

3.4 Future Conditions

3.4.1 In order to effectively appraise the Duke's Cut scheme, it is imperative to understand the future context and situation in which the schemes will sit. As part of this, the following section provides an overview of development proposals, and forecasted transport conditions.

Future Growth

3.4.2 The population in West Oxfordshire is expected to grow in the future. The West Oxfordshire Local Plan 2031 commits to delivering 13,200 new homes between 2011-2031, the equivalent of 660 new homes per year. In addition, West Oxfordshire is delivering an additional 2,750 new homes between 2021-2031 to assist Oxford City in meeting its unmet housing need. As a result, the total level of housing provision until 2031 is forecast to be at least 15,950 homes.

3.4.3 A significant proportion of this housing will be provided in the towns of Witney, Carterton and Chipping Norton, and around 10,000 of the new homes will be delivered along the A40 corridor in Carterton, Witney, and Eynsham Parish. Based on existing travel choices the substantial future growth would worsen the current congestion on the A40 corridor due to its limited capacity. However, The A40 corridor improvement schemes, including the Duke's Cut scheme, aim to alleviate congestion by encouraging a modal shift from the private car to the more sustainable use of public transport, walking and cycling, will increase the A40 corridor capacity and facilitate delivery of these new homes. Four key Strategic Development Areas have been identified along the A40 corridor (mentioned in the section 2.2.5 and shown in Figure 2 1).

3.4.4 Two of the key sites surrounding the A40 are the Salt Cross Garden Village (SCGV) development area and the West Eynsham Strategic Development Area (SDA). SCGV and West Eynsham SDA combined will provide around 3,200 new homes, a Science Park generating a significant number of new jobs, primary and secondary education provision and additional service facilities. Although the two developments are separated by the physical barrier of the A40, there are several interdependencies between SCGV and West Eynsham SDA including transport and access arrangements.

3.4.5 In addition, the proposed Oxford North development which is set to inhabit land between the A44 and A40 is of interest, especially for the Duke's Cut scheme. This development, if it goes ahead, will directly increase traffic along the A40 near to Duke's Cut, further exacerbating existing congestion issues if no mitigating measures are taken.

3.4.6 According to the Oxford Local Plan 2036, 10,884 new homes will be delivered in Oxford between 2016-2036. In addition to this, and as a result of the constrained nature of Oxford (due to greenbelt and other sensitive areas), the remaining Oxfordshire districts need to collectively deliver 14,300 dwellings by 2031 to assist Oxford in meeting its unmet housing need.

3.4.7 In the county as a whole, 88,000 new jobs and 100,000 new homes will be delivered between 2011-2031 (number of homes by site is listed in Appendix A), as set out in Oxfordshire's Strategic Housing Market Assessment. Up to 4,556 of these new jobs will be delivered at Oxfordshire Cotswold Garden Village, just north of the A40 near Eynsham.

Transport Modelling

3.4.8 As part of the successful HIF bid, modelling was undertaken using the Oxfordshire Strategic Model (OSM) in order to assess the impact of the Duke's Cut scheme on the transport network. Three scenarios were tested:

- Scenario P, Do Nothing, Future Year Growth; without 'dependent' development; without transport interventions
- Scenario S, Future Year Growth; without 'dependent' development; with transport interventions
- Scenario R, Future Year Growth; with dependent development; with transport interventions

3.4.9 The results from Scenario P show that the growth in housing and employment within the vicinity of the A40 Corridor is likely to negatively impact upon the transport network. OSM modelling of Scenario P shows that with 5,223 independent new homes increased delay and congestion are likely. Queues and delays are likely to be experienced at the A40 junctions with Cassington Road, Witney Road and Cuckoo Lane. These junctions are forecast to be approaching capacity or over capacity.

3.4.10 OSM forecasting of Scenario S shows that the introduction of the proposed A40 dualling is likely to attract induced highway demand, by providing additional capacity, whilst reducing delay and increasing average speeds. In terms of highway operation, the Duke's Cut component of the A40 schemes has only a negligible impact on network performance.

3.4.11 High level observations from OSM based on 2041 Scenario R suggest that tidal movement patterns are likely to persist along the A40 with the main movement eastbound towards Oxford in the AM peak and westbound from Oxford in the PM peak. Demand levels along the A40 corridor are consistent as alternative parallel routes are less attractive.

3.4.12 Overall, the observations for the AM peak are as follows:

- Due to the growth and the associated increase in capacity more traffic is drawn to the A40 corridor
- Additional capacity is provided for bus services at Duke's Cut and westbound along the A40 corridor
- There is a forecast increase in general network delay eastbound on the dual motorway section east of Witney at the proposed roundabout junction enabling HIF development site access. This increase in delay is likely to be associated with additional demand accessing the network at the new junction. As the design evolves this junction may need to be amended to facilitate additional capacity
- Widening at Duke's Cut is likely to lead to reduced bus journey times through this section

3.4.13 Overall, the observations for the PM peak are as follows:

- As with the AM peak, additional traffic is drawn to the A40 corridor
- There is a forecast increase in general network delay eastbound and westbound on the dual motorway section east of Witney. This increase in delay is likely to be associated with additional demand accessing the network from proposed HIF development sites. As the design evolves a multi lane signal-controlled roundabout may be required to provide additional capacity
- Public transport modelling suggests that the introduction of the westbound bus lane in Scenario S is likely to reduce bus journey times between Wolvercote and Witney, when compared to Scenario P, particularly in the PM peak, bus journey times are forecast to reduce by almost 5 minutes. Modelled comparison of bus journey times between Scenario R and Scenario P suggest a forecast reduction in bus journey time of around 4 minutes in the PM peak. This equates to a bus journey time increase of around 1 minute for Scenario R with proposed HIF growth included.

3.4.14 Given the scale of growth and existing issues, it is unlikely that congestion and delay can be completely removed from the A40 entirely. HIF infrastructure is likely to improve A40 performance in Scenario S, however some corridor delays are likely to be experienced and junction design review may be required, particularly to the development access roundabout. The proposal does bring substantial advantages to public transport journey speed and reliability along the corridor, enhancing this both for existing journeys and those from the new developments.

3.4.15 In addition, it is noted as part of the HIF bid that Provision of additional bus priority lane capacity through Duke's Cut connects the A40 eastbound bus priority lane (provided by LGF) to Wolvercote and removes a significant public transport pinch point. Removal of this network constraint is likely to improve bus journey reliability eastbound along the corridor towards Oxford.

3.4.16 Public transport modelling suggests that the provision of additional eastbound bus lane capacity at Duke's Cut in Scenario S, is likely to reduce bus journey times between Wolvercote and Witney, when compared to Scenario P, particularly in the morning peak, where bus journey times are forecast to reduce in excess of 3 minutes. Modelled comparison of bus journey times between Scenario R, with HIF growth and infrastructure, and Scenario P, without infrastructure or growth, suggest a forecast reduction in eastbound bus journey time approaching 1.5 minutes in the morning peak. This equates to a bus journey time increase of around 2 minutes eastbound for Scenario R with proposed HIF growth included.

3.5 Identifying the need for Intervention

3.5.1 The analysis to date has demonstrated that there are significant challenges on the A40 corridor between Witney and Oxford, both existing issues and future concerns.

3.5.2 These include vehicle congestion, which affects both private and public transport modes, air and noise pollution, a lack of peak-time public transport provision and potential safety concerns. In addition, if housing development comes forward as planned, there will be significant capacity issues on the existing infrastructure. There is a clear need for infrastructure improvements to enable delivery of additional homes in the area.

3.5.3 The A40 is an important long-distance route linking central and east England with south west England and south and west Wales. It is also the major arterial route in West Oxfordshire linking the growing towns of Witney and Carterton with Oxford and the wider country. Thus, intervention is needed to:

- **Encourage modal shift to sustainable travel**: Significant private car traffic congestion reduces bus reliability and attractiveness. This includes improving integration between various modes as a means of reducing car travel and encouraging the use of more sustainable modes of transport.
- **Provide high quality cycling and walking provision**: to encourage more sustainable and active travel.
- **Protect and enhance the environment**: There is an AQMA along the eastern section of the A40 corridor, between Wolvercote and Cutteslowe, that was declared in 2010 due to exceedances of nitrogen dioxide. The A40 corridor is surrounded by several ecological/landscape designations, such as noise important areas and Special Areas of Conservation (SACs).
- **Reduce congestion**: There are long-standing issues of congestion and journey time unreliability on the A40 corridor, issues which are likely to be exacerbated by planned local growth.
- **Support local growth**: West Oxfordshire will deliver an increase of 15,950 homes by 2031, most of which will be centred around Witney, Carterton, and Eynsham. Local growth plans also include the delivery of 4,556 new jobs in Salt Cross Garden Village, a new garden village to the north of A40, near Eynsham. Furthermore, economic growth, including increased employment, is planned more widely across West Oxfordshire. There is a Science Park proposed at Salt Cross. Reliable infrastructure is essential to support local growth, as well as providing enhanced connectivity from West Oxfordshire to employment areas in central, northern and eastern Oxford.

3.5.4 As such, the analysis of challenges to date has demonstrated the need for interventions to address the issues and ensure the area has transport provisions suitable for the intended increase in housing.

3.5.5 The next chapter sets out scheme objectives that have been developed on the basis of the identified challenges and existing policies, both local and national.

3.5.6 A longlist of options was then generated to address the identified challenges by meeting the proposed objectives. For this assessment, a modally agnostic approach is taken, irrespective of previously identified or 'preferred' options.

4 Development of Scheme Objectives

4.1 Scheme Objectives

4.1.1 This chapter of the report sets out the agreed scheme objectives based on the assessment of contextual factors, challenges and the underlying policy context set out in the previous two chapters of this report.

4.1.2 As such, the objectives have been tailored to the need for the Duke's Cut scheme, but also to maintain consistency with the wider policy aspirations, other A40 corridor schemes and ensure that the scheme will contribute to delivering wider regional policies and plans.

4.1.3 The scheme objectives were agreed in workshops with OCC, and after reviewing them against the objectives in the LTP4 and West Oxfordshire District Council's (WODC) Local Plan. The objectives for each of these are set out in turn, with alignment between the two shown in Table 4-2. The A40 Corridor Strategy Objectives are also considered, as the Duke's Cut scheme was originally developed as part of this strategy.

4.1.4 All potential scheme options will be assessed against these objectives.

4.2 LTP4 and WODC Local Plan Objectives

4.2.1 The OCC 'Connecting Oxfordshire' Local Transport Plan 4 (LTP4) developed three overarching transport goals around the economy (1), the environment (2) and society (3), and ten objectives to support these goals. These are set out in Table 4-1.

Table 4-1 LTP4 Goals and Objectives

LTP4 Goals		LTP4 Objectives
LTP4#1 – Support jobs and housing growth and economic vitality	1.1	Maintain and improve transport connections to support economic growth and vitality across the county
	1.2	Make most effective use of all available transport capacity through innovative management of the network
	1.3	Increase journey time reliability and minimise end-to-end public transport journey times on main routes
	1.4	Develop a high-quality, innovative and resilient integrated transport system that is attractive to customers and generates inward investment
LTP4#2 – Reduce emissions, enhance air quality and support the transition to a low carbon economy	2.1	Minimise the need to travel
	2.2	Reduce the proportion of journeys made by private car by making the use of public transport, walking and cycling more attractive
	2.3	Influence the location and layout of development to maximise the use and value of existing and planned sustainable transport investment
	2.4	Reduce per capita carbon emissions from transport in Oxfordshire in line with UK Government targets
LTP4#3 – Support social inclusion and equal opportunities; protect and enhance the environment and improve quality of life (including public health, safety and individual wellbeing)	3.1	Mitigate and wherever possible enhance the impacts of transport on the local built, historic and natural environment
	3.2	Improve public health and wellbeing by increasing levels of walking and cycling, reducing transport emissions, reducing casualties and enabling inclusive access to jobs, education, training and services

Source: Connecting Oxfordshire: Local Transport Plan 2015-2031, Oxfordshire County Council

4.2.2 The specific transport related objectives identified in the WODC Local Plan are listed in

4.2.3 Table 4-2 below. In addition, these have been mapped to the most pertinent OCC LTP4 objectives to demonstrate the synergy and consistency between them. The WODC objectives include a combination of economic, environmental, and social elements, and hence any one objective may map to more than one of the LTP4's three overarching goals.

Table 4-2 WODC Local Plan 2031: Transport-related Core Objectives

Core Objectives (CO)	Description	Map to LTP4 Objectives
CO1	Enable new development, services and facilities of an appropriate scale and type in locations which will help improve the quality of life of local communities and where the need to travel, particularly by car, can be minimised	1.1, 2.1
CO10	Ensure that land is not released for new development until the supporting infrastructure and facilities are secured	1.2, 2.3
CO11	Maximise the opportunity for walking, cycling and use of public transport	1.3, 2.2
CO13	Plan for enhanced access to services and facilities without unacceptably impacting upon the character and resources of West Oxfordshire	3.1, 3.2
CO15	Contribute to reducing the causes and adverse impacts of climate change, especially flood risk	2.4, 3.1
CO16	Enable improvements in water and air quality	3.1
CO17	Minimise the use of non-renewable natural resources and promote more widespread use of renewable energy solutions	2.4

4.2.4 The objectives above, from both the OCC's LTP4 and WODC's Local Plan, have been used to inform the Duke's Cut scheme objectives, as found in Section 0. The LTP4 acknowledges that predicting and providing for increased demand for road travel by car and freight vehicles solely in the form of highway capacity improvements is neither affordable nor desirable from an environmental or economic perspective. Therefore, it is considered vital that journeys made by sole occupancy vehicles are reduced. Further to this, it is also highlighted in LTP4, and in the WODC Core Objectives, that journey time delays on the road network can impact on the local economy and make the area less desirable for living and working. There is also an important emphasis on ensuring that any impacts upon the environment are kept to a minimum, or better yet reduced. Both the LTP4 and WODC's Local Plan put a clear emphasis on Climate Change and reducing emissions across Oxfordshire in line with Government targets. Overall the objectives from the above documents place a focus on enabling housing and economic growth, encouraging use of sustainable transport and improving the natural environment, all of which are covered as part of the Duke's Cut objectives.

4.3 A40 Corridor Strategy Objectives

4.3.1 The **A40 Corridor Strategy**, which forms the basis of the development of the Duke's Cut scheme, was developed alongside the WODC Local Plan. The overarching A40 Strategy has three core objectives:

- a) Improve travel times and journey reliability along the A40 corridor, particularly between Witney and Oxford;
- b) Stimulate economic growth, in line with the Oxfordshire Strategic Economic Plan; and
- c) Improve safety and reduce environmental impacts such as air pollution and noise along the A40 corridor. These objectives were developed to address the specific problems identified while taking into account the relevant County and District goals and objectives.

4.3.2 The A40 Corridor Strategy was initially comprised of two overarching schemes, the A40 Science Transit 2 and the A40 Smart Corridor. In formulating the objectives for these two overarching schemes, the key challenges and priorities were distilled, and objectives created accordingly.

4.4 A40 Science Transit Objectives

4.4.1 As part of the A40 STP2 scheme, five objectives were defined. Table 4-3 below outlines the linkages between the objectives for the A40 STP2 scheme, the LTP4 goals and objectives and outlines any relevance to the A40. The red, yellow and orange represent a high, medium and low relevance to the A40 respectively. This clearly shows that the A40 STP2 as a scheme is aligned with the goals and objectives of LTP4 and will help achieve the aims of the LTP4.

Table 4-3 Connecting Oxfordshire links to Science Transit Phase 2 Objectives

LTP4 Goals	LTP4 Objectives	Relevance to A40 situation	STP2 Objectives
To support jobs and housing growth and economic vitality	Maintain and improve transport connections to support economic growth and vitality across the county	**High** – West Oxfordshire has the lowest productivity and competitiveness in the county but has been identified for significant growth	To improve travel times and/or journey reliability between Witney/Carterton and Oxford To stimulate economic growth within Oxford, West Oxfordshire and the Oxfordshire Knowledge Spine Interface with existing and committed schemes in the corridor including P&R To reduce carbon emissions and other pollutants associated with travel To encourage safer travel between Witney/Carterton and Oxford
	Make most effective use of all available transport capacity through innovative management of the network	**High** – A40 is at or close to capacity for much of the day leading to problems	
	Increase journey time reliability and minimise end-to-end public transport journey times on main routes	**High** – journey times along A40 have high variability and buses have no way to avoid them	
	Develop a high quality, innovative and resilient integrated transport system that is attractive to customers and generates inward investment	Low – Will be significant whichever option is chosen	
To support the transition to a low carbon future	Minimise the need to travel	Low – none of the options would have a direct impact on this, although they may have an indirect impact through influencing location of development or encouraging longer distance commuting	
	Reduce the proportion of journeys made by private car by making the use of public transport, walking and cycling more attractive.	**High** – The high levels of bus use between West Oxfordshire and Oxford city centre has been a notable success of the county's transport strategy of the last 20- 30 years	
	Influence the location and layout of development to maximise the use and value of existing and planned sustainable transport investment	Low – Will be significant whichever option is chosen	
	Reduce per capita carbon emissions from transport in Oxfordshire in line with UK Government targets.	**High** – stationary or slow-moving traffic will be emitting excess carbon for extended periods daily	
To support social inclusion and equality of opportunity **To protect and, wherever possible enhance Oxfordshire's environment and improve quality of health** **To improve public health, safety and individual well being**	Mitigate and wherever possible enhance the impacts of transport on the local built, historic and natural environment	Medium – this would need to be taken into account whichever option is chosen	
	Improve public health and wellbeing by increasing levels of walking and cycling, reducing transport emissions, reducing casualties and enabling inclusive access to jobs, education, training and services	**High** – stationary or slow-moving traffic will be emitting excess carbon for extended periods daily; traffic conditions may put off prospective walkers or cyclists on route.	

Source: A40 Science Transit 2 – Option Assessment Report, Oxfordshire County Council (2017)

4.5 A40 Smart Corridor Objectives

4.5.1 Three main challenges informed the development of six objectives for the A40 Smart Corridor. These challenges, along with the A40 Smart Corridor objectives and links between these objectives and the WODC and LTP4 objectives set out below in Table 4-4.

Table 4-4 A40 Smart Corridor Objectives

Challenge Summary	A40 Smart Corridor Objectives	Measures of Success	Map to WODC Transport and LTP 4 Objectives
There are long-standing issues of congestion and journey time unreliability on the A40 corridor, issues which are likely to be exacerbated by planned local growth.	Ensure the impact of additional housing on the transport network is acceptable and associated impacts on it are adequately mitigated	Traffic queueing and congestion levels	CO1, CO13 LTP4#1, LTP4#2
West Oxfordshire will deliver an increase of 15,950 homes by 2031, most of which will be centred around Witney, Carterton, and Eynsham. Local growth plans also include the delivery of 4,556 new jobs in Oxfordshire Cotswolds Garden Village, a new garden village to the north of A40, near Eynsham.	Unlock the delivery of 4,813 additional homes along the A40 Smart Corridor in support of the Housing and Growth Deal	Delivery of homes	CO1 LTP4#1, LTP4#2
	Support the delivery of 2,222 affordable homes along the A40 Smart Corridor	Delivery of affordable housing	
	Unlock economic growth at key employment sites along the 'Knowledge Spine' at Oxfordshire Cotswolds Garden Village	Delivery of jobs	
Significant traffic congestion reduces bus reliability and attractiveness and contributes to air and noise pollution.	Encourage sustainable bus travel between Eynsham/Witney/wider area and Oxford	Mode shift to bus	CO1, CO11, CO16 LTP4#2, LTP4#3
	Encourage sustainable cycle and pedestrian travel between Eynsham/Witney/wider area and Oxford	Mode shift to walk and cycle Improved air quality and wellbeing	

4.6 Duke's Cut Objectives

4.6.1 The objectives for the proposed scheme are a combination of both the A40 Smart Corridor and A40 STP2 objectives and therefore also draw on the LTP4 and WODC Local Plan objectives, as explained above. The **objectives for the Duke's Cut scheme** are as follows:

Table 4-5 Duke's Cut Scheme Objectives

Ref	Theme	Objective	Relevance against the scheme
Objective 1	Support housing development	Unlock the delivery of 4,813 additional homes along the A40 Smart Corridor in support of the Housing and Growth Deal	Improve public transport access and supply to / from West Oxfordshire to Oxford and the developments
Objective 2		Support the delivery of 2,222 affordable homes along the A40 Smart Corridor	
Objective 3		Ensure the impact of additional housing on the transport network is acceptable and associated impacts on it are adequately mitigated	Additional capacity provided further enhances the benefits of the rest of the A40 Corridor schemes
Objective 4	Support economic growth	Unlock economic growth at key employment sites along the 'Knowledge Spine' at Oxfordshire Cotswolds Garden Village	Additional capacity (both private and public transport) to employment sites and improved accessibility, in particular to the east of Eynsham, such as to Oxford.
Objective 5		To stimulate economic growth within Oxford, West Oxfordshire and the Oxfordshire Knowledge Spine	
Objective 6	Improve sustainable transport and provision	Encourage sustainable bus travel between Eynsham/Witney/wider area and Oxford	Improved access to / from West Oxfordshire to Oxford.
Objective 7		Encourage sustainable cycle and pedestrian travel between Eynsham/Witney/wider area and Oxford	Enhance the current shared footway/ cycleway/ crossings.
Objective 8		To improve travel times and/or journey reliability between Witney/Carterton and Oxford	Additional capacity and resilience.
Objective 9	Environment	To reduce carbon emissions and other pollutants associated with travel	Shift from car to bus would reduce emissions and improve air quality; may also improve journey time. Support climate change agenda.
Objective 10	Improve road safety	To encourage safer travel between Witney/Carterton and Oxford	Redesigned crossing and network would help reduce incidents (including for active travel).
Objective 11	Strategic alignment	Interface with existing and committed schemes in the corridor including P&R	Additional capacity further enhances the benefits of the rest of the rest of the A40 Corridor schemes

5 Option Development and Sifting

5.1 Introduction

5.1.1 This chapter discusses the option development method and assessment framework developed to sift the options. The assessment framework has been developed in accordance to the DfT's the Transport Appraisal Process (2014), EAST Guidance (2017) and the HMT Greenbook (2018).

5.1.2 The options have been derived based on the assessment of current and forecast travel patterns, development and growth, and challenges; previous and current proposals from the relevant local authorities and stakeholders; workshops with Oxfordshire County Council officers; and professional judgement based on experience elsewhere and within Oxfordshire to provide a comprehensive list of options.

5.1.3 It is recognised that options could be packaged in order to provide an optimum solution to the identified problems and achieve the scheme objectives. However, funding, financing and affordability as well as deliverability will need to be taken into account for not just single options but also potential packages. Delivery may be dependent on different agencies, developers and funding sources, and completion and sign-off of other emerging strategies.

5.1.4 Options that are sifted out may still perform well either as part of an overall package; to address other specific issues such as new developments; or following implementation of other options.

5.2 Background

5.2.1 The purpose of this section is to document the strategic option appraisal work that underpins the proposed A40 corridor strategy and the schemes, as well as the more recent optioneering exercise that has been conducted to inform the design of the Duke's Cut scheme. Figure 5-1 gives an overview of the previous strategies and consultations which have taken place in chronological order. The text below considers each of these in turn.

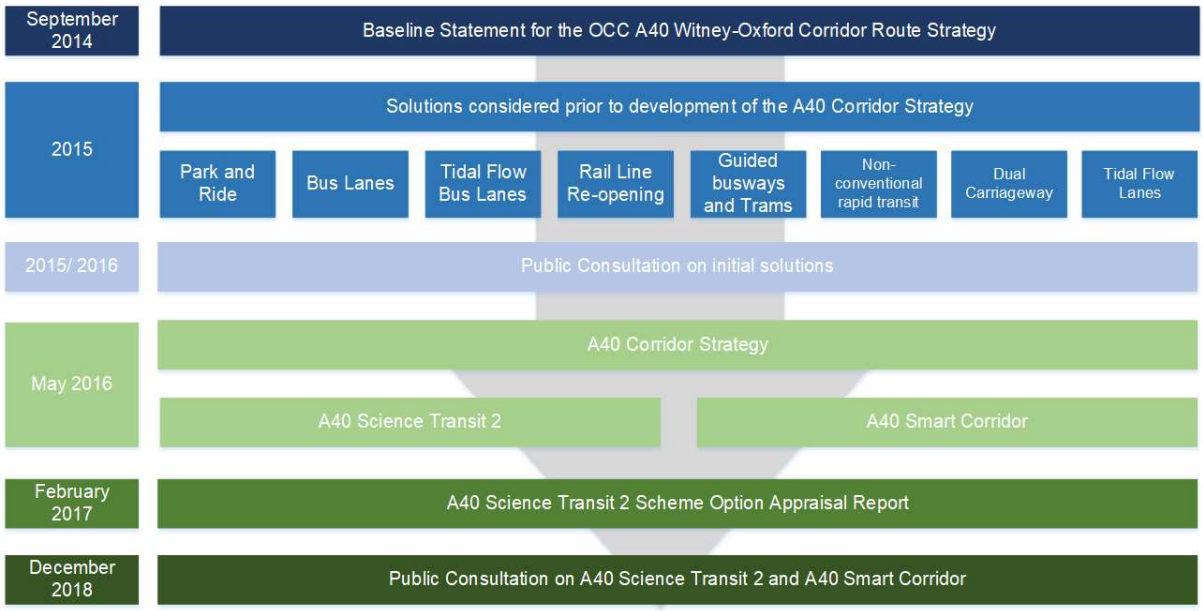


Figure 5-1 Overview of Previous Consultations

5.2.2 A Baseline Statement for the OCC A40 Witney-Oxford Corridor Route Strategy was prepared in September 2014. This identified that the A40 has long standing issues of congestion and leading to extended journey times and high journey unreliability. Key problems and challenges for the corridor were identified and these are outlined in Section 1.1.9 of this report. It has also been noted that there are few alternative means of travel from this part of West Oxfordshire as the alternative routes also suffer from heavy congestion, there are no rail or fixed link connections, buses have no alternative but to use the congested roads.

5.2.3 Furthermore, as part of informing the development of an A40 Corridor Strategy a range of potential improvement solutions were considered including Park and Ride, Bus Lanes, Tidal Flow Bus Lanes and Dual Carriageway. A full list of potential options is shown in Figure 5-1.

5.2.4 Five of these options then went through a public consultation process in 2015, in order to gather public opinions on the potential proposed schemes. The results represent 796 responses in total and can be seen in Figure 5-2 and Figure 5-3. When asked about level of support for each concept presented, the option that received the highest 'strongly support' response, with just under 50%, was the 'dual carriageway' option and the option with the highest 'do not support at all' response, with just over 40%, was the 'guided busway'. When the public were asked '*which one scheme or combinations of options, do you think Oxfordshire County Council give top priority to?',* the top three in favour were 'dual carriageway' with 28%, followed by 'bus lane' with 15%, and 'train' with 13%.

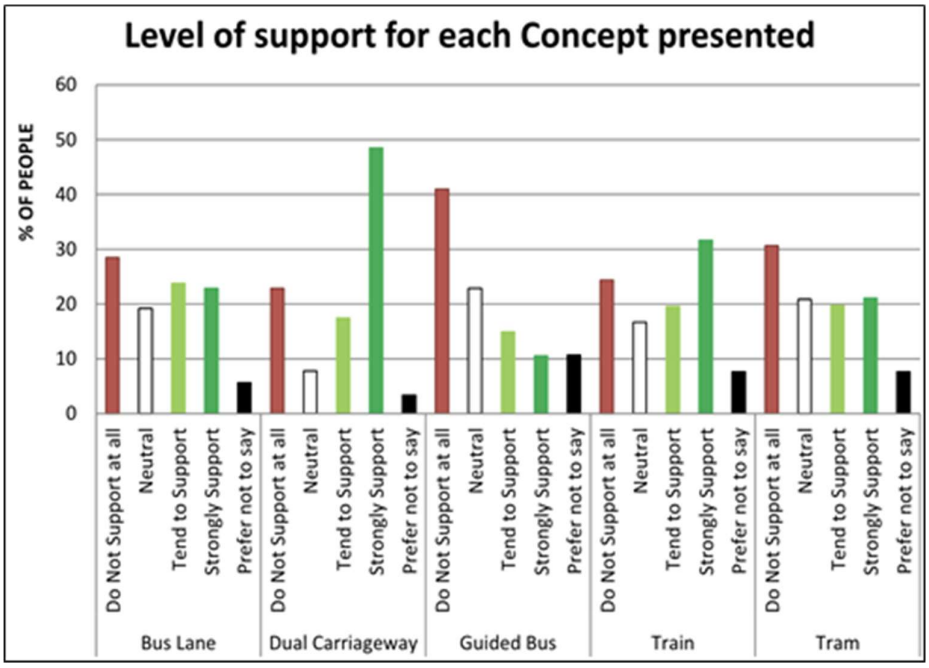


Figure 5-2 Public consultation results (level of support)
Source: Investing in the A40 – Long Term Strategy Consultation Report, OCC (May 2016)

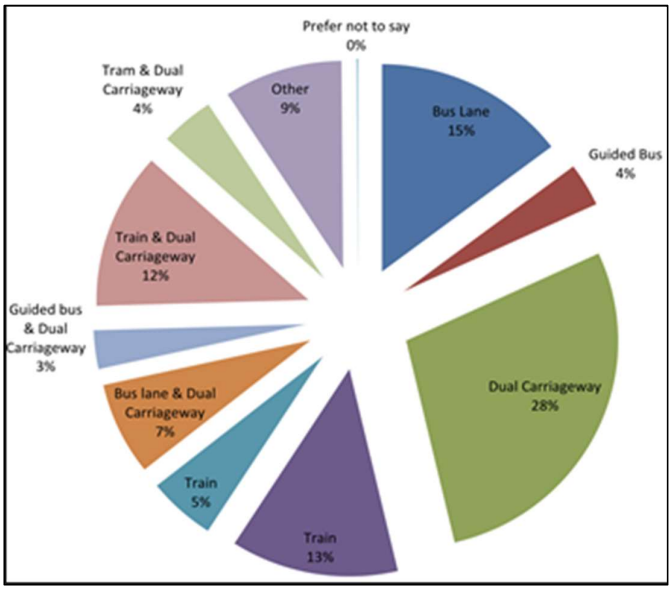


Figure 5-3 Public consultation results (scheme priority)
Source: Investing in the A40 – Long Term Strategy Consultation Report, OCC (May 2016)

5.2.5 Following this consultation, in May 2016 OCC adopted the A40 Corridor Strategy which is a road-based improvement strategy as the most viable and affordable option which could be delivered on a relatively short timescale. The strategy seeks to encourage greater use of public transport and cycling for trips between West Oxfordshire and Oxford. As mentioned previously, the A40 Corridor Strategy promoted two schemes: the A40 Science Transit 2 scheme and the A40 Smart Corridor scheme.

5.2.6 As part of the option appraisal work on the A40 Strategy, A40 Science Transit 2 scheme Option Appraisal Report (2017)[18] was produced. In this report, a number of transport options were assessed based on the DfT's Early Assessment Sifting Tool (EAST)[19] and the results of this appraisal can be found in Table 5-1. The five cases were weighted as: 45% Strategic, 35% Economic, 10% Financial, 5% Managerial, and 5% Commercial. The Duke's Cut scheme was not scored as a specific/ separate option as part of this process, however intervention at Duke's Cut would be required to deliver these options.

[18] A40 Science Transit Phase 2 – Option Assessment Report (OCC, 2017)
[19] EAST is a decision support tool aimed at providing decision makers with relevant, high level, information to help them form an early view of how options perform and compare. The EAST assessment does not in itself make comparisons or recommendations between options, but it is possible to take the output from the EAST assessments and use this to assess the relative "value" of the different options. The tool is not prescriptive, and it is for decision-makers to determine whether and how to use it.

Table 5-1 A40 Science Transit 2 EAST Assessment – LGF Scoring

Option	Description	Strategic (/20)	Economic (/30)	Managerial (/20)	Financial (/20)	Commercial (/5)	TOTAL
Dual Carriageway	Widening the A40 to 2 lanes in each direction separated by a central reservation between Shores Green and A40/A44 Link Road generally within current corridor but with significant alterations to junctions. Two options suggested at Eynsham – either widening on current line or bypassing to the north.	15	20	15	11	3	69
Bus Lane	Building 3 metre wide bus lanes on the existing verges between Shores Green and Duke's Cut bridge in both directions. The bus lanes would be separated from the general traffic by a 1 metre buffer.	16	26	14	14	5	82
Guided Bus	Installing a two-way guided busway track to provide a new route from Witney to Oxford using specially adapted buses. The route would use the line of the old railway from Witney to Cassington, except through Eynsham, but would continue alongside the A40 to Duke's Cut canal bridge.	14	26	11	8	2	71
Heavy Rail	Building a new single track railway line with double track running through stations to allow for trains to pass each other. The line would run from a new station south of Duckington Roundabout to join the old line near South Leigh, then pass between Eynsham and B4449 before joining the Cotswold line at Yarnton.	15	22	11	6	1	66
Light Rail	Double track light rail line from south of Ducklington to the old railway at South Leigh then using the old railway line to Eynsham where a new line would be created between the village and the southern bypass. The line would continue on the old railway line to A40 where it would either continue to the Cotswold Line at Yarnton or continue alongside the A40 toward Oxford.	15	25	11	7	1	70

Source: A40 Science Transit 2 – Option Assessment Report, Oxfordshire County Council (2017)

5.2.7 A further public consultation then took place in December 2018 focused on public views of the proposed A40 schemes ('Phase one – A40 Science Transit Phase 2' and 'Phase two – A40 Smart Corridor'). For this consultation the information provided on the proposed A40 schemes was much more detailed than the previous consultation. The consultation received 455 responses with the public given three options to choose from: 'like', 'do not like' and 'no view'. The two schemes which came out on top, both gaining over 70% of 'like' votes were 'B4044 Community Path from Eynsham to Botley' and the 'A40 Cycle link to the National Cycle Route 5 on the Oxford Canal Tow Path'. The two with the most 'do not like' votes, placing them to be the least popular were 'A40 Eynsham Park and Ride' and 'Bus Lane'.

Table 5-2 Public consultation results for proposed Phase 1 and Phase 2

What best describes your opinion of the proposals?	Like	Do not like	No view
A40 Eynsham Park & Ride proposal	35%	46%	19%
Bus Lane proposal	41%	40%	19%
A40 Dual Carriageway	53%	26%	21%
Completing the A40 Westbound Bus Lane	44%	32%	24%
A40 Eastbound bus lane over the Duke's Cut and Wolvercote railway bridges	**44%**	**29%**	**27%**
B4044 Community Path from Eynsham to Botley	76%	5%	18%
A40 Cycle link to the National Cycle Route 5 on the Oxford Canal Tow Path	71%	5%	24%

Source: Investing in the A40 – Long Term Strategy Consultation Report, OCC (May 2016)

5.2.8 The options appraisal and the initial consultation did not include the Duke's Cut scheme. However, the second consultation identified the "A40 Eastbound bus lane over the Duke's Cut and Wolvercote railway bridges" which is part of the current Duke's Cut scheme. This option received 44% like votes, and 29% 'do not like' and 27 % 'no view' votes. It should be noted these consultations did not suggest that multiple interventions could be taken forward (for example both dual carriageway and bus lane coming forward) and instead considered the interventions in opposition. Further consultation showing the interventions moving forward as a package may lead to more public support.

5.2.9 Based on the option appraisal work and the public consultation exercise outlined above a long-term strategy for the A40 was recommended taking a combined approach which included both increased road capacity as well as improvements to the public transport. Funding has been secured from the Government to deliver a number of projects which will help realise the A40 Strategy and form the A40 Corridor Improvement Programme. These include, but are not limited to, a section of new road dualling between Witney and Eynsham, the provision of a new Park and Ride site at Eynsham, improvements at Duke's Cut, a fully-segregated bus lanes between Eynsham and Oxford Ring Road and improved cycle route provision from Witney along the A40 to Oxford.

5.2.10 Originally, the A40 Smart Corridor scheme was envisioned to be delivered as a second phase of works after the completion of A40 STP2. However, following the award of the HIF2 funding OCC is now proposing to combine elements of the A40 Smart Corridor and A40 STP2 schemes, to ensure scheme benefits are maximised, deliver cost and programme efficiencies and minimise disruption during construction.

5.3 A40 Corridor Improvements

5.3.1 The A40 Corridor Improvements consist of the following schemes, as shown in Figure 5-4:

- The Integrated Bus Lanes scheme;
- A40 Dualling between Hill Farm, Witney and Eynsham; and
- Capacity and connectivity improvements at Duke's Cut Bridges.

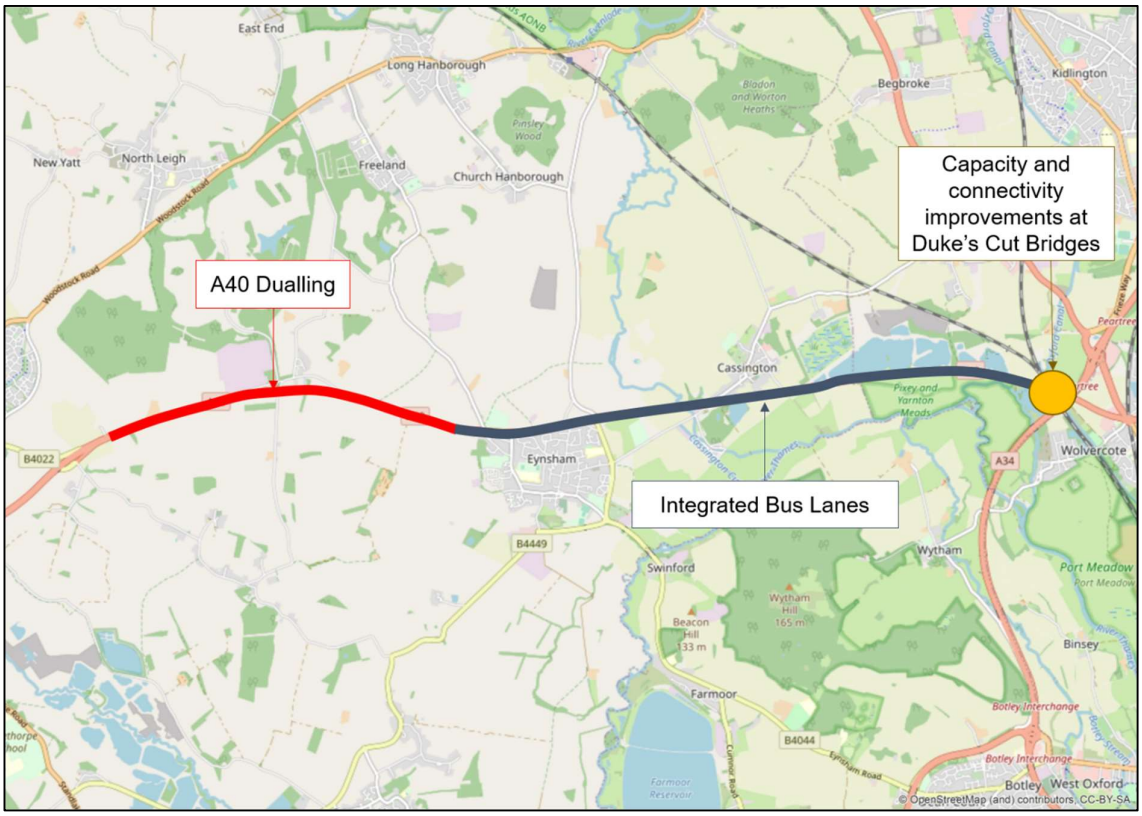


Figure 5-4 A40 Corridor Improvements

5.3.2 The Duke's Cut scheme requires changes to the existing road design, proposed crossings and will impact upon adjacent land. To meet these needs, a number of options have been devised to deliver the Duke's Cut scheme. The following section appraises these options.

5.3.3 Figure 5-5 below shows the location of Duke's Cut and the location in context with the A40 overall.

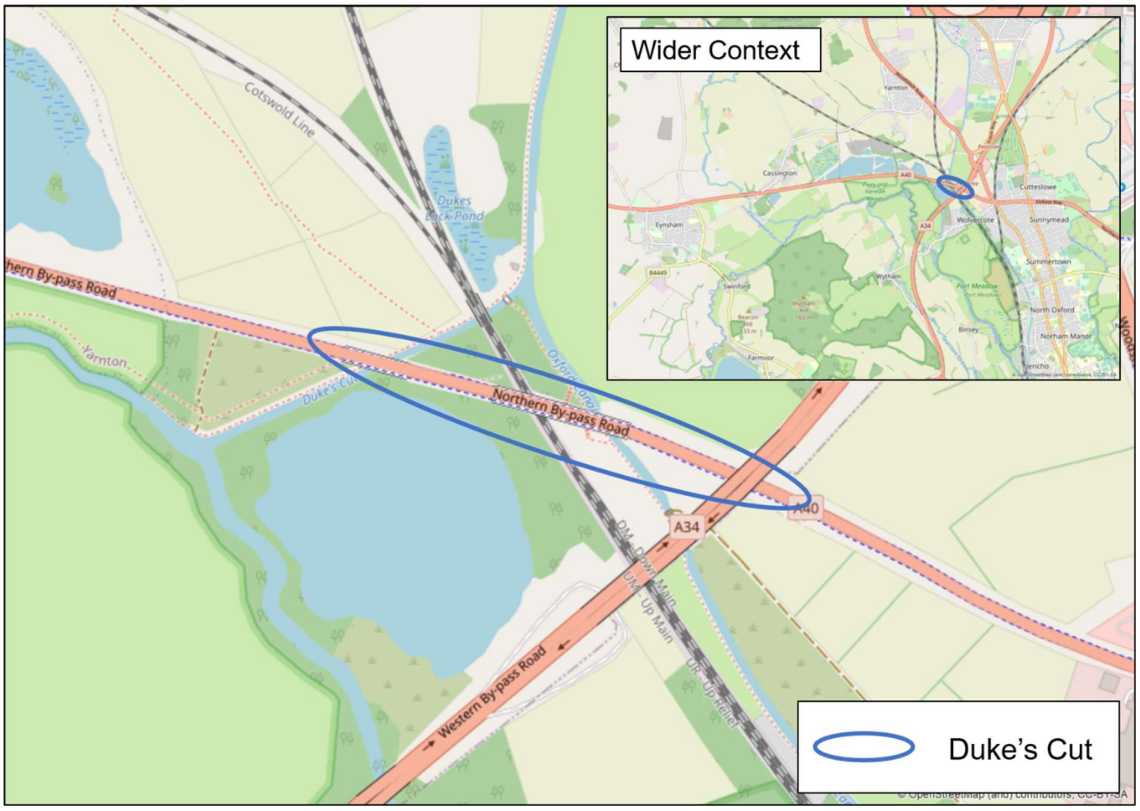


Figure 5-5 Duke's Cut Location

5.4 Methodology

5.4.1 A robust option selection process following DfT guidance was undertaken to ensure that the shortlisted options represented the best way to meet the project objectives. The Duke's Cut scheme specific assessment framework is formed of two sifting stages as set out in this section. Each stage involved workshops with Oxfordshire County Council officers to agree the scoring and shortlisted options.

5.4.2 The options have been derived based on the following:

- Assessment of current and forecast travel patterns, development and growth, and identified challenges;
- Previous and current proposals from the relevant local authorities and stakeholders, especially the A40 Smart Corridor and A40 STP2 schemes as proposed in Oxfordshire County Council's A40 Strategy;
- Workshops with Oxfordshire County Council officers; and
- Professional judgement based on experience elsewhere and within Oxfordshire and across the UK.

5.4.3 Appraisal of an option (Do Something [DS])[20] was undertaken against its 'Do Nothing (DN)' and 'Do Minimum' (DM) scenario. The DN scenario assumes no interventions are undertaken; DM scenario assumes no physical interventions are undertaken on the network within the A40 Corridor that are not already committed or funded. The DM scenario does therefore include all committed local plan developments and the transport scheme (including Park & Ride scheme/ associated infrastructure).

5.4.4 At each sifting stage, the evidence available to base the assessment on is different. Each sifting stage draws not only on the new evidence included as part of that stage, but also on the evidence compiled in the previous stage. Table 5-3 below shows the evidence available at each stage.

5.4.5 AECOM has produced an updated and extended Vissim model for the A40 Corridor, building upon the validated 2020 VISSIM microsimulation model developed by AECOM. This has been used to assess the impact of a Bus Gate at Duke's Cut only. The model uses the estimated demand based on outputs from the A40 Corridor Highway Model and the 2020 demand included in the validated Vissim model developed by AECOM. Whilst the previous model developed by Wood consultants covered the A40 from just west of Eynsham to Wolvercote roundabout, the extended model includes the western section of the A40 up to and including the Ducklington junction, the Wolvercote roundabout, the A34/A44 junction and the A44/ A4260 junction, in order that the Oxford North scheme can be modelled. The extension includes the A40/ Banbury Road junction. The modelling approach is summarised below:

- The test has been undertaken in AM models only as the eastbound queue is more significant in the AM period.
- This modelling test is only an operational assessment to identify the journey time savings, estimated queue lengths and to provide an indication of the red time required to maintain the desired operation. This test will not prove the feasibility or other technical limitations to replicate the modelled operation in reality.

5.4.6 It is to be noted that this is an iterative process, further corrections to the scoring (Stage 2) can take place in line with feedback from relevant stakeholders, OCC and new/revised evidence.

Table 5-3 Sifting Stages

Sifting Stage	Method	Evidence
Stage 1 – Initial Longlist and Sifting	• Long list of options was developed, which if delivered can prioritise bus. • Number of options were sifted out as they had clear issues (such as constructability/ land take/ cost/ acceptability) and are likely unfeasible/ unviable and therefore not taken forward. • A list of options taken forward to Stage 2 was developed.	• Priority for active travel/ sustainable travel • Professional judgement • Extents of highway boundary; land take • General location of utilities; constructability • Departures / relaxations from standards • Impact on environment • Road safety, key risks and costs (for some options) • Junction capacity modelling (for some options)
Stage 2 – Appraisal and Scoring	• Appraisal/ scoring of options which were not sifted out in the Stage 1 was undertaken against a range of criteria (associated to strategic, economic, financial, management and commercial cases)	• CAD drawings • Priority for active travel/ sustainable travel • Professional judgement • Extents of highway boundary; land take • General location of utilities; constructability • Departures / relaxations from standards • Impact on environment • Road safety, key risks and costs • Junction capacity modelling (for some options)

[20] The DS option is in addition to the DM scenario.

5.5 Stage 1 – Initial Sift

5.5.1 This stage of sifting entails removing schemes with initial significant issues. If an issue is identified the option can then be deemed unfeasible and is therefore not taken forward to the second sift.

5.5.2 An Initial Long List of options was developed and assessed. The Initial Long List includes 19 options for Duke's Cut. Detailed appraisal and rational of sifting out an option is presented in **Appendix C** and briefly discussed in the following sections, whilst the options which have been taken forward to Stage 2 sift are detailed out in the next chapter.

5.6 Option 0: Do Nothing

5.6.1 The Do-Nothing Option 0 will make no modification to existing structures, with inboard vehicle restraint barriers retained on Wolvercote Railway Bridge. The carriageway will be restricted to two traffic lanes with combined cycle/footways on both verges.

5.6.2 There is not any construction work involved, and the impact on environment and road safety is considered as neutral. Central to the key risk and assumption is that this option will not deliver against any of the requirements of the scheme objectives.

5.6.3 This option does not cater for increased demand and modal shift, and is therefore **rejected** for reasons as follows:

- Using the existing cross section width would not be sufficient to provide a complaint shared use facility across the structure.
- On the northern side the facility would be less than 1.0m effective and on the south under 2.0m effective width.

5.7 Option 0.1: Bus gate to the west of Duke's Cut canal bridge

5.7.1 This option will provide an Eastbound bus gate to the west of the scheme, where the proposed Integrated Bus Lanes eastbound bus lane would end. There will be no modification to existing structures, with inboard vehicle restraint barriers retained on Wolvercote Railway Bridge. The carriageway will be restricted to two traffic lanes with combined cycle/footways on both verges. Buses will be given priority over the structures over other vehicles and will be able to enter the proposed bus lane east of the A34 (part of the A40 Oxford North Scheme)

5.7.2 The potential benefits and issues are summarised in Table 5-4.

Table 5-4 Option 0.1

Benefits	Issues	Comments
• No/ low level of land requirement, as it would not require any land acquisition due to being contained within the existing highway boundary. • In terms of constructability, a Bus Gate is simplest to construct. • The option would provide significant improvements for buses and provide the minimum level of provision for shared use across the bridges (assuming the use of the cross section proposal provided). • There will be only limited effect on utilities at Bus Gate itself but depending on measures across bridges minor works maybe required. • No permanent impact but may require temporary works over NR/ CRT depending on construction method. • There will be limited environmental impact at the location of the Bus Gate	• The Bus Gate would be a Red-Light Camera (not ANPR). Ducting provision is required in the footway, but operation can be linked to a BT line for remote camera operation. In addition, provision of facilities across the structures would require upgrade of existing parapets to provide wider shared use facilities. Some use of two-way signals would be required and works to construct the parapet upgrade would require likely overnight closures. • DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. • Junction capacity modelling for the base year (2020) has shown that the journey time for general traffic would be unaffected but the wait at the red light itself would be average 80 seconds and up to a maximum of three minutes.(180 seconds). The length of the queue from the bus gate does not	• The VISSIM modelling results (Base Year only) ensure that the Bus Gate can provide a gap large enough to allow free passage for the bus across the Duke's Cut structures. • However, the modelling results also indicate a key risk and assumption that general traffic would create queuing up to 3 minutes at the Bus Gate with an average waiting time of 80 seconds. • This option is not **recommended** as a permanent and long term solution due to an unacceptable level of delay for general traffic at Bus Gate, which would also lead to significant safety

Benefits	Issues	Comments
itself. Unlikely to require an EIA in its own right.	reach back to Cassington Road. Additional modelling was undertaken to consider the impact the proposed Oxford North Scheme will have to journey time. The results show that average red time does improve slightly however the modelling shows that the maximum waiting time increases. There is a significant increase in queues along the A40 in the 2031 scenario and the queue will reach back to Cassington junction. • This delay is considered too high and likely to lead to significant safety concerns and misuse of the Bus Gate.	concerns and misuse of the Bus Gate. • Following further discussion within OCC, it was decided that to keep the Bus Gate option in the shortlist until feasibility of a better preferred option is established. Thus, this option **is included in the Stage 2.**

5.8 Option 1.1: Bus Gate at Wolvercote Railway Bridge

5.8.1 This option will have no modification to existing structures, with inboard vehicle restraint barriers retained on Wolvercote Railway Bridge. The carriageway will be restricted to two traffic lanes with combined cycle/footways on both verges with a bus gate installed at Wolvercote Railway Bridge.

5.8.2 The potential benefits and issues are summarised in Table 5-5.

Table 5-5 Option 1.1

Benefits	Issues	Comments
• This option has no/ low level of land requirements, as it would not require any land acquisition due to being contained within the existing highway boundary. • In terms of constructability, it is simplest to construct but there are issues of exact nature of enforcement to be agreed (see issues). • There will be limited effect on utilities at Bus Gate itself but depending on measures across bridges minor works maybe required. • No permanent impact but may require temporary works over NR/ CRT depending on construction method. • There will be limited environmental impact. • No significant safety issues identified.	• Shared use facilities, two traffic lanes and a bus lane would not fit within the available width along the existing structures west of the Wolvercote railway bridge. • DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. • This Bus Gate has not been modelled as it uses a different system that only holds traffic for eastbound buses. Significantly less delay is expected.	• This option is **rejected** for the reason of being unable to fit the Bus Gate at this location within existing bridge parameters and due to the inability of providing all the NMU and bus infrastructure enhancements required to fulfil the scheme objectives and OCC's Walking and Cycling Strategy

5.9 Option 1.2a: No footbridges

5.9.1 This option will be arranged in accordance with a previous assessment by Atkins with Steelgard barriers located 750mm from the north parapet and 2670mm from the south parapet. This will provide three lanes, including two 3.235m traffic lanes and a 3.033m bus lane. The footway on the north would be restricted to 750mm which is less than the desired minimum effective width of 1.5m (2m total width). The shared use facility on the south doesn't achieve the desired minimum effective width of 2.5m (3.5m total width). The Steelgard barriers would need to be relocated to achieve this.

5.9.2 The potential benefits and issues are summarised in Table 5-6.

Table 5-6 Option 1.2a

Benefits	Issues	Comments
• This option has no/ low level of land requirements, as it would not require any land acquisition due to being contained within the existing highway boundary. • In terms of constructability, it is relatively straightforward; a concrete "Beam" may be required to support the relocated inboard barrier. • There will be no impact over NR/ CRT. • The works will be contained within existing bridge structure. There will be minor environmental impact for temporary works, but the extent of which is to be determined as method of working is developed or agreed.	• It will be likely that shared use will be substandard, as there will be 0.5m lost on either side of the shared use due to "kerb shyness". • It doesn't provide a shared-use facilities up to standard and it is not compliant with the OCC walking and cycling strategy, especially regarding the width requirements which states that a minimum effective width. • There will be some effect on utilities, as some minor works will be required around VM and BT ducting / Chambers. • In terms of road safety, the narrow-shared use facilities will compromise interaction between pedestrians and cyclists, which may lead to potential conflicts in limited space provided	• This option is **rejected** as the facilities will be substandard on the north and the south, with the edge beams not strengthening and the parapets having no replacements. It does not provide a north side shared use facility.

5.10 Option 1.2b: No footbridges (40mph speed limit)

5.10.1 This option will improve the Wolvercote Railway Bridge and limit the speed to 40mph. The improvement includes strengthening of weak verges, replacement of edge beams, and removal of inboard vehicle restraint barrier of the bridge. With departures from standards, three traffic lanes can be accommodated with a single combined cycle/footway on the southern and northern verges. More specifically, this option will provide several facilities as follows:

- Share use facility to the south: total width of 3.0m (2.5m effective width)
- Segregation strip south width: 0.5m (compliant with 40mph and under speed limit)
- General Traffic lane widths: 3.25m each (6.5m)
- Bus lane width: 3.2m width
- Segregation strip north width: 0.5m
- Footway to the north: total width of 1.5m

5.10.2 The potential benefits and issues are summarised in Table 5-7.

Table 5-7 Option 1.2b

Benefits	Issues	Comments
• This option has no/ low level of land requirements, as it would not require any land acquisition due to being contained within the existing highway boundary. However, land maybe required on a temporary construction basis to permit the	• The cost estimate is £4.0M for structural works (Skanska). The construction programme duration is estimated to be 6 months (Skanska). • The existing masonry parapets at Wolvercote Railway Bridge will require upgrading to H4a High compliance. This will allow for the removal of the existing inboard barriers. These will be	• This option is **shortlisted** for scoring in consideration of its benefits and low risk. Note: general traffic lanes width are substandard but this is mitigated by

Benefits	Issues	Comments
strengthening of the parapet (assumes deck is complaint). • It fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard. This will improve bus journey time reliability, as well as potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (but reduced to 2.5m wide for short section over Wolvercote Railway Bridge as permitted) where the cyclist demand is higher than on the northern side. In addition, this option would utilise the existing 15.20m width between existing parapets, without the need to provide new structures.	undertaken using narrow lanes with closure of one side of existing footway. • Lane widths will be narrowed with provision of 40mph speed limit. • Lane widths would be compliant with DMRB but shared use facility on southern side is compromised across bridge and reduced to 2.5m. • The impact on utilities would be the modification of footway/ lane widths on north side only, as footway would be narrower than existing layout. • DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. The risk of reduced lane width is controllable: it is a permitted design for upgrading the Steelgard H4A parapet with existing structure in compliance with the vehicle impact, and there is no further works required (it is assumed a 15.20m existing width between parapet). • There will be minor environmental impact for temporary works, but the extent of which is to be determined as method of working is developed or agreed. • Cyclist provisions not provided on the northern side.	lowering the speed limit to 40mph.

5.11 Option 1.2c: No footbridges (30mph speed limit)

5.11.1 This option will improve the Wolvercote Railway Bridge and limit the speed to 30mph. The improvement includes strengthening of weak verges, replacement of edge beams, and removal of inboard vehicle restraint barrier of the bridge. With departures from standards, three traffic lanes can be accommodated with a single combined cycle/footway on the southern and northern verges. More specifically, this option will provide several facilities as follows:

- Share use facility to the south: total width of 3.5m (3m effective width)
- Segregation strip south width: 0.5m (compliant with 30mph and under speed limit)
- General Traffic lane widths: 3m each (6m)
- Bus lane width: 3.2m width
- Segregation strip north width: 0.5m
- Footway to the north: total width of 1.5m

5.11.2 The potential benefits and issues are summarised in Table 5-8.

Table 5-8 Option 1.2c

Benefits	Issues	Comments
• This option has no/ low level of land requirements, as it would not require any land acquisition due to being contained within the existing highway boundary. However, land maybe required on a temporary construction basis to permit the strengthening of	• The cost estimate is £4.0M for structural works. The construction programme duration is estimated to be 6 months (Skanska). • The existing masonry parapets at Wolvercote Railway Bridge will require upgrading to H4a High compliance. This will allow for the removal of the existing inboard barriers. These will be	• This option is **rejected**, due to departure from standard (DMRB CD 127, Figure 2.1.1N1e). 3m wide general traffic lanes are deemed unsuitable for the type

Benefits	Issues	Comments
the parapet (assumes deck is complaint). • This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard. This will improve bus journey time reliability and potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side (3m) where the cyclist demand is higher than on the northern side. In addition, this option would utilise the existing 15.20m width between existing parapets, without the need to provide new structures.	undertaken using narrow lanes with closure of one side of existing footway. • The impact on utilities would be the modification of footway/ lane widths on north side only, as footway would be narrower than existing layout. • There will be minor environmental impact for temporary works, but the extent of which is to be determined as method of working is developed or agreed. • DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. • Cyclist provisions not provided on the northern side.	of vehicles travelling along this route.

5.12 Option 1.3: Replacement of Wolvercote Railway Bridge parapets

5.12.1 This option will provide three traffic lanes and shared use facility provision on the southern side only, with replacement of Wolvercote Railway Bridge parapets with independent Edge beams. It will cover several works as follows:

- The removal of Masonry Parapet, and the replacement with self-supporting edge beam and H4A vehicular parapet of Wolvercote Railway Bridge only.
- With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge only.

5.12.2 The potential benefits and issues are summarised in Table 5-9.

Table 5-9 Option 1.3

Benefits	Issues	Comments
• This option has no/ low level of land requirements, as it would not require any land acquisition due to being contained within the existing highway boundary. However, land maybe required on a temporary construction basis to permit the strengthening of the parapet (assumes deck is complaint). • There will be no permanent impact but may require temporary works over NR/ CRT depending on construction method.	• There will be minor environmental impact for temporary works, but the extent of which is to be determined as method of working is developed or agreed. • This option is based upon the Atkins Assessment Report identifying the transverse bracing and high weight of the masonry parapet being the leading cause of the weak verges for the bridge. • Adding an independent edge beam has limited benefit above using a Steelgard H4A parapet. • The layout will only provide a compliant shared use facility on the southern side but does not provide a facility on the north side. • The modification of footway/ lane widths may affect utilities on north side only as footway would be narrower than existing layout.	• The key risks and assumption of this option is that the train companies will need to accept longer possessions at certain times of year by commercial agreement. • This option is **rejected**, as only limited benefit could be added by an independent edge beam above using a Steelgard H4A parapet.

5.13 Option 1.4a: Footbridges added to the north (7.3m general traffic)

5.13.1 This option is where footbridges are added to the north of Duke's Cut with three traffic lanes as well as a shared use facility on southern side and speed limit of 40mph. This includes Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge. North side new footbridge will have a total width 2.5m to provide an effective width of 1.5m. This option would provide the following widths on the existing bridge with inboard barriers removed and parapets upgraded to H4a:

- Shared use facility to the south: Total width of 3.3m (2.8m effective width)
- Segregation strip south width: 0.5m (compliant with 40mph and under speed limit)
- General Traffic lane widths: 3.65m each (7.3m)
- Bus lane width: 3.5m width
- North Footway/ Bridge Protection Strip 0.6m

5.13.2 The potential benefits and issues are summarised in Table 5-10.

Table 5-10 Option 1.4a

Benefits	Issues	Comments
• This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (but reduced to 2.8m wide for short section over Wolvercote Railway Bridge as permitted) where the cyclist demand is higher than on the northern side.	• £7.5M for Structural Works (Skanska) and 12 month construction period. • Land is likely to be required for a temporary period during construction. • The construction of a new bridge will be complex to undertake due to the existing site constraints. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself. • Utilities adversely impacted, specifically gas main. • Lane widths would be compliant with DMRB but shared use facility on southern side is compromised across bridge and reduced to 2.8m. • North side of existing structures has dense vegetation and multiple trees likely to be of significant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed.	• This option is **rejected** based on its issues..

5.14 Option 1.4b: Footbridges added to the north (7m general traffic)

5.14.1 This option is where footbridges are added to the north of Duke's Cut with three traffic lanes and a shared use facility on the southern side. There is a speed limit of 40mph speed limit. This includes strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge. North side new footbridge with total width 2.5m to provide an effective width of 1.5m. This option would provide the following widths on the existing bridge with inboard barriers removed and parapets upgraded to H4a:

- Share use facility to the south: Total width of 3.6m (3.1m effective width)
- Segregation strip south width: 0.5m (compliant with 40mph and under speed limit)

- General Traffic lane widths: 3.5m each (7.0m)
- Bus lane width: 3.5m width
- North Footway/ Bridge Protection Strip 0.6m

5.14.2 The potential benefits and issues are summarised in Table 5-11.

Table 5-11 Option 1.4b

Benefits	Issues	Comments
• This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (including across the existing structures) where the cyclist demand is higher than on the northern side.	• £7.5M for Structural Works (Skanska) and 12 month construction period. • In addition, land is likely to be required for a temporary period during construction. • The construction of a new bridge will be complex to undertake due to the existing site constraints. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself. • Utilities adversely impacted, specifically gas main. • The 3.5m wide lane widths with 40mph speed limit is an acceptable reduction from 3.65 DMRB compliant lane widths. • North side of existing structures has dense vegetation and multiple trees likely to be of significant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed.	• This option is **shortlisted** for Stage 2, in consideration of its benefits..

5.15 Option 1.4c: Footbridges to the north

5.15.1 This option is where footbridges are added to the north of Duke's Cut with three traffic lanes and there is a shared use facility provision on southern side. This includes strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the north side of Wolvercote Railway Bridge only. Therefore, the inboard barrier in the south would remain where it is. This would mean leaving the existing footway provision in the southern side as existing (2.4m). With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge. Footbridges are added to the north spanning Duke's Cut Canal and Oxford Canal.

5.15.2 The potential benefits and issues are summarised in Table 5-12.

Table 5-12 Option 1.4c

Benefits	Issues	Comments
• This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (including across the existing structures) where the cyclist demand is higher than on the northern side.	• £7.5M for Structural Works. 12 month construction period (Skanska). • The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. • In addition, land is likely to be required for a temporary period during construction. • The construction of a new bridge will be complex to undertake due to the existing site constraints. Multiple road closures are likely to be required to enable equipment to be located in specific locations for	• This option is **rejected** based on its issues.

Benefits	Issues	Comments
	construction, along with the actual provision of the new structure itself. • Utilities adversely impacted, specifically gas main • Lane widths would be reduced to 3.5m (minor non-compliance with DMRB). DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. • North side of existing structures has dense vegetation and multiple trees likely to be of significant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed.	

5.16 Option 1.4d: Footbridges added to the north (30mph speed limit)

5.16.1 This option is where footbridges are added to the north of Duke's Cut with three traffic lanes and there is a shared use facility provision on northern side. This option has a 30mph speed limit. This includes strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the north side of Wolvercote Railway Bridge only. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge. Footbridges added to the north spanning Duke's Cut Canal and Oxford Canal. This option would provide the following:

- Shared use facility to the south: Total width of 4.15m (3.15m effective width)
- Inboard barrier width: 0.6m
- Inboard barrier set back: 0.6m
- General Traffic lane widths: 3.00m each
- Bus lane width: 3.25m widths
- Segregation hard strip north width: 0.6m

5.16.2 The potential benefits and issues are summarised in Table 5-13.

Table 5-13 Option 1.4d

Benefits	Issues	Comments
• This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (including across the existing structures) where the cyclist demand is higher than on the northern side.	• £7.5M for structural works and 12-month construction period (Skanska). • The existing highway boundary provides limited scope for the provision of the new bridge construction and some land acquisition is required. In addition, land is likely to be required for a temporary period during construction. • Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself. • Lane widths would be reduced to 3.5m (minor non-compliance). DMRB requires 3.65m running lanes for either urban or rural.	• This option is **rejected**, due to departure from standard (DMRB CD 127, Figure 2.1.1N1e). 3m wide general traffic lanes is deemed unsuitable for the type of vehicles travelling along this route.

Benefits	Issues	Comments
	Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. • Utilities adversely impacted, specifically gas main.	

5.17 Option 1.5a: Footbridges added to the south (40mph speed limit)

5.17.1 This option is where footbridges are added to the South of Duke's Cut with three traffic lanes and there is a shared use facility provision on northern side. This option has a 40mph speed limit. This includes strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only. Footbridges added to the south spanning Duke's Cut Canal and Oxford Canal. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the northern verge. South side new footbridge with total width 4.0m to provide an effective width of 3.0m. This option would provide the following widths on the existing bridge with inboard barriers removed and parapets upgraded to H4a:

- Shared use facility to the North: Total width of 3.6m (3.1m effective width)
- Segregation strip south width: 0.5m (compliant with 40mph and under speed limit)
- General Traffic lane widths: 3.5m each (7.0m)
- Bus lane width: 3.5m width
- South Footway/ Bridge Protection Strip 0.6m

5.17.2 The potential benefits and issues are summarised in Table 5-14.

Table 5-14 Option 1.5a

Benefits	Issues	Comments
• This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (with the provision of a new structure) where the cyclist demand is higher and in excess of the recommended effective width of (1.5m) in the northern side with a 3.1m effective width share use provision. This could be reduced to 2.8m and permit compliant carriageway lane widths. • Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). No utilities found in the embankment areas to the south.	• £7.5M for structural works and 12-month construction period (Skanska). • The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. • In addition, land is likely to be required for a temporary period during construction. • The construction of a new bridge will be complex to undertake due to the existing site constraints. The works within the existing bridge structure can be undertaken as described in earlier options with narrow lanes. • Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself. • Lane widths would be reduced to 3.5m (minor non-compliance). DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. • South side of existing structures has dense vegetation and multiple trees likely to be of	• This Option is **rejected** as Option 1.5c provides up to standard shared use facilities with a lower cost estimate.

Benefits	Issues	Comments
	significant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed. In addition, on this side of the structure the existing lake maybe affected by the provision of either temporary or permanent works depending on the construction method adopted.	

5.18 Option 1.5b: Footbridges added to the south (with north side shared use facility of 2.33m)

5.18.1 This option is where footbridges are added to the south of Duke's Cut with three traffic lanes and there is a shared use facility provision on northern side. This includes strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the North side of Wolvercote Railway Bridge only. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the northern verge. The inboard barrier to the north would be retained in existing location providing a shared use facility of 2.33m total width in the northern side (effective width of 1.33m).

5.18.2 The potential benefits and issues are summarised in Table 5-15.

Table 5-15 Option 1.5b

Benefits	Issues	Comments
• This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m.	• £7.5M for Structural Works (Skanska). 12-month construction period. • The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction. • The construction of a new bridge will be complex to undertake due to the existing site constraints. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself. • Lane widths would be reduced to 3.5m (minor non-compliance). DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. • Likely to require vegetation and several trees to be removed.	• This Option is **rejected** as it retains inboard barriers as other options as options 1.5a and 1.5c provide improved shared use facilities.

5.19 Option 1.5c: Footbridges added to the south (with north side shared use facility of 2.6m)

5.19.1 This option is where footbridges are added to the south of Duke's Cut with three traffic lanes and there is a shared use facility provision on northern side. This is a variation from 1.5b. It includes strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the North side of Wolvercote Railway Bridge only. The inboard barrier to the north would be retained but moved slightly south to accommodate an NMU facility up to standard in the northern side. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the northern verge. The existing south side inboard barrier would be repositioned.

- Share use facility to the north: Total width of 2.6m (1.6m effective width)
- North Side Barrier 0.6m wide and 0.6m setback from carriageway
- General Traffic lane widths: 3.65m each (7.3m)
- Bus lane width: 3.5m width
- South Footway/ Bridge Protection Strip 0.6m

5.19.2 The potential benefits and issues are summarised in Table 5-16.

Table 5-16 Option 1.5c

Benefits	Issues	Comments
• This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. • This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m. • It is a compliant layout. • No road safety issues identified.	• £7.5M for Structural Works (Skanska) (likely to be slightly less expensive than 1.5a). 12-month construction period. • The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction. • Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself. • Likely to require vegetation and several trees to be removed.	• This option is **shortlisted** for Stage 2.

5.20 Option 1.6: Footbridge added to the north and south

5.20.1 This option is where footbridges are provided to the north and south of Duke's Cut. This includes strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only. Footbridges are added to the north and south spanning Duke's Cut Canal and Oxford Canal. Three traffic lanes are provided. The potential benefits and issues are summarised in Table 5-17.

Table 5-17 Option 1.6

Benefits	Issues	Comments
• The option would provide a fully compliant layout for shared use facilities with compliant widths on both sides and compliant lane widths and bus lanes.	• It is estimated to cost over £14M. Construction period likely to be of 18 months (to be determined with Skanska). • The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction. • Implementing two footbridges to north and south of the bridges is be a more expensive option than proposed options 4.A-C (footbridges in the north) and 5.A-B (footbridges in the south). It is	• This option is **rejected** due to high cost being and construction programme likely to too long.

Benefits	Issues	Comments
	considered two footbridges are not required as there is enough space available within the existing carriageway to implement the proposed infrastructure with just one footbridge. • Utilities adversely impacted, specifically gas main. • Will require extensive vegetation and tree removal.	

5.21 Option 1.7: Widen all structures on the north or south

5.21.1 This option is to widen all structures on the north or south of Duke's Cut. Three traffic lanes are provided as well as a shared use facility to the north and south. This includes strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the north side of Wolvercote Railway Bridge only. All four structures are widened on the north side. The potential benefits and issues are summarised in Table 5-18.

Table 5-18 Option 1.7

Benefits	Issues	Comments
• The option would provide a fully compliant layout for shared use facilities with compliant widths on both sides and compliant lane widths and bus lanes. • Works contained within existing bridge structure.	• The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction. • Widening of Wolvercote Railway Bridge is not considered feasible. – 1) Making a physical connection with riveted metalwork is not necessarily feasible as welds and rivets act differently under load. – 2) Making a physical connection may not be possible due to the reported limited capacity of the existing structure to transverse loading. Adding new structure adjacent will add transverse loading. – 3) Widening the bridge will also require relocation of the existing retaining walls on the approaches to accommodate the realigned vehicle restraint system. • Gas main may be affected within the north embankment. • Minor environmental impact for temporary works, the extent of which is to be determined as method of working is developed/ agreed.	• This option is **rejected** due to feasibility of connection to the existing structure.

5.22 Option 1.8: Southern pedestrian extension

5.22.1 This option is where a southern pedestrian extension is added with the inboard barrier retained. This includes Wolvercote Railway bridge being strengthened and a new pedestrian only extension being added to the south. The inboard barrier is moved southward to allow for three lanes across the bridge.

5.22.2 The potential benefits and issues are summarised in Table 5-19.

Table 5-19 Option 1.8

Benefits	Issues	Comments
• The option would provide a fully compliant layout for shared use facilities with compliant widths on both sides and compliant lane widths and bus lanes. • Works contained within existing bridge structure.	• The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction. • Widening of Wolvercote Railway Bridge is not considered feasible.	• This option is **rejected** due to feasibility of connection to the existing structure.

Benefits	Issues	Comments
	– 1) Making a physical connection with riveted metalwork is not necessarily feasible as welds and rivets act differently under load. – 2) Making a physical connection may not be possible due to the reported limited capacity of the existing structure to transverse loading. Adding new structure adjacent will add transverse loading. – 3) Widening the bridge will also require relocation of the existing retaining walls on the approaches to accommodate the realigned vehicle restraint system. • Gas main may be affected within the north embankment. • Minor environmental impact for temporary works, the extent of which is to be determined as method of working is developed/ agreed.	

5.23 Option 1.9: New structures on the north for separate carriageway

5.23.1 This option is where new structures are provided on the north for a separate carriageway. The eastbound carriageway over the new structure and the westbound carriageway to remain on the existing bridges with no modification to the structures. This includes no modification to existing structures, with inboard vehicle restraint barriers retained on Wolvercote Railway Bridge. The potential benefits and issues are summarised in Table 5-20.

Table 5-20 Option 1.9

Benefits	Issues	Comments
• Relatively straightforward construction. New structure to be constructed offline while existing structure continues to carry existing traffic. Eastbound traffic would then switch when new structure completed. • The option would provide a fully compliant layout for shared use facilities with compliant widths on both sides and compliant lane widths and bus lanes.	• Construction of three entirely new highway bridges will cost approximately £45-£50M, this arrangement has been reviewed by Skanska based on similar schemes to identify an approximate construction cost • Land take will be required. • Gas main may be affected within the north embankment. • Likely to require vegetation and several trees to be removed. • Significant impact on National Rail structures	• This option is **rejected** due to high cost.

5.24 Option 1.10: On-Line Replacement

5.24.1 This option is an online replacement of the existing structures. The potential benefits and issues are summarised in Table 5-21.

Table 5-21 Option 1.10

Benefits	Issues	Comments
• The option would provide a fully compliant layout for shared use facilities with compliant widths on both sides and compliant lane widths and bus lanes.	• Cost is likely to be significant – to be more than option 9 (£45m). • Significant construction land take will be need. • Complex constructability. The construction process will take	• This option is **rejected** as it requires closure of A40 for works duration of 12 months and estimated high cost.

Benefits	Issues	Comments
	approximately 12 months on site. It is not feasible to close the A40 for 12 months without providing alternative routes. The A44 and A420 will become extremely congested throughout. • Significant impact on National Rail structures. • Existing structure replacement is likely to affect the vegetation on both sides of the structure for construction purposes.	

5.25 Option 1.11: Offline Replacement

5.25.1 This option is the offline replacement of the existing structures. The potential benefits and issues are summarised in Table 5-22.

Table 5-22 Option 1.11

Benefits	Issues	Comments
• Relatively straightforward constructability. New structures to be constructed offline while existing structure continues to carry existing traffic. All traffic would then switch when new structure completed. • The option would provide a fully compliant layout for shared use facilities with compliant widths on both sides and compliant lane widths and bus lanes.	• Construction of will cost more than option 9. In excess of £45M-£50M. • Significant land will be required. New road and new structures will be away from existing road. • Significant timescale involved to construct new structures • Gas main may be affected within the north embankment. • Bridge will be for all traffic and require extensive vegetation and tree removal.	• This option is **rejected** due to estimated cost.

5.26 Stage 2 – Detailed Sift

5.26.1 The purpose of the second sift is to appraise the short-listed options (Options 0.1, 1.2b, 1.4b and 1.5c) against strategic, economic, financial, management and commercial criteria. This will help identify a better performing option as compared to others. This Stage 2 sift is discussed in the next chapter.

6 Detailed Sift – Shortlisted Options

6.1 Introduction

6.1.1 Stage 2 consists of further assessment, appraisal and scoring of the options taken forward based on the Stage 1 sift. This stage of appraisal is based on EAST, but adapted to suit the local context, key success criteria and key location specific issues along A40 corridor. The criteria developed and used in the Stage 2 is aligned with DfT's Option Assessment Framework, and includes criteria on the Strategic Case, Economic Case, Management Case, Financial Case and Commercial Case (shown in Table 6-1; more detailed criteria for each case is shown in **Appendix D**).

Table 6-1 Sift 2 Criteria

Criteria	Scoring	Description
Strategic Case	**Very Good Impact (2)** **Good Impact (1)** **Neutral/No Impact (0)** **Poor Impact (-1)** **Very Poor Impact (-2)**	Fit with project objectives and wider transport and government objectives. *11 sub-criteria were considered thus resulting in a maximum score of 22 for an option.*
Economic Case		The scale of benefits arising from the improved transport network in terms of connectivity, reliability, resilience, housing, wider economic impacts, environmental and social impacts. *13 sub-criteria were considered thus resulting in a maximum score of 26 for an option.*
Financial Case		Assessment of infrastructure capital costs, operating and maintenance costs. *2 sub-criteria were considered thus resulting in a maximum score of 4 for an option.*
Management Case		Assessment of option feasibility and stakeholder and public accessibility *18 sub-criteria were considered thus resulting in a maximum score of 36 for an option.*
Commercial Case		Flexibility of an option, funding and income potential. *4 sub-criteria were considered thus resulting in a maximum score of 8 for an option.*

6.1.2 This assessment for all four options (**1, 2b, 4b and 5c**) includes transport modelling, engineering, safety, transport planning, environment and other inputs and data that would help in appraising the options and undertake sifting in accordance to the EAST. Further, the Do Nothing option is also scored. The next sections provide description, detailed assessment and scoring of all the options considered in Sift 2.

6.2 Option 0: Do Nothing

6.2.1 The Do Nothing scenario EAST assessment was undertaken, its score and related comments are as follows:

- **Strategic case:** this option scores very poorly in the strategic case as it does not support bus lane, active travel infrastructure or associated benefits including deliver of new homes. It scores -12, the worst of all options.
- **Economic case:** similar to the strategic case, this scenario is the worst option for the economic case as it will not help ease congestion, support bus lane or active travel infrastructure. It scores 0.
- **Management case**: this option scores the highest in the management case, compared to the other options, as it does not include deliver of infrastructure and therefore has no impact on the practical feasibility of the option. However, this option will not be acceptable to stakeholders. It scores -5.

- **Financial case**: similar to the management case, this option scores highest in the financial case compared to the other options, as it does not require further infrastructure and therefore there is no cost. It scores 0.
- **Commercial Case**: this scenario scores neutral, as there are no impacts on committed schemes. It scores 0.
- This option is **rejected.**

6.3 Option 0.1: Bus Gate

6.3.1 An EAST assessment of Bus Gate option was undertaken, see Figure 6-1 and 6-2. Score and related comments are as follows:

- **Strategic case:** this option scores slightly positive as it will support bus lane, active travel infrastructure and associated benefits including deliver of new homes. It scores 3.
- **Economic case:** similar to the strategic case, this option scores slightly positive as it will help support bus lane and active travel infrastructure. This option is likely to have negative impact on the highway users (about 3 minutes of red time as per modelling in AM in 2020). It scores 3.
- **Management case**: this option scores negatively due to stakeholder concerns for potential delays at the Bus Gate, minor diversions of utilities are likely and minor modifications to existing embankment profile are required. It scores -12.
- **Financial case**: this option scores slightly negative due to its scheme cost. It scores -1.
- **Commercial Case**: this option scores highest as it is not entirely dependent on other scheme elements and could be delivered as a stand-alone with relatively low cost. It scores 4.
- Overall, this option scores -3. This option is can be a **back-up option**.

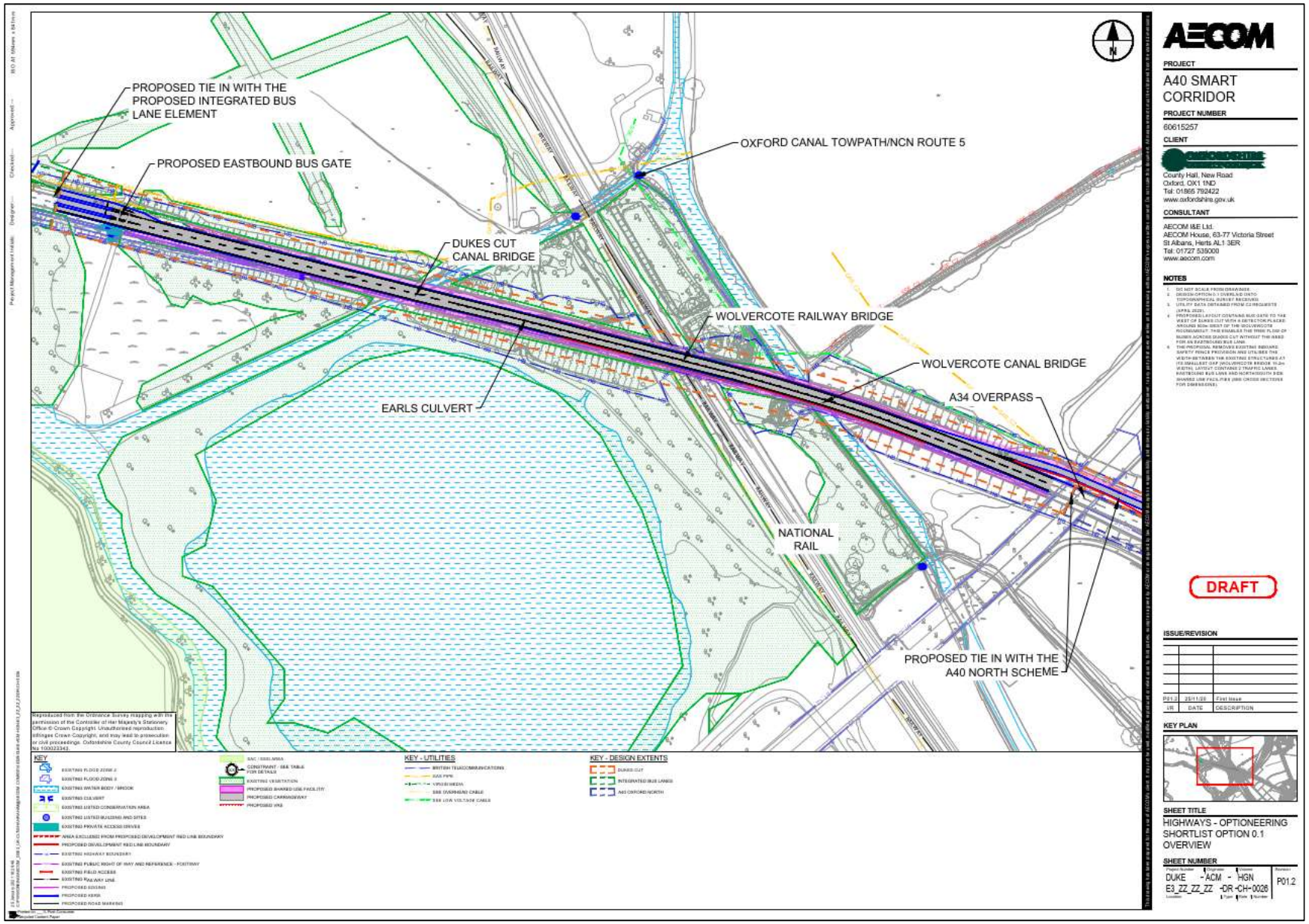


Figure 6-1 Option 0.1: Bus Gate

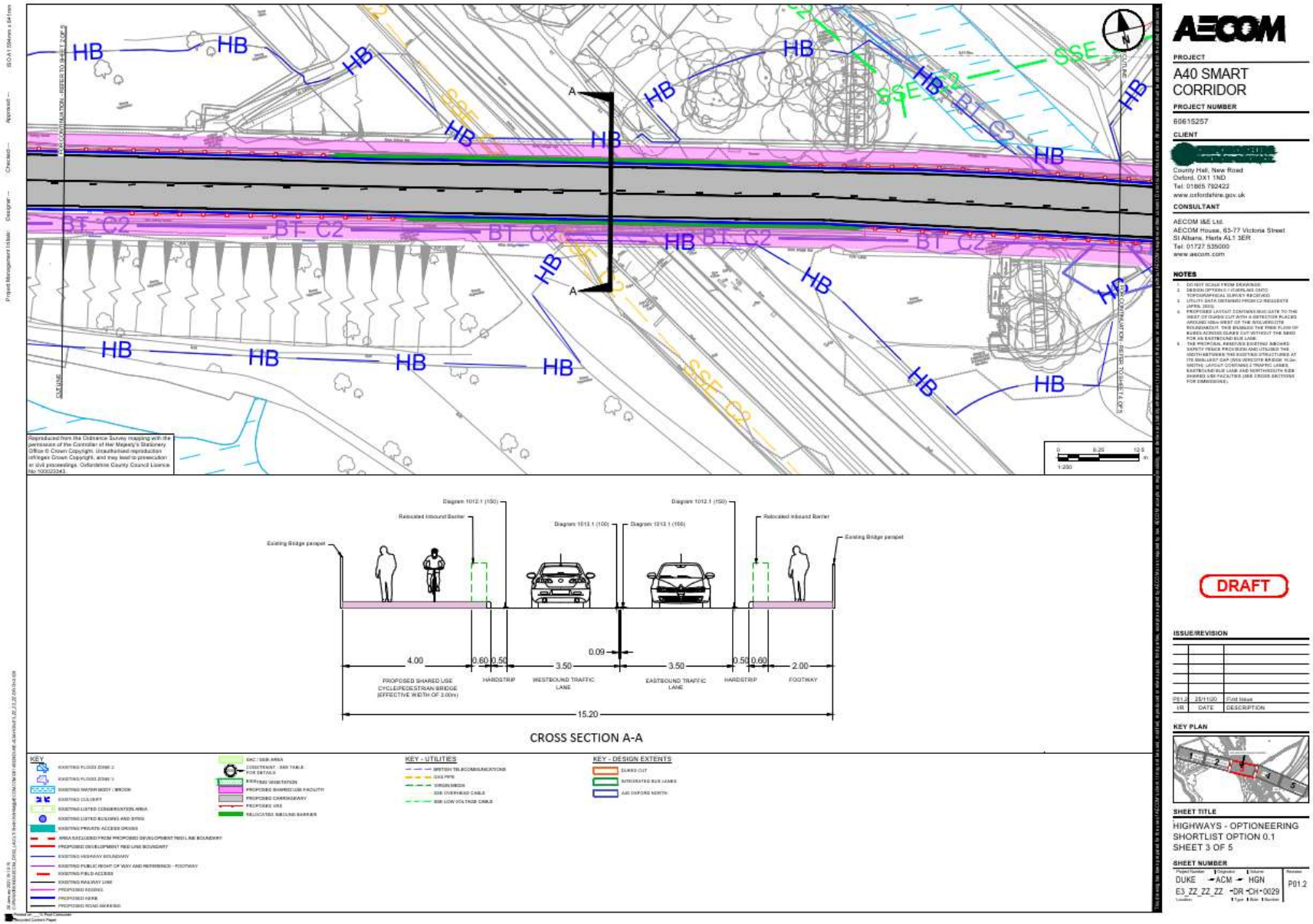


Figure 6-2 Option 0.1: Bus Gate, Cross Section at Wolvercote Railway Bridge

6.4 Option 1.2b: No footbridges (40mph speed limit)

6.4.1 An EAST assessment of the 1.2b option was undertaken, see Figure 6-3 and 6-4. Score and related comments are as follows:

- **Strategic case:** this option scores positively as it will support bus lane, active travel infrastructure and associated benefits including delivery of new homes. It scores 7.
- **Economic case:** similar to the strategic case, this option scores positively as it will help support bus lanes and active travel infrastructure. However, this option is likely to have some negative impact on highway users. It scores 5.
- **Management case**: this option scores negatively as minor diversions of utilities are likely to be required, there may be some opposition by highway users, minor modifications to existing embankment profile are required and it is likely to trigger planning requirements as part of wider A40 schemes. However, this option has no effect on existing habitats and vegetation. It scores -8.
- **Financial case**: this option scores slightly negatively due to its scheme cost. It scores -1.
- **Commercial Case**: this option scores slightly negatively as modification of existing parapets will require Network Rail approval, which could result in higher cost. It scores -3.
- Overall, this option scores 0, this **option scores the highest** and performs well**.**

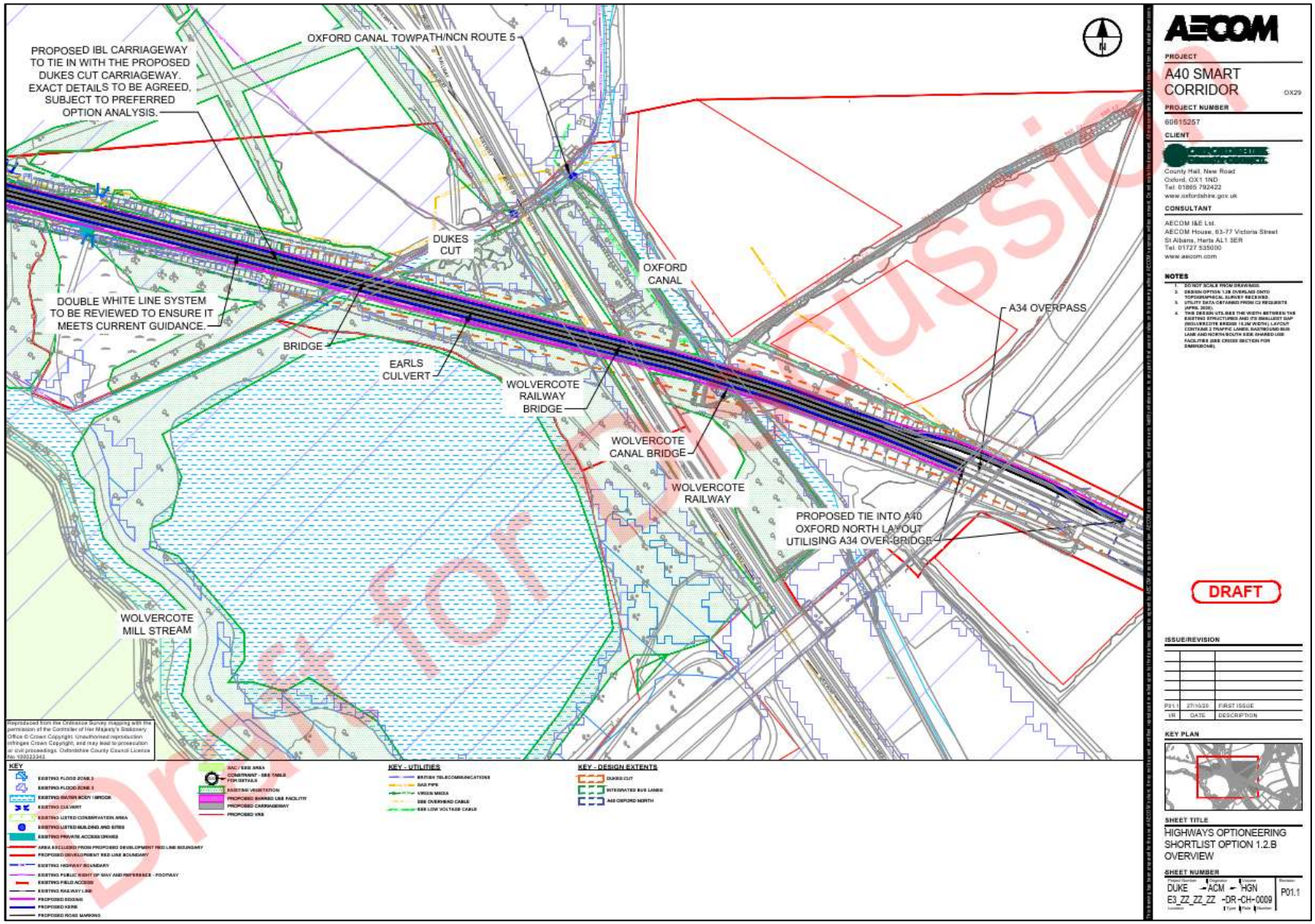


Figure 6-3 Option 1.2b: No footbridges (40mph speed limit)

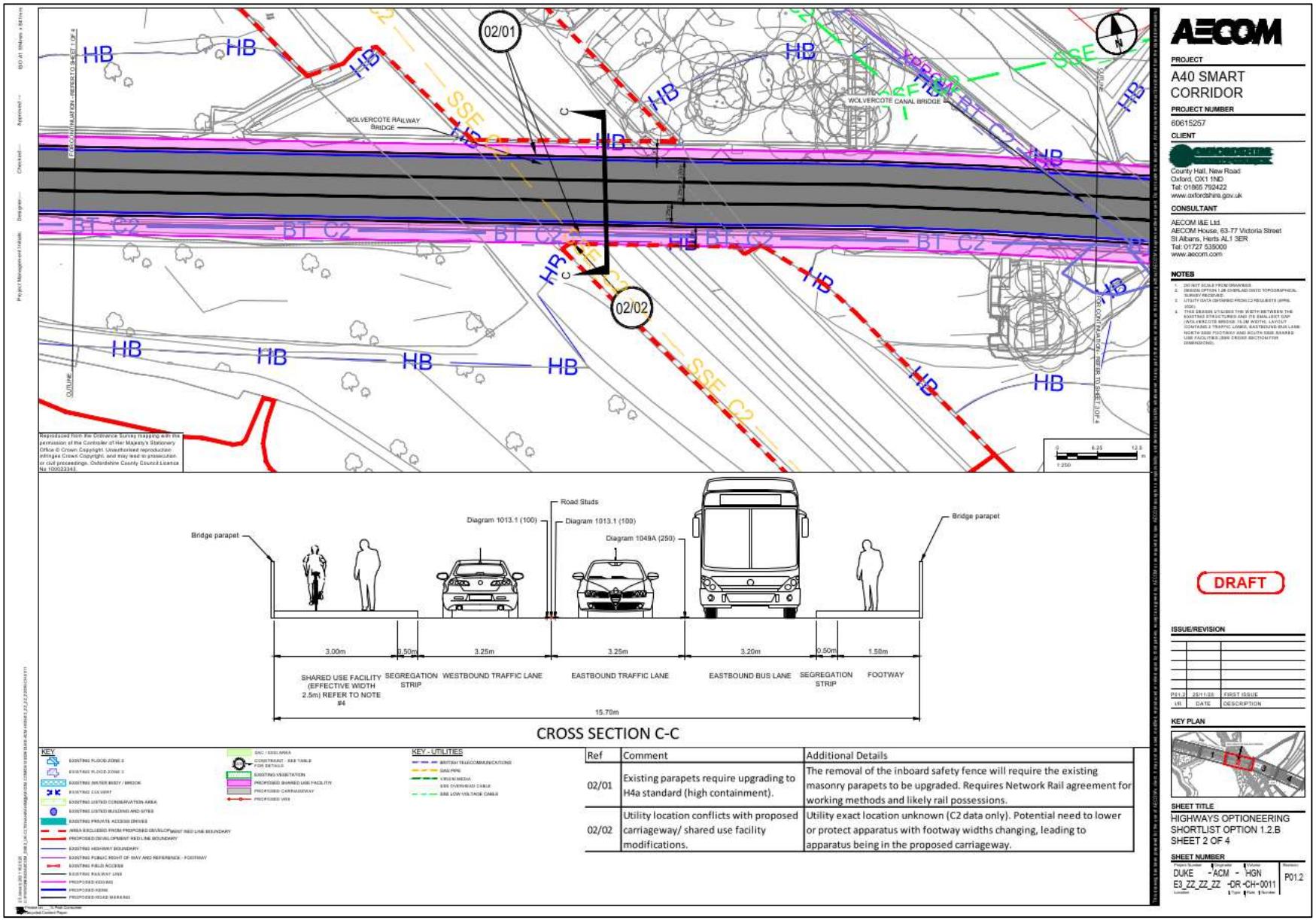


Figure 6-4 Option 1.2b Cross Section at Wolvercote Railway Bridge

6.5 Option 1.4b: Footbridges added to the north (7m general traffic)

6.5.1 An EAST assessment of the 1.4b option was undertaken, see Figure 6-5 and 6-6. Score and related comments are as follows:

- **Strategic case:** this option scores positively as it will support bus lane, active travel infrastructure and associated benefits including deliver of new homes. It scores 7.
- **Economic case:** similar to the strategic case, this option scores positively as it will help support bus lane and provides new active travel infrastructure. This option is likely to have some negative impact due to the construction of a new bridge. It scores 5.
- **Management case**: this option scores negatively as large scale diversions of utilities are likely to be required, an S106 agreement is required and there is a negative impact on the environment. Planning permission is required, but this can be part of wider A40 schemes. It scores -18.
- **Financial case**: this option scores negatively due to the high scheme cost. It scores -3.
- **Commercial Case**: this option scores negatively as the new bridge will require Network Rail approval and significant of diversions of utilities, which could result in higher cost. It scores -5.
- Overall, this option scores -14. This option is **rejected.**

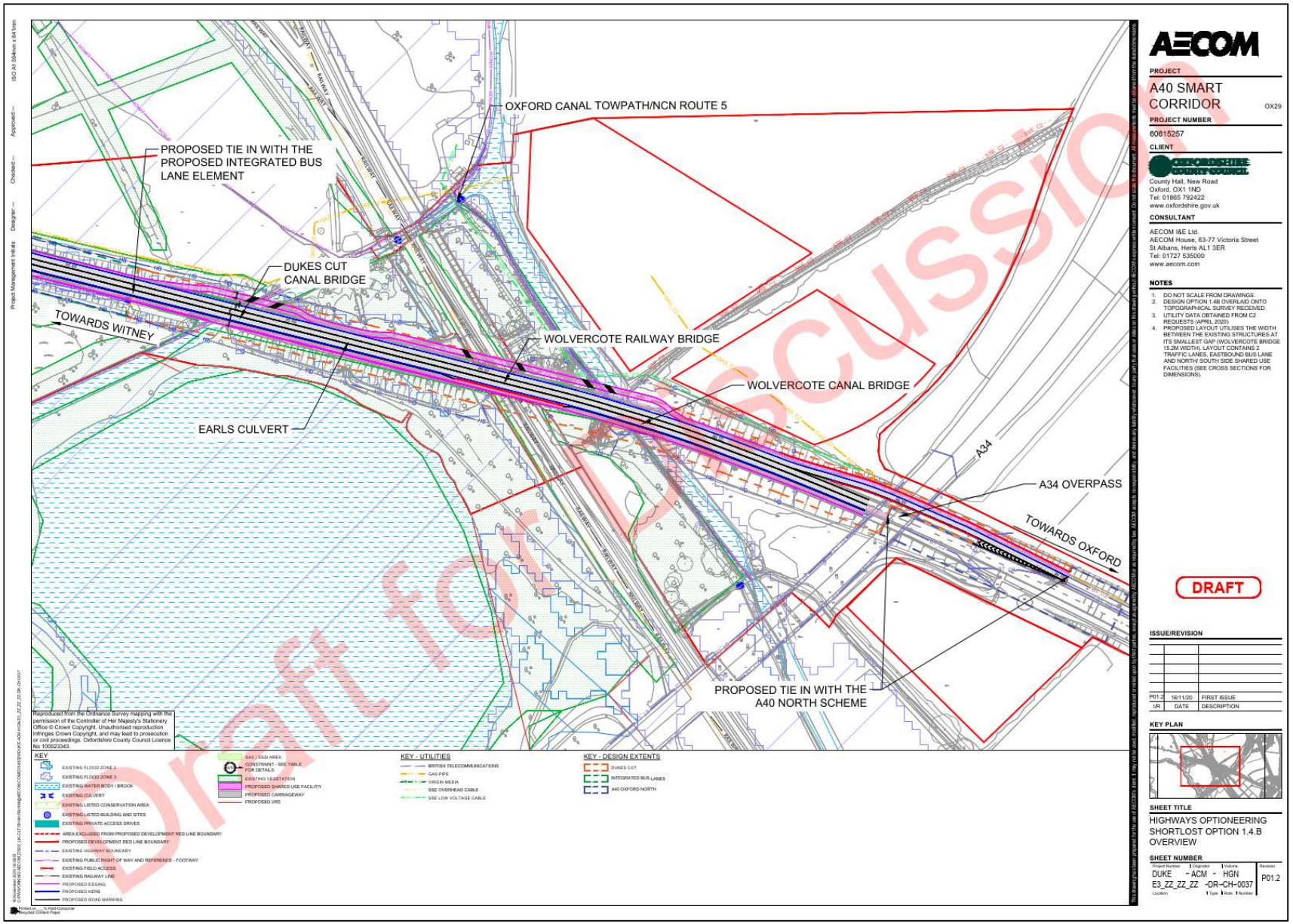
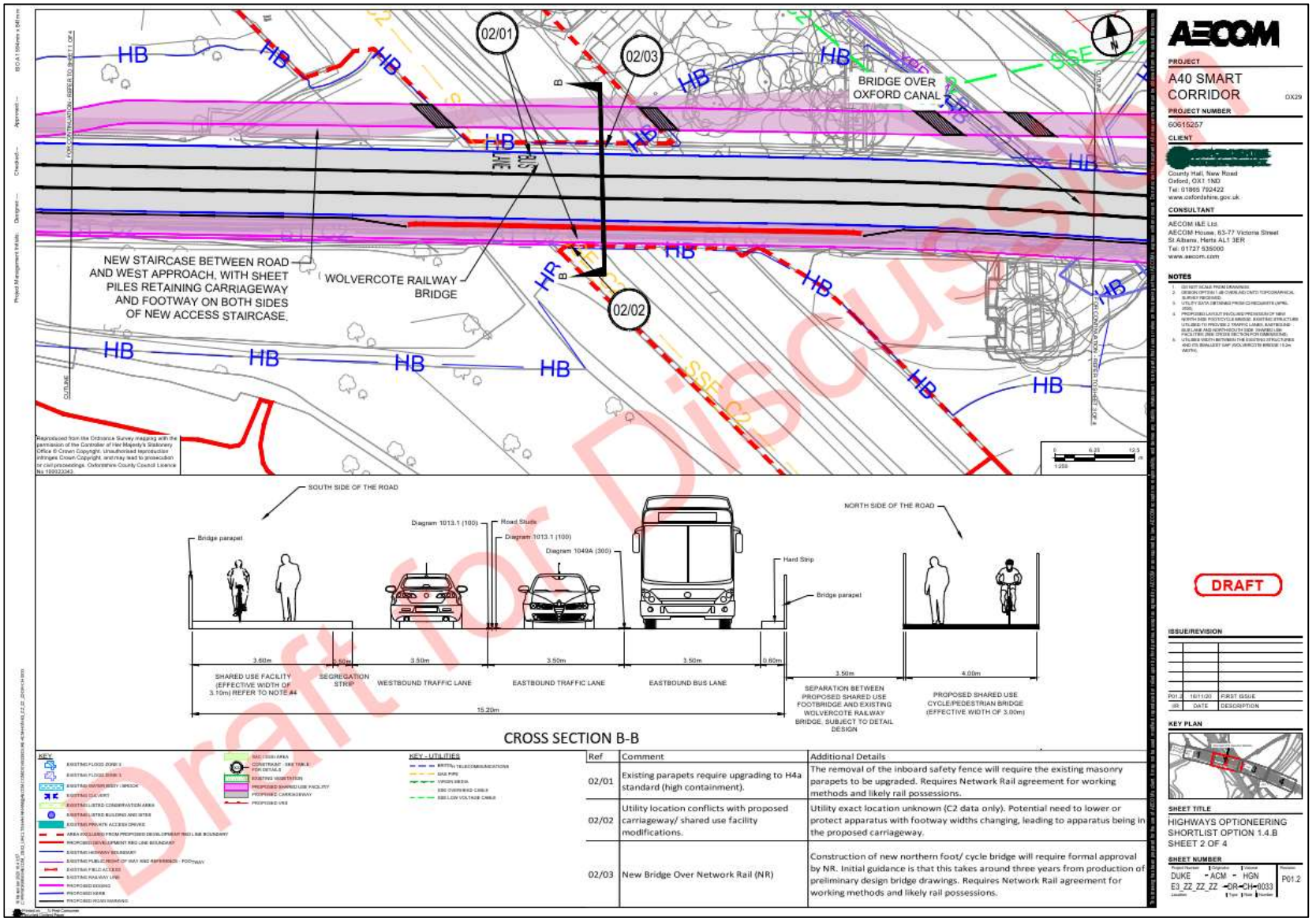


Figure 6-5 Option 1.4b: Footbridges added to the north



Ref	Comment	Additional Details
02/01	Existing parapets require upgrading to H4a standard (high containment).	The removal of the inboard safety fence will require the existing masonry parapets to be upgraded. Requires Network Rail agreement for working methods and likely rail possessions.
02/02	Utility location conflicts with proposed carriageway/ shared use facility modifications.	Utility exact location unknown (C2 data only). Potential need to lower or protect apparatus with footway widths changing, leading to apparatus being in the proposed carriageway.
02/03	New Bridge Over Network Rail (NR)	Construction of new northern foot/ cycle bridge will require formal approval by NR. Initial guidance is that this takes around three years from production of preliminary design bridge drawings. Requires Network Rail agreement for working methods and likely rail possessions.

Figure 6-6 Option 1.4b Cross Section at Wolvercote Bridge

6.6 Option 1.5c: Footbridges added to the south (shared use facility of 2.6m)

6.6.1 An EAST assessment of the 1.5c option was undertaken, see Figure 6-7 and 6.8. Score and related comments are as follows:

- **Strategic case:** this option scores positively as it will support bus lane, active travel infrastructure and associated benefits including deliver of new homes. It scores 7.
- **Economic case:** similar to the strategic case, this option scores positively as it will help support bus lane and provides new active travel infrastructure. This option is likely to have some negative impact due to the construction of a new bridge. It scores 4.
- **Management case**: this scenario scores negatively as minor diversions of utilities are likely to be required, an S106 agreement is required and there is a negative impact on the environment. Planning permission is required, but this can be part of wider A40 schemes. It scores -17.
- **Financial case**: this option scores negatively due to the high scheme cost. It scores -3.
- **Commercial Case**: this option scores negatively as the new bridge will require Network Rail approval and significant of diversions of utilities, which could result in higher cost. It scores -5.
- Overall, this option scores -14. This option is **rejected.**

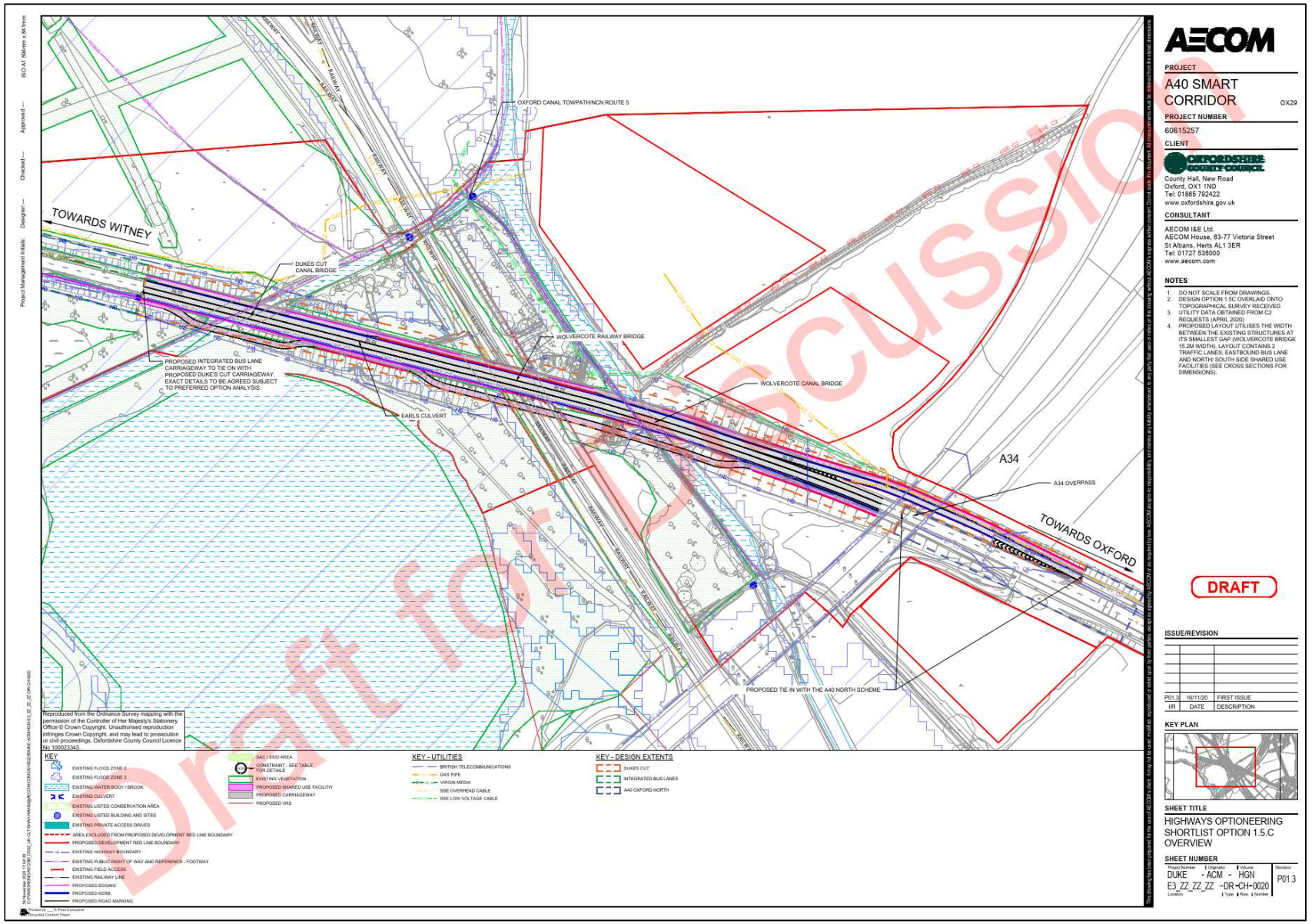


Figure 6-7 Option 1.5c: Footbridges added to the south

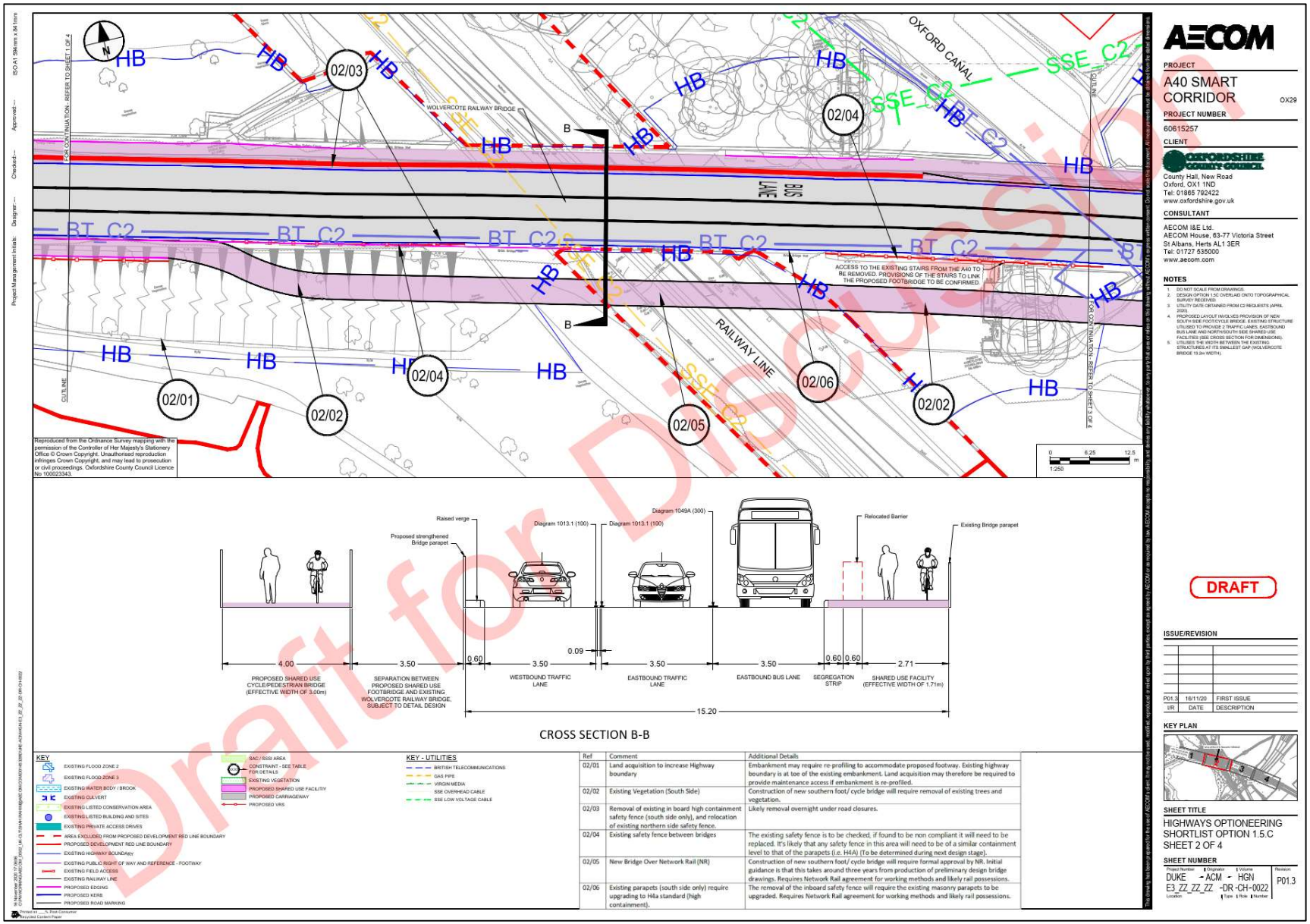


Figure 6-8 Option 1.5c Cross Section at Wolvercote Bridge

6.7 Weighting

6.7.1 The scoring undertaken in the Stage 2 (for each option) was against a list of criteria, grouped within the five business cases. The maximum score an option can get under each case of the five business cases varied (mentioned as 'base case' in Table 6-2). Due to this imbalance in the maximum score possible for each of the five business cases, the overall results (EAST score of each option) can be reasoned as biased towards the strategic, economic and management cases. Therefore, it was decided that three further weighting scenarios would be tested in order to understand the impact of the weighting on the results and the subsequent ranking of the options (Table 6-2 gives an overview of the weighting assigned in each scenario).

- The first scenario tested was equal weighting, where each business case was assigned a 20% weight.
- The second scenario tested was following OCC's LGF Weighting.
- The third scenario tested was limiting the scoring to high-level objectives (reduced the strategic case maximum score from 22 to 12) which were found to be similar to some of the other business case criteria.

Table 6-2 Weighting Scenarios – maximum score

Scenario	Strategic Case	Economic Case	Financial Case	Management Case	Commercial Case	Total
Base case	*22*	*26*	*4*	*36*	*8*	*96*
Scenario 1: Equal Weighting	20	20	20	20	20	80
Scenario 2: OCC LGF Weighting	45	35	10	5	5	80
Scenario 3: Limiting Objectives to High-Level	12	26	4	36	8	86

6.7.2 Table 6-3 shows the results (as 'rank') of this weighting process. This table shows that the better performing options are 'Option 0.1 Bus Gate' and 'Option 1.2b No Footbridges'.

Table 6-3 Weighting Scenarios Result

Options	Ranking			
	Base case	Scenarios 1: Equal Weighting	Scenarios 2: OCC LGF Weighting	Scenarios 3: Limiting Objectives to High-Level
Do Nothing	5	3	5	3
Option 0.1[21]	2	1	2	1
Option 1.2b	1	2	1	2
Option 1.4b	3	4	2	4
Option 1.5c	3	4	4	4

[21] Option 0.1 score high in equal weighting due to low financial cost as compared to other options. Further, Bus Gate can be contingency measure and could be developed in parallel/background to the preferred option.

6.8 Closing

6.8.1 The options derived as part of the EAST assessment optioneering process have been discussed in this chapter. Option 1.2b (No Footbridges) is to be taken forward as the preferred option. The Option 0.1 Bus Gate can remain a backup option at this stage and this will be clarified with OCC.

6.8.2 Both options, Option 1.2b and Option 0.1, include for a narrow facility for NMU on the A40 north side, which is wide enough only to be used as a footpath. Cyclists from the west heading eastbound that remain on the north side pathway will need to divert via the proposed NCN5 north side link. For further information on this link, please refer to Appendix F which documents the optioneering of the required NCN5-A40 link for a shared use facility.

6.9 Next Steps

6.9.1 The preferred options to deliver the Duke's Cut scheme have been selected through the optioneering process discussed in this report. These options will now be taken forward for further assessment and design to understand the feasibility of the schemes in greater detail (Feasibility Design; Preliminary Design including geotechnical ground surveys; Detailed Design).

6.9.2 It is to be noted that this is an iterative process. Further corrections to the scoring can take place in line with feedback from relevant stakeholders, OCC and new/revised evidence. Further baseline surveys (ecological, noise, air quality, traffic, topographical etc.) may need be undertaken to inform further option design work, traffic modelling and impact appraisals that are required to inform the next stage of option assessment.

6.9.3 A logic map should be developed for the preferred options to set out the short to medium term outcomes and longer term impacts, including mapping the preferred options against scheme objectives.

6.9.4 A high-level ASR to set out the methodology and how further appraisal has been produced including potential scenarios and sensitivity tests. The ASR details the proposed approach to modelling and forecasting, the proposed level of design or specification which will inform the cost estimation and other details.

6.9.5 The list of risks and mitigation measures will be updated to include risks on modelling, design, land take, cost estimates, COVID-19 on travel patterns/ demand, and other key components.

6.9.6 Finally, as the study progresses, design and refinement of the preferred option(s)/ sub-options(s) to be undertaken; but as evidence, for example from updated modelling, becomes available, it may be necessary to revisit the optioneering. Options sifted out at this stage may still have a strong case for more specific needs (e.g. related to particular development sites and / or following delivery of other interventions, as part of an overarching packaged approach, funds permitting).

Appendix A List of Referred Documents

List of Referred Documents

Document name	Last updated	Project	Author
A40 Strategy - Consultation	2019	A40 Strategy	OCC
A40 Option Assessment Report	2017	A40 Smart Corridor	OCC
HIF2 Economic Appraisal Report	2019	A40 Smart Corridor	Steer
HIF2 Business Case Submission	2019	A40 Smart Corridor	OCC
A40 Smart Corridor - Feasibility Design	2019	A40 Smart Corridor	AECOM
Eynsham P&R modelling report	2019	A40 Science Transit 2 – Business Case	OCC
A40 Option Assessment Report	2017	A40 Science Transit 2 – Business Case	OCC
DfT Outline Business Case Submission	2019	A40 Science Transit 2 – Business Case	OCC
VISSIM Base Model Local Validation Report	2019	OCGV Eynsham AAP and West Eynsham SPD – Supporting Transport Study	Wood
VISSIM 2031 Forecast Year Report	Still being finalised	OCGV Eynsham AAP and West Eynsham SPD – Supporting Transport Study	Wood
Cotswolds Garden Village AAP & West Eynsham SPD: Developing the Transport Evidence Base	2019	OCGV Eynsham AAP and West Eynsham SPD – Supporting Transport Study	Wood
Oxfordshire Housing and Growth Deal	2017	Oxfordshire Housing and Growth Deal	Oxfordshire Growth Board
Draft Access to Witney – TAG Report	2020	Access to Witney	OCC
Oxfordshire Infrastructure Strategy (OXIS)	2017	Oxfordshire Infrastructure Strategy (OXIS)	Oxfordshire Growth Board
Connecting Oxfordshire Local Transport Plan 4 (LTP4)	2016	Connecting Oxfordshire Local Transport Plan 4 (LTP4)	OCC
Oxford Transport Strategy	2016	Oxford Transport Strategy	OCC
West Oxfordshire Local Plan 2031	2018	West Oxfordshire Local Plan 2031	West Oxfordshire District Council
Oxford Local Plan 2036	2019	Oxford Local Plan 2036	Oxford City Council
A40 Park and Ride and Bus Lane Scheme – Transport Assessment	2019	A40 Smart Corridor	AECOM
A40 Corridor – Witney to Oxford North Future Walking and Cycling Provision	2020	A40 Corridor	TBC
National Planning Policy Framework	2019	National Planning Policy Framework	Ministry of Housing, Communities and Local Government
Highways England Delivery Plan	2015	Delivery Plan	Highways England
Industrial Strategy White Paper	2017	Building a Britain fit for the future	HM Government
Housing White Paper	2017	Fixing our broken housing market	Ministry of Housing, Communities and Local Government
Transport Investment Strategy	2017	Transport Investment Strategy	Department for Transport
Strategic Economic Plan Oxfordshire	2016	Strategic Economic Plan	OxLEP
Bus and Rapid Transit Strategy	2016	Bus and Rapid Transit Strategy	OCC
Salt Cross Garden Village AAP, Transport Strategy	2020	SCGV	OCC
Garden Village Oxfordshire, Transport Assessment	2020	OGV	Stantec
West Eynsham, Strategic Development Area	2018	West Eynsham	West Oxfordshire District Council
Salt Cross Garden Village AAP	2020	Salt Cross Garden Village	West Oxfordshire District Council

Appendix B **Eynsham Park and Ride**

As part of the A40 Strategy, the need for a new Park and Ride scheme along the A40 was highlighted. This led to a site in Eynsham being identified as a future Park and Ride site, as part of Phase 1 of the A40 Corridor Strategy.

The Eynsham Park and Ride site was included as part of the A40 Science Transit 2 scheme. The scheme includes:

- An 850 car parking space Park & Ride, with additional cycle parking and motorcycle parking;
- A segregated eastbound bus lane between the proposed Park & Ride and Duke's Cut, with intermittent gaps on junction approaches;
- A westbound bus lane starting a short distance west of the A40/Horsemere Lane junction and ending approximately 150m before the A40/Eynsham Road signalised junction;
- A westbound bus lane starting approximately 300m west of the A40/Cassington Road signalised junction continuing for approximately 550m;
- Shared footway/cycleway on the northern side of the A40 with links into the Park & Ride site;
- A new roundabout on the A40 to provide access to the Park & Ride; and
- A new entry only access to the Park & Ride from Cuckoo Lane.

Two access junctions are provided for the Park and Ride: the primary access junction is a roundabout with the A40, west of Cuckoo Lane, the secondary access is from Cuckoo Lane and is a priority T-junction. As part of the scheme the existing bus stops along the bus lane route will be improved and re-located and a new pair of bus stops will be provided.

The proposed Park and Ride will be located to the north of the A40 west of Cuckoo Lane, to the north-west of Eynsham. Figure 6-9 shows the location of the scheme.

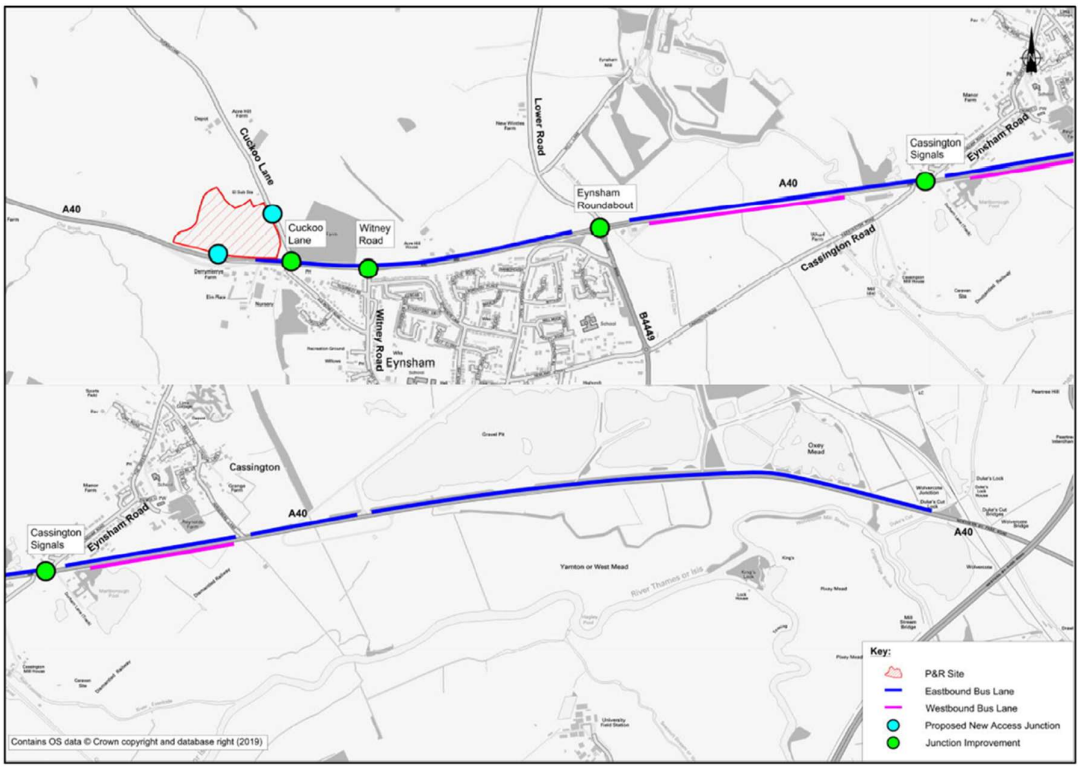


Figure 6-9 Park and Ride Site Boundary and Associated Schemes
Source: A40 Park & Ride and Bus Lane Scheme Transport Assessment, AECOM (May 2019)

The aim of the scheme is to improve the reliability, frequency and variety of destination in Oxford served by public transport, thereby encouraging a reduction in car travel into Oxford and to do so while avoiding significant adverse impacts on general traffic along the A40 corridor. The scheme also delivers improvements for people using non-motorised transport along and across the A40.

Further information on the Eynsham Park and Ride can be found in the A40 Park & Ride and Bus Lane Scheme Transport Assessment (AECOM, 2019).

Appendix C **Initial Long List of Options**

Table 6-4 Initial Long List of Options

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
0	Do Nothing	No modification to existing structures, with inboard vehicle restraint barriers retained on Wolvercote Railway Bridge. The carriageway will be restricted to two traffic lanes with combined cycle/footways on both verges.	Nil	None	N/A	N/A - No constructio n work	This option will not deliver against any of the requirements of the scheme objectives.	None - no construction works	None	None	Neutral	Neutral	This option will not deliver against any of the requirem ents of the scheme objective s.	**OPTION REJECTED - Using the existing cross section width would not be sufficient to provide a complaint shared use facility across the structure. On the northern side the facility would be less than 1.0m effective and on the south under 2.0m effective width. Option does not cater for increased demand and modal shift.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
0.1.	Bus gate to the west of Duke's Cut canal bridge	Eastbound bus gate provided to the west of the scheme where the proposed A40 SC eastbound bus lane would end. No modification to existing structures, with inboard vehicle restraint barriers retained on Wolvercote Railway Bridge. The carriageway will be restricted to two traffic lanes with combined cycle/footways on both verges. This option to be modelled in VISSIM so the bus gate provides a gap large enough to allow free passage for the bus across the Duke's Cut structures.	Cheapest construction option (£0.5M for Bus Gate works only). Option can be combined with other options across the structures to provide an overall cost. Total assumed (using 1.2c estimate) is £4.5M.	This option would not require any land acquisition as it is contained within the existing highway boundary. Unlikely to require any temp land for construction	Four Month construction programme estimate (Skanska)	Bus Gate simplest to construct but issues of exact nature of enforcement to be agreed. The Bus Gate would be a Red Light Camera (not ANPR). Ducting provision is required in the footway but operation can be linked to BT line for remote camera operation. Provision of facilities across the structures would require upgrade of existing parapets to provide wider shared use facilities. Construction would be similar to Option 1.2c with narrow	The option would provide significant improvements for Buses and provide the minimum level of provision for shared use across the bridges (assuming the use of the cross section proposal provided). The Journey Time for general traffic would be unaffected but the wait at the red light itself would be average 80 seconds and up to a maximum of 193 seconds. This is considered too high and likely to lead to significant safety concerns and misuse of the Bus Gate. 'VISSIM modelling has been undertaken on the base model only. Future (2031) will be unavailable until November. Initial Modelling indicates no journey time disbenefit for general traffic along whole of tested route and significant benefits for buses. However the bus gate projected to hold traffic for average of 80 seconds on a single red light with a maximum of over 170 seconds. Potential cross section of 4m south side shared use facility (3m effective width)/ 0.6m VRS (repositioned)/ two	Limited effect on utilities at Bus Gate itself but depending on measures across bridges minor works maybe required.	No permanent impact but may require temporary works over NR/ CRT depending on construction method.	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used.	Limited impact at the location of the Bus Gate itself.	Modelling of base year only indicates general traffic would create queuing of upto 3 minutes at the bus gate and an average of 80 seconds. AECOM consider the delay to be unacceptably long and likely to lead to non compliance with serious safety concerns. OCC Signals review also agreed delays would not be acceptable.	Modelling for 2031 provides an acceptable level of delays, with the A40 Oxford North scheme included. Assumes that the Bus Gate would be acceptable to the Police and that a suitable method of enforcement can be agreed/ achieved.	**OPTION REJECTED - Unacceptable level of delay for general traffic at Bus Gate would lead to significant safety concerns and misuse of the Bus Gate. Meeting held with OCC on 12th October Signals lead who agreed with rejecting the option.** **Instruction received from OCC to inlcude this option within the scoring process. Option Included in Sage 2.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
						lanes provided for the duration which permit constructio n on north or south side. Some use of two way signals would be required and works to construct the parapet upgrade would require likely overnight closures.	3.5m running lanes /0.6m VRS (repositioned) and a north side facility of 3m (2m effective width). Total of 15.2m. However, using two 3.5m carriageway lanes without the provision of a hard strip will result in vehicles running too close to the safety fence. This is likely to reduce vehicle speeds and limit the benefit for buses using this section as they will also need to travel slower. A compromise of 0.5m hard strips (not compliant as 1.0m required) would be needed to reduce the north side shared use facility to 2m (effective width 1m). This would be permitted under the criteria for short sections under 100m in length (which is the suitable with the bridge lengths we have).							

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.1.	Bus Gate at Wolvercote Railway Bridge	No modification to existing structures, with inboard vehicle restraint barriers retained on Wolvercote Railway Bridge. The carriageway will be restricted to two traffic lanes with combined cycle/footways on both verges with a bus gate installed at Wolvercote Railway Bridge	No cost estimate provided as rejected prior to ECI review.	This option would not require any land acquisition as it is contained within the existing highway boundary. Unlikely to require any temp land for construction	Four Month construction programme estimate (Skanska)	Bus Gate simplest to construct but issues of exact nature of enforcement to be agreed. The Bus Gate would be a Red Light Camera (not ANPR).	A bus gate and its associated taper as well as shared use facilities (2m total width north and 3.5m south in accordance with cycling and walking strategy), two traffic lanes (3m width per lane) and a bus lane (3.2m width) would not fit within the available width along the existing structures west of the Wolvercote railway bridge . The extra width required for the implementation of a bus gate (including its road markings) would be of circa 2.1.m. The width at Duke's Cut canal bridge is of 15.3m and the width across the existing culvert 15.5m based on the topo survey available. Therefore, it is advised this option is rejected due to the inability of providing all the NMU and bus infrastructure enhancements required to fulfil the scheme objectives and OCC's Walking and Cycling Strategy.	Limited effect on utilities at Bus Gate itself but depending on measures across bridges minor works maybe required.	No permanent impact but may require temporary works over NR/ CRT depending on construction method.	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used.	Limited impact at the location of the Bus Gate itself.	Bus Gate not modelled but uses a different system that only holds traffic for eastbound buses. Significantly less delay projected and no significant safety issues identfied.	Modelling for 2031 provides an acceptable level of delays, with the A40 Oxford North scheme included. Assumes that the Bus Gate would be acceptable to the Police and that a suitable method of enforcement can be agreed/ achieved.	**OPTION REJECTED - Unable to fit the Bus Gate at this location within existing bridge parameters.** **The bus gate and required taper at Wolvercote railway bridge would not fit within the available carriageway width or within the remaining structures. If a bus gate is to be provided, it will have to be located in the A40 corridor to the west of the Duke's Cut structures.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.2a.	No footbridges. Atkins Assessment Layout	Arrangement in accordance with a previous assessment by Atkins with Steelgard barriers located 750mm from the north parapet and 2670mm from the south parapet. This would provide three lanes, two 3.235m traffic lanes and a 3.033m bus lane. The footway on the north would be restricted to 750mm which is less than the desired minimum effective width of 1m (2m total width). The shared use facility on the south doesn't achieve the desired minimum effective width of 2.5m (3.5m total width). The Steelgard barriers would need to be relocated to achieve this.	No cost estimate provided as rejected prior to ECI review.	This option would not require any land acquisition as it is contained within the existing highway boundary. Unlikely to require any temp land for construction	Three Month construction programme estimate (AECOM)	Relatively straightforward - Concrete "Beam" may be required to support the relocated inboard barrier	This option to be discarded as it is as it doesn't provide a shared-use facilities up to standard and it is not compliant with the OCC walking and cycling strategy width requirements which states that a minimum effective width of 1m should be provided in the north and 2.5m in the south (for a 100m maximum).	Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). No utilities found in the embankment areas to the south.	None	likelihood that shared use will be substandard. 0.5m either side of the shared use will be lost due to "kerb shyness"	Works contained within existing bridge structure. Minor impact for temporary works, the extent of which is to be determined as method of working is developed/ agreed.	Narrow shared use facilities will compromise interaction between pedestrians and cyclists leading to potential conflicts in limited space provided.	Substandard facilities north and south, no strengthening of the edge beams and no replacement of the parapets	**OPTION REJECTED - Does not provide a north side shared use facility.**
1.2b	Do min - No footbridges. Strengthening of Wolvercot	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of	£4.0M for Structural works (Skanska)	This option would not require any land acquisiti	Six Month construction programme estimate (Skanska)	Existing parapets will require updating to H4a High compliance with the	This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus	Modification of footway/ lane widths may affect utilities on north side only as footway would	No permanent impact but may require temporary works over NR/ CRT	DMRB requires 3.65m running lanes for either urban or rural.	Works contained within existing bridge structure. Minor	Traffic lane widths reduced to 3.25m for general	Upgrade of parapet is possible with existing	**OPTION SHORTLISTED FOR STAGE 2**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
	e Railway Bridge Only. Three traffic lanes and Shared use facility provision on southern and northern sides. 40 mph speed limit.	Wolvercote Railway Bridge only so the full width of carriageway can be used. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern and northern verges. No footbridges proposed. Speed Limit Reduced to 40mph. This option would provide the following: - Share use facility to the south: Total width of 3.0m (2.5m effective width); -Segregation strip south width: 0.5m (compliant with 40mph and under speed limit) -General Traffic lane widths: 3.25m each (6.5m) -Bus lane width: 3.2m width. -Segregation strip north width: 0.5m - Share use facility to the north: Total width of 1.5m (1.0m effective width);		on as it is containe d within the existing highway boundar y. However , land maybe required on a temporar y construct ion basis to permit the strength ening of the parapet (assume s deck is complain t).		removal of the existing inboard barriers. To be undertaken using narrow lanes and closure of one side of existing footway.	journey time reliability and potentially encourage the use of public transport. This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (but reduced to 2.5m wide for short section over Wolvercote Railway Bridge as permitted) where the cyclist demand is higher and the recommended effective width of 1.5m in the northern side (short distance over bridges 100m). 'This option would utilise the existing 15.20m width between existing parapets, without the need to provide new structures. Lane widths narrowed with provision of 40mph speed limit.	be narrower than existing layout.	depending on construction method.	Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used.	impact for temporar y works, the extent of which is to be determin ed as method of working is develope d/ agreed.	traffic and 3.2 for eastboun d bus lane. Introduce d in combinat ion with lower speed limit of 40mph. 3.65m DMRB complian t layout not possible with this option. OCC to advise of minimum lane widths permitted on OCC networks for different scenario s (eg Rural/ Urban).	structure and no further works are required. Assumes 15.20m existing width between parapet. Use of Steelgar d H4A parapets are a permitted design for the upgradin g of the parapet to be vehicle impact complian t.	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.2.c	Do min - No footbridges. Strengthening of Wolvercote Railway Bridge Only. Three traffic lanes and Shared use facility provision on southern and northern sides. 30 mph speed limit.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only so the full width of carriageway can be used. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern and northern verges. No footbridges proposed. Speed Limit Reduced to 30mph. This option would provide the following: - Share use facility to the south: Total width of 3.5m (3m effective width); - Segregation strip south width: 0.5m (compliant with 40mph and under speed limit) - General Traffic lane widths: 3.00m each (6.0m) -Bus lane width: 3.2m	£4.0M for Structural works (Skanska)	This option would not require any land acquisition as it is contained within the existing highway boundary. However, land maybe required on a temporary construction basis to permit the strengthening of the parapet (assumes deck is complaint).	Six Month construction programme estimate (Skanska)	Existing parapets will require updating to H4a High compliance with the removal of the existing inboard barriers. To be undertaken using narrow lanes and closure of one side of existing footway.	This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side (3.m) where the cyclist demand is higher and the minimum effective width of 1m in the northern side (short distance over bridges 100m)	Modification of footway/ lane widths may affect utilities on north side only as footway would be narrower than existing layout.	No permanent impact but may require temporary works over NR/ CRT depending on construction method.	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used.	Works contained within existing bridge structure. Minor impact for temporary works, the extent of which is to be determined as method of working is developed/ agreed.	Traffic lane widths reduced to 3.0m for general traffic and 3.2m for eastbound bus lane. Introduced in combination with lower speed limit of 30mph. 3.65m DMRB compliant layout not possible with this option. OCC to advise of minimum lane widths permitted on OCC networks for different scenarios (eg Rural/ Urban). A40 Identified	Upgrade of parapet is possible with existing structure and no further works are required. Assumes 15.20m existing width between parapet. Use of Steelgard H4A parapets are a permitted design for the upgrading of the parapet to be vehicle impact compliant.	**OPTION REJECTED - 3.0m lane widths determined as unacceptable by OCC.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
		width. - Segregation strip north width: 0.5m - Share use facility to the north: Total width of 1.5m (1.0m effective width);										as Freight Corridor for Oxford and 3.0m lane widths for significant levels of HGV's would not be acceptable to OCC.		
1.3.	Do Something - Replacement of Wolvercote Railway Bridge parapets with independent Edge beams. Three traffic lanes and Shared use facility provision on southern side only.	Removal of Masonry Parapet and replacement with self-supporting edge beam and H4A vehicular parapet of Wolvercote Railway Bridge only. The full width of carriageway can be used. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge only. No footbridges proposed.	No cost estimate provided as rejected prior to ECI review.	This option would not require any land acquisition as it is contained within the existing highway boundary. However, land maybe required on a temporary construction basis to permit the strengthening of the	No programme provided as rejected prior to ECI review.	This option is based upon the Atkins Assessment Report identifying the transverse bracing and high weight of the masonry parapet being the leading cause of the weak verges for the bridge. (AECOM). Adding an independent edge beam has limited benefit	The layout will only provide a compliant shared use facility on the southern side but does not provide a facility on the north side.	Modification of footway/ lane widths may affect utilities on north side only as footway would be narrower than existing layout.	No permanent impact but may require temporary works over NR/ CRT depending on construction method.	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used. The shared use facility on the north side would not be provided and not be complaint.	Works contained within existing bridge structure. Minor impact for temporary works, the extent of which is to be determined as method of working is developed/ agreed.	Not reviewed in detail as rejected at early stage due to cost implications but no road safety issues identified as compliant layout can be achieved for lane widths and shared use facilities with wider structure.	Available possessions are permitted to allow construction to proceed. Train companies will need to accept longer possessions at certain times of year by commercial agreement.	**OPTION REJECTED - Adding an independent edge beam has limited benefit above using a Steelgard H4A parapet. Both systems are designed to minimise the load transfer into the deck. Steelgard H4A parapets are a standard option and should be progressed as part of option 1.2.**

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				parapet (assume s deck is complain t).		above using a Steelgard H4A parapet. Both systems are designed to minimise the load transfer into the deck. Steelgard H4A parapets are a standard option and should be progressed as part of option 1.2.								

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.4.A	Do Something - Footbridges added to the North with three traffic lanes and Shared use facility provision on southern side . 40 MPH speed limit.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge. Footbridges added to the north spanning Duke's Cut Canal, Oxford Canal and Didcot to Leamington Spa Railway. 40 MPH speed limit. North side new footbridge with total width 2.5m to provide an effective width of 1.5m. A wider Footbridge can be used to accommodate wider widths. This option would provide the following widths on the existing bridge with inboard barriers removed and	£7.5M for Structural Works (Skanska)	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.	12 month construction period	The construction of a new bridge will be complex to undertake due to the existing site constraints. The works within the existing bridge structure can be undertaken as described in earlier options with narrow lanes. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself.	This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (but reduced to 2.8m wide for short section over Wolvercote Railway Bridge as permitted) where the cyclist demand is higher and the recommended effective width of 1.5m in the northern side (short distance over bridges 1.0m). Lane widths would be compliant.	"There is an IP gas main located to the north of the scheme extents which crosses the existing embankment conflicting with the proposed footbridge/shared use facility to the eastern section of the scheme. To the western section of the scheme, the gas main runs parallel to the toe of the embankment at an approximate distance of 10m of the proposed footbridge. Skanska's ECI are currently working on another scheme just along from Duke's Cut and have stated that the local gas utility provider (SGN) has advised that vibration pile within 15m of the gas main location is not allowed. If this	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design approval (further NR discussion required) .	Lane widths would be compliant with DMRB but shared use facility on southern side is compromised across bridge and reduced to 2.8m.	North side of existing structures has dense vegetation and multiple trees likely to be of significant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed .	North side bridge needs to be a minimum of 4m to permit a 3m shared use facility. Lane widths would be a compliant layout but south side shared use would be 2.8m and just under the preferred 3.0m widths.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependent on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial	**OPTION REJECTED - Option 1.4b provides compliant shared use facility with minimal carriageway lane width reduction.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
		parapets upgraded to H4a: - Share use facility to the south: Total width of 3.3m (2.8m effective width); -Segregation strip south width: 0.5m (compliant with 40mph and under speed limit) -General Traffic lane widths: 3.65m each (7.3m) -Bus lane width: 3.5m width. - North Footway/ Bridge Protection Strip 0.6m;						is the case, there would be an opportunity to re-locate the gas main further north however, based on previous liaison with SGN as part of the A40 STP2 project, the diversion costs would significantly exceed the utilities diversion HIF2 budget of 600k. Overhead LV power supply also appears in close proximity to the canal bridge which could potentially interfere with bridge installation, piling and other construction activities. BT located in southern footpath could be Impacted if there are changes in existing surface levels as part of the					agreeme nt. Prelimina ry design of suitable new structure is submitte d to NR by March 2021 to permit construct ion by March 2024.	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
								design. VM located in northern footpath potentially impacted due to the removal of the northern footpath to provide new carriageway. Relocation may be required."						

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.4.B	Do Something - Footbridges added to the North with three traffic lanes and Shared use facility provision on southern side. 40 MPH speed limit. 3.5m General Traffic Lanes.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge. Footbridges added to the north spanning Duke's Cut Canal, Oxford Canal and Didcot to Leamington Spa Railway. North side new footbridge with total width 2.5m to provide an effective width of 1.5m. A wider Footbridge can be used to accommodate wider widths. This option would provide the following widths on the existing bridge with inboard barriers removed and parapets	£7.5M for Structural Works (Skanska).	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.	12 month construction period	The construction of a new bridge will be complex to undertake due to the existing site constraints. The works within the existing bridge structure can be undertaken as described in earlier options with narrow lanes. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself.	This option fulfills the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (including across the existing structures) where the cyclist demand is higher and the recommended effective width of 1.5m in the northern side (short distance over bridges 1.0m). Lane widths would be reduced to 3.5m (minor non-compliance).	"There is an IP gas main located to the north of the scheme extents which crosses the existing embankment conflicting with the proposed footbridge/shared use facility to the eastern section of the scheme. To the western section of the scheme, the gas main runs parallel to the toe of the embankment at an approximate distance of 10m of the proposed footbridge. Skanska's ECI are currently working on another scheme just along from Duke's Cut and have stated that the local gas utility provider (SGN) has advised that vibration pile within 15m of the gas main location is not allowed. If this	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design approval (further NR discussion required) .	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used.	North side of existing structures has dense vegetation and multiple trees likely to be of significant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed.	3.5m wide lane widths with 40mph speed limit is an acceptable reduction from 3.65 DMRB compliant lane widths.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependant on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial	**OPTION SHORTLISTED FOR STAGE 2**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
		upgraded to H4a: - Share use facility to the south: Total width of 3.6m (3.1m effective width); -Segregation strip south width: 0.5m (compliant with 40mph and under speed limit) -General Traffic lane widths: 3.5m each (7.0m) -Bus lane width: 3.5m width. - North Footway/ Bridge Protection Strip 0.6m;						is the case, there would be an opportunity to re-locate the gas main further north however, based on previous liaison with SGN as part of the A40 STP2 project, the diversion costs would significantly exceed the utitlities diversion HIF2 budget of 600k. Overhead LV power supply also appears in close proximity to the canal bridge which could potentially interfere with bridge installation, piling and other construction activities. BT located in southern footpath could be Impacted if there are changes in existing surface levels as part of the					agreeme nt. Prelimina ry design of suitable new structure is submitte d to NR by March 2021 to permit construct ion by March 2024.	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
								design. VM located in northern footpath potentially impacted due to the removal of the northern footpath to provide new carriageway. Relocation may be required."						

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.4.C	Do Something - Footbridges added to the North with three traffic lanes and Shared use facility provision on southern side.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the north side of Wolvercote Railway Bridge only. Therefore, the inboard barrier in the south would remain where it is. This would mean leaving the existing footway provision in the southern side as existing (2.4m). With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge. Footbridges added to the north spanning Duke's Cut Canal, Oxford Canal and Didcot to Leamington Spa Railway.	£7.5M for Structural Works (Skanska)	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.	12 month construction period	The construction of a new bridge will be complex to undertake due to the existing site constraints. The works within the existing bridge structure can be undertaken as described in earlier options with narrow lanes. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself.	The total width of the southern footpath would remain as existing (2.4m) in this proposal as the southern inboard restraint barrier would remain where it is. This would lead to an effective width of 1.9m in the southern side which is not acceptable as it does not comply with OCC Walking and Cycling Standards or DMRB minimum requirements. Option 1.4.D presents a variation of this option in which the remaining southern inboard barrier is relocated to the north to provide a shared use facility in the south compliant with DMRB standards and OCC Walking and Cycling strategy.	"There is an IP gas main located to the north of the scheme extents which crosses the existing embankment conflicting with the proposed footbridge/shared use facility to the eastern section of the scheme. To the western section of the scheme, the gas main runs parallel to the toe of the embankment at an approximate distance of 10m of the proposed footbridge. Skanska's ECI are currently working on another scheme just along from Duke's Cut and have stated that the local gas utility provider (SGN) has advised that vibration pile within 15m of the gas main location is not allowed. If this	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design approval (further NR discussion required) .	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used.	North side of existing structures has dense vegetation and multiple trees likely to be of signficiant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed.	Shared use south side facility is 2.4m risks conflicts with pedestrians and cyclists as larger volumes are projected for the south side facility.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependent on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial	**OPTION REJECTED - Option 1.4b provides compliant shared use facility with minimal carriageway lane width reduction.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
								is the case, there would be an opportunity to re-locate the gas main further north however, based on previous liaison with SGN as part of the A40 STP2 project, the diversion costs would significantly exceed the utilities diversion HIF2 budget of 600k. Overhead LV power supply also appears in close proximity to the canal bridge which could potentially interfere with bridge installation, piling and other construction activities. BT located in southern footpath could be Impacted if there are changes in existing surface levels as part of the					agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by March 2024.	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
								design. VM located in northern footpath potentially impacted due to the removal of the northern footpath to provide new carriageway. Relocation may be required."						

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.4.D	Do Something - Footbridges added to the North with three traffic lanes and Shared use facility provision on southern side. 30 mph.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the north side of Wolvercote Railway Bridge only. The inboard barrier to the south would be retained but moved slightly north to accommodate an NMU facility up to standard in the southern side compliant with OCC Walking and Cycling Strategy width requirements. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the southern verge. Footbridges added to the north spanning Duke's Cut Canal, Oxford Canal and Didcot to Leamington Spa Railway. This option would provide the	£7.5M for Structural Works (Skanska). (Likely to be slightly less expensive than 1.4.B).	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.	12 month construction period	The construction of a new bridge will be complex to undertake due to the existing site constraints. The works within the existing bridge structure can be undertaken as described in earlier options with narrow lanes. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself.	This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (including across the existing structures) where the cyclist demand is higher and the recommended effective width of 1.5m in the northern side (short distance over bridges 1.0m). Lane widths would be reduced to 3.5m (minor non-compliance).	"There is an IP gas main located to the north of the scheme extents which crosses the existing embankment conflicting with the proposed footbridge/shared use facility to the eastern section of the scheme. To the western section of the scheme, the gas main runs parallel to the toe of the embankment at an approximate distance of 10m of the proposed footbridge. Skanska's ECI are currently working on another scheme just along from Duke's Cut and have stated that the local gas utility provider (SGN) has advised that vibration pile within 15m of the gas main location is not allowed. If this	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design approval (further NR discussion required) .	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used.	North side of existing structures has dense vegetation and multiple trees likely to be of signficiant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed.	Traffic lane widths reduced to 3.0m for general traffic and 3.2m for eastbound bus lane. Introduced in combination with lower speed limit of 30mph. 3.65m DMRB compliant layout not possible with this option. OCC to advise of minimum lane widths permitted on OCC networks for different scenarios (eg Rural/ Urban). A40 Identified	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependent on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial	**OPTION REJECTED - Option 1.4b provides compliant shared use facility with minimal carriageway lane width reduction.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
		following: - Share use facility to the south: Total width of 4.15m (3.15m effective width); -Inboard barrier width: 0.6m -Inboard barrier set back: 0.6m -General Traffic lane widths: 3.00m each -Bus lane width: 3.25m widths. -Segregation hard strip north width: 0.6m -Shared use cycle/footbridge north: Width TBC. Recommended total width of 3m.						is the case, there would be an opportunity to re-locate the gas main further north however, based on previous liaison with SGN as part of the A40 STP2 project, the diversion costs would significantly exceed the utilities diversion HIF2 budget of 600k. Overhead LV power supply also appears in close proximity to the canal bridge which could potentially interfere with bridge installation, piling and other construction activities. BT located in southern footpath could be Impacted if there are changes in existing surface levels as part of the				as Freight Corridor for Oxford and 3.0m lane widths for significant levels of HGV's would not be acceptable to OCC.	agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by March 2024.	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
								design. VM located in northern footpath potentially impacted due to the removal of the northern footpath to provide new carriageway. Relocation may be required."						
1.5.A	Do Something - Footbridges added to the South with three traffic lanes and Shared use facility provision on northern side. 40 mph speed limit.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only. Footbridges added to the south spanning Duke's Cut Canal, Oxford Canal and Didcot to Leamington Spa Railway With	£7.5M for Structural Works (Skanska)	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land	12 month construction period	The construction of a new bridge will be complex to undertake due to the existing site constraints. The works within the existing bridge structure can be	This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. This option also complies with the OCC Walking and Cycling Strategy by providing the recommended	Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). No utilities found in the embankment areas to the south.	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but	South side of existing structures has dense vegetation and multiple trees likely to be of signficiant value. Topographical survey	No road safety issues identified.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT	**OPTION REJECTED - Option 1.5.C. provides up to standard shared use facilities with a lower cost estimate.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
		departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the northern verge. South side new footbridge with total width 4.0m to provide an effective width of 3.0m. This option would provide the following widths on the existing bridge with inboard barriers removed and parapets upgraded to H4a: - Share use facility to the North: Total width of 3.6m (3.1m effective width); -Segregation strip south width: 0.5m (compliant with 40mph and under speed limit) -General Traffic lane widths: 3.5m each (7.0m) -Bus lane width: 3.5m width. - South Footway/ Bridge Protection Strip 0.6m		acquisition is likely. In addition, land is likely to be required for a temporary period during construction.		undertaken as described in earlier options with narrow lanes. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself.	effective width in the southern side of 3.0m (with the provision of a new structure) where the cyclist demand is higher and in excess of the recommended effective width of (1.5m) in the northern side with a 3.1m effective width share use provision. This could be reduced to 2.8m and permit compliant carriageway lane widths. Lane widths would be reduced to 3.5m (minor non-compliance).		approval (further NR discussion required) .	reduced road widths are commonly used.	was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed. In addition on this side of the structure the existing lake maybe affected by the provision of either temporary or permanent works depneding on the construction method adopted.		approval. 3 year timescale for NR is dependent on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
													March 2024.	
1.5.B	Do Something - Footbridges added to the South with three traffic lanes and Shared use facility provision on northern side.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the North side of Wolvercote Railway Bridge only. Footbridges added to the south spanning Duke's Cut Canal, Oxford Canal and Didcot to Leamington Spa Railway. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the northern verge. The inboard barrier to the north would be retained in existing location providing a shared use facility of 2.33m total width in the northern side (effective width of 1.33m).	£7.5M for Structural Works (Skanska).	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.	12 month construction period	The construction of a new bridge will be complex to undertake due to the existing site constraints. The works within the existing bridge structure can be undertaken as described in earlier options with narrow lanes. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself.	This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (with the provision of a new structure) where the cyclist demand is higher and an effective width of 1.33 in the northern side across the structures. Lane widths would be reduced to 3.5m (minor non-compliance).	Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). No utilities found in the embankment areas to the south.	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design approval (further NR discussion required) .	DMRB requires 3.65m running lanes for either urban or rural. Proposed lane width reduction combined with lower speed limit would be a departure from standard but reduced road widths are commonly used.	South side of existing structures has dense vegetation and multiple trees likely to be of signficiant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed. In addition on this side of the structure the existing lake maybe	No road safety issues identified.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependant on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by	**OPTION REJECTED - The option retains inboard barriers as other options as options 1.5A. And 1.5C provide improved shared use facilities.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
											affected by the provision of either temporary or permanent works depending on the construction method adopted.		commercial agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by March 2024.	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.5.C	Do Something - Footbridges added to the South with three traffic lanes and Shared use facility provision on northern side.	Variation from 1.5.B. Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the North side of Wolvercote Railway Bridge only. The inboard barrier to the north would be retained but moved slightly south to accommodate an NMU facility up to standard in the northern side with a total width of 2.5m. Footbridges added to the south spanning Duke's Cut Canal, Oxford Canal and Didcot to Leamington Spa Railway. With departures from standards three traffic lanes can be accommodated with a single combined cycle/footway on the northern verge. South side new footbridge with total width 4.0m to provide an	£7.5M for Structural Works (Skanska). (Likely to be slightly less expensive than 1.5.A).	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.	12 month construction period	The construction of a new bridge will be complex to undertake due to the existing site constraints. The works within the existing bridge structure can be undertaken as described in earlier options with narrow lanes. Multiple road closures are likely to be required to enable equipment to be located in specific locations for construction, along with the actual provision of the new structure itself.	This option fulfils the scheme requirements of providing two traffic lanes (eastbound and westbound) and a bus lane up to standard that will improve bus journey time reliability and potentially encourage the use of public transport. This option also complies with the OCC Walking and Cycling Strategy by providing the recommended effective width in the southern side of 3.0m (with the provision of a new structure) where the cyclist demand is higher and in excess of the recommended effective width of 1.5m in the northern side with a 1.6m effective width share use provision. This could be improved in detriment of general traffic lane widths.	Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). No utilities found in the embankment areas to the south.	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design approval (further NR discussion required) .	Compliant layout.	South side of existing structures has dense vegetation and multiple trees likely to be of signficiant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to require vegetation and several trees to be removed. In addition on this side of the structure the existing lake maybe affected by the	No road safety issues identified.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependant on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial	**OPTION SHORTLISTED FOR STAGE 2**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
		effective width of 3.0m. This option would provide the following widths on the existing bridge with inboard barriers removed on the south side only and parapets upgraded to H4a oh the north side only. The existing south side inboard barrier would be repositioned.: - Share use facility to the north: Total width of 2.6m (1.6m effective width); -North Side Barrier 0.6m wide and 0.6m setback from carriageway; -General Traffic lane widths: 3.65m each (7.3m) -Bus lane width: 3.5m width. - South Footway/ Bridge Protection Strip 0.6m									provision of either temporary or permanent works depneding on the construction method adopted.		agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by March 2024.	
1.6.	Do Something - Footbridge added to the North and South. Three traffic lanes provided.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of Wolvercote Railway Bridge only. Footbridges added to the north and south	Provision of two bridges is estimated to be in excessive of 14M construction budget	The existing highway boundary provides limited scope for the provision of the new	Assumes a construction period of 18 months (To be determined with Skanska).	Implementing two footbridges to north and south of the bridges is be a more expensive option than proposed options	The option would provide a fully compliant layout for shared use facilities of compliant widths on both sides and compliant lane widths and bus lanes.	There is an IP gas main located to the north of the scheme extents which crosses the existing embankment conflicting with the proposed footbridge/sha	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design	Compliant layout.	Combination of both North and South side foot/ cycle bridges will require extensiv	Both foot/cycle bridges needs to be a minimum of 4m to permit a 3m shared use facility.	Available possessions are permitted to allow construction to proceed. S106 agreement is	**OPTION REJECTED - Discarded due to cost being above budget and construction programme likely to too long to permit construction**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
		spanning Duke's Cut Canal, Oxford Canal and Didcot to Leamington Spa Railway. Three traffic lanes provided.		bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.		1.4.A-C (footbridges in the north) and 1.5.A/B (footbridges in the south). It is considered two footbridges are not required as there is enough space available within the existing carriageway to implement the proposed infrastructure with just one footbridge.		red use facility to the eastern section of the scheme. To the western section of the scheme, the gas main runs parallel to the toe of the embankment at an approximate distance of 10m of the proposed footbridge. Skanska's ECI are currently working on another scheme just along from Duke's Cut and have stated that the local gas utility provider (SGN) has advised that vibration pile within 15m of the gas main location is not allowed. If this is the case, there would be an opportunity to re-locate the gas main further north however, based on previous liaison with assign as part	would be an appropriate timescale. Subject to design approval (further NR discussion required) . Feedback was for a single structure provision and it would be reasonable to assume a longer timescale would be required for two structures to be proposed.		e vegeation and tree removal and have the most environmental imapct of the options proposed.		deliverable within timescale for CRT approval. 3 year timescale for NR is dependent on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial agreement. Preliminary design of suitable new structure is submitted to NR	**by March 2024.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
								of the A40 STP2 project, the diversion costs would significantly exceed the utilities diversion HIF2 budget of 600k					by March 2021 to permit construction by March 2024.	
1.7.	Do Something - Widen ALL Structures on the North or South. Three traffic lanes provided and shared use facility to the north and south provided.	Strengthening of weak verges, replacement of edge beams and removal of inboard vehicle restraint barrier of the North side of Wolvercote Railway Bridge only. All four structures widened on the North side. Three traffic lanes provided and shared use facility to the north and south provided.	No cost estimate provided as rejected prior to ECI review.	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.	No programme provided as rejected prior to ECI review.	Widening of Wolvercote Railway Bridge is not considered feasible. 1) Making a physical connection with riveted metalwork is not necessarily feasible as welds and rivets act differently under load. 2) Making a physical connection may not be possible due to the reported limited capacity of the existing structure to transverse loading. Adding new structure	The option would provide a fully compliant layout for shared use facilities of compliant widths on both sides and compliant lane widths and bus lanes.	Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). Gas main may be affected within the north embankment. No utilities found in the embankment areas to the south.	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design approval (further NR discussion required) . Feedback was for a single structure provision and it would be reasonable to assume a longer timescale would be required for two structures	Compliant layout.	Works contained within existing bridge structure. Minor impact for temporary works, the extent of which is to be determined as method of working is developed/ agreed.	No road safety issues identified.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependent on design approval and construction methodology approval. Train companies will	**OPTION REJECTED - This option is disregarded due to feasibility of connection to the existing structure.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumpt ions	AECOM Recommendat ion
						adjacent will add transverse loading. 3) Widening the bridge will also require relocation of the existing retaining walls on the approache s to accommod ate the realigned vehicle restraint system.			to be proposed.				need to accept longer possessi ons at certain times of year by commerc ial agreeme nt. Prelimina ry design of suitable new structure is submitte d to NR by March 2021 to permit construct ion by March 2024.	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.8.	Do Something - Add Southern pedestrian extension with inboard barrier retained.	Wolvercote Railway bridge strengthened and a new pedestrian only extension added to the south. In board barrier moved southward to allow for three lanes across the bridge.	No cost estimate provided as rejected prior to ECI review.	The existing highway boundary provides limited scope for the provision of the new bridge construction and limited land acquisition is likely. In addition, land is likely to be required for a temporary period during construction.	No programme provided as rejected prior to ECI review.	Widening of Wolvercote Railway Bridge is not considered feasible. 1) Making a physical connection with riveted metalwork is not necessarily feasible as welds and rivets act differently under load. 2) Making a physical connection may not be possible due to the reported limited capacity of the existing structure to transverse loading. Adding new structure adjacent will add transverse loading. 3) Widening the bridge will also require relocation	The option would provide a fully compliant layout for shared use facilities of compliant widths on both sides and compliant lane widths and bus lanes.	Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). No utilities found in the embankment areas to the south.	Initial feedback from NR has indicated a three year timescale from receipt of a structure preliminary design would be an appropriate timescale. Subject to design approval (further NR discussion required) . Feedback was for a single structure provision and it would be reasonable to assume a longer timescale would be required for two structures to be proposed.	Compliant layout.	Works contained within existing bridge structure. Minor impact for temporary works, the extent of which is to be determined as method of working is developed/ agreed.	No road safety issues identified.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependent on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial	**OPTION REJECTED - This option is disregarded due to feasibility of connection to the existing structure.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
						of the existing retaining walls on the approaches to accommodate the realigned vehicle restraint system.							agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by March 2024.	
1.9.	Do Something - New Structures on the North for a separate Carriageways. Eastbound carriageway over new structures, westbound carriageway to remain on existing bridges.	No modification to existing structures, with inboard vehicle restraint barriers retained on Wolvercote Railway Bridge. New Vehicle bridges added to the North to provide a separate Eastbound carriageway. Westbound carriageway to use existing bridges and carriageway with no modification to the structures.	Construction of three entirely new highway bridges will cost approximately £45-50M, this arrangement has been reviewed by Skanska based on similar schemes to identify an approximate construction cost	Permanent land will be required. Assumed new structure will run parallel to existing structure.	No programme provided as rejected prior to ECI review.	Relatively straightforward. New structure to be constructed off line while existing structure continues to carry existing traffic. Eastbound traffic would then switch when new structure completed	The option would provide a fully compliant layout for shared use facilities of compliant widths on both sides and compliant lane widths and bus lanes.	Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). Gas main may be affected within the north embankment. No utilities found in the embankment areas to the south.	Significant - new structures required	Compliant layout.	North side of existing structures has dense vegetation and multiple trees likely to be of signficiant value. Topographical survey was unable to individually locate each tree and further survey work is required. Likely to	No road safety issues identified.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependant on design approval and	**OPTION REJECTED - Discarded due to cost significantly being above budget**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
											require vegetation and several trees to be removed.		construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by March 2024.	

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
1.10.	Do Maximum - On Line Replacement	On line replacement of existing structures	No cost estimate provided as rejected prior to ECI review. Cost is likely to be significant - likely to be more than than option 1.9 (£45m)	Permanent land take not needed - but significant construction land take will be need	Considering a launched methodology for a new railway bridge, the construction process will take approximately 12 months on site. It is not feasible to close the A40 for 12 months without providing alternative routes. The A44 and A420 will become extremely congested throughout.	Complex - Closure or Single lane working needed in order to construct new structures half and half which extends the duration of the works. In addition, the loads would need to be carefully assessed to ensure that they are not compromised if single lane working was used.	The option would provide a fully compliant layout for shared use facilities of compliant widths on both sides and compliant lane widths and bus lanes.	Existing stats are within the existing bridge structure (Some minor works required around VM and BT ducting / Chambers). Gas main may be affected within the north embankment. No utilities found in the embankment areas to the south.	Significant - existing structures removed and new structures in the same place	Compliant layout.	Existing structure replacement is likely to affect the vegetation on both sides of the structure for construction purposes.	No road safety issues identified.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependent on design approval and construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial	**OPTION REJECTED - Requires closure of A40 for works duration of 12 months and estimated cost significantly over budget.**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
													agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by March 2024.	
1.11.	Do Maximum - Off Line Replacement	Off line replacement of existing structures	Construction of three entirely new highway bridges will cost more than option 1.9. In excess of £45M-£50M	Significant permanent land will be required. New road and new structures will be away from existing road	No programme provided as rejected prior to ECI review. Significant timescale involved to construct new structures	Relatively straightforward. New structures to be constructed off line while existing structure continues to carry existing traffic. All traffic would then switch when new structure completed	The option would provide a fully compliant layout for shared use facilities of compliant widths on both sides and compliant lane widths and bus lanes.	Existing stats are within the existing bridge structure If existing structures retained - no affect, but If likely to demolish existing structures, all services will be affected, Gas main will also be affected within the north embankment. No utilities found in the embankment areas to the south.	Significant - new structures required	Compliant layout.	Assumed North side construction some distance from existing structure. Bridge will be for all traffic and require extensive vegeation and tree removal.	No road safety issues identified.	Available possessions are permitted to allow construction to proceed. S106 agreement is deliverable within timescale for CRT approval. 3 year timescale for NR is dependent on design approval and	**OPTION REJECTED - Discarded due to cost significantly being above budget**

#	Options	Description	Cost Estimate	Land Require-ments	Construction programme duration estimate	Construc-tability	To what extent the option delivers against the requirements/benefits	Impact on utilities	Impact and interfaces on/with NR / CRT	Any departures / relaxations from standards	Environ-mental	Road Safety	Key risks & assumptions	AECOM Recommendation
													construction methodology approval. Train companies will need to accept longer possessions at certain times of year by commercial agreement. Preliminary design of suitable new structure is submitted to NR by March 2021 to permit construction by March 2024.	

Appendix D **Stage 2 Sifting Outcome**

Stage 2 Sifting Outcome

Business Case - Elements	Category	#	Sub-criteria/ details	Option 0 Do Nothing	Option 1.2b Utilising Space	Option 1.4b North Side Bridge	Option 1.5c South Side Bridge	Option 0.1 Bus Gate
Strategic Case	**S1. Scheme Objectives**	1	Unlock the delivery of 4,813 additional homes along the A40 Smart Corridor in support of the Housing and Growth Deal	-1	1	1	1	1
		2	Support the delivery of 2,222 affordable homes along the A40 Smart Corridor	-1	1	1	1	1
		3	Ensure the impact of additional housing on the transport network is acceptable and associated impacts on it are adequately mitigated	-1	0	0	0	0
		4	Unlock economic growth at key employment sites along the 'Knowledge Spine' at Oxfordshire Cotswolds Garden Village	-1	0	0	0	0
		5	Encourage sustainable BUS travel between Eynsham/Witney/wider area and Oxford	-2	2	2	2	1
		6	Encourage sustainable CYCLE and PEDESTRIAN travel between Eynsham/Witney/wider area and Oxford	-1	2	2	2	1
		7	To improve travel times and/or journey reliability between Witney/Carterton and Oxford	-1	0	0	0	0
		8	To reduce carbon emissions and other pollutants associated with travel	-1	0	0	0	-1
		9	To stimulate economic growth within Oxford, West Oxfordshire and the Oxfordshire Knowledge Spine	-1	0	0	0	0
		10	To encourage safer travel between Witney/Carterton and Oxford	-1	0	0	0	-1
		11	Interface with existing and committed schemes in the corridor including Oxford North.	-1	1	1	1	1
	Score - Strategic	**Score out of 22**		**-12**	**7**	**7**	**7**	**3**
Economic Case	**E1. Impact on the Economy**	12	PT travel time changes	0	2	2	2	2
		13	Highway user travel time changes	0	-1	-1	-1	-1
		14	Walk and cycle	0	1	2	2	1
		15	Buses - Reliability	0	2	2	2	2
		16	Private vehicles	0	0	0	0	0
		17	NMUs (walk and cycle)	0	1	2	2	1
	E2. Impact on the Environment	18	Construction Period Environmental Impacts	0	-1	-2	-2	-1
		19	Flood mitigation	0	-1	-1	-1	-1
		20	Water quality	0	0	0	-1	0
		21	SSSI, Habitats, etc	0	0	-1	-1	0
	E3	22	Health benefits	0	2	2	2	2
		23	Impact on RATE of incidents	0	0	0	0	-2
		24	Network Rail, CRT.	0	0	0	0	0

Business Case - Elements	Category	#	Sub-criteria/ details	Option 0 Do Nothing	Option 1.2b Utilising Space	Option 1.4b North Side Bridge	Option 1.5c South Side Bridge	Option 0.1 Bus Gate
	Score - Economic Case	**Score out of 26**		**0**	**5**	**5**	**4**	**3**
Financial Case	**F1. Capital and Revenue Costs**	24	Capital costs / Consider Affordability against total scheme budget	0	-1	-2	-2	-1
		25	Operation and maintenance costs	0	0	-1	-1	0
	Score - Financial Case	**Score out of 4**		**0**	**-1**	**-3**	**-3**	**-1**
Management Case	**M1. Practical Feasibility**	26	Design and Construction - Include programme etc. design standards	0	-1	-1	-1	0
		27	Prep and Management during construction	0	-1	-2	-2	-1
		28	Future Proofing	-2	1	1	1	-1
	M2. Stakeholder acceptability	29	Environment Agency	0	0	-1	-1	0
		30	Network Rail	0	-2	-2	-2	-1
		31	Natural England	0	0	-2	-2	0
		32	Canal and Rivers Trust	0	0	0	0	0
		33	District Councils	0	-1	-1	-1	-2
		34	Parish Councils	0	-1	-1	-1	-2
		35	OCC structures	0	-1	-1	-1	-1
		36	Utilities	0	-1	-2	-1	-1
		37	Highways England	0	-1	-1	-1	0
		38	Secretary of State Approval (Highways Act Section 106)	0	0	-2	-2	0
		39	Non-Statutory bodies (residents association groups, cycle, horse group) Refer to **2 on the Introduction / Key Tab	-1	1	-1	-1	-1
		40	Land and property impacts, access to property, businesses etc	0	0	0	0	0
		41	Planning Requirements	0	-1	-2	-2	0
		42	Geotechnical maintenance Implications	-1	-1	-1	-1	-1
	M3. Public Acceptability / Interest	43	Public view on scheme components. Earlier consultation responses may help inform this.	-1	1	1	1	-1
	Score - Management Case	**Score out of 36**		**-5**	**-8**	**-18**	**-17**	**-12**
Commercial Case	**C1. Funding and Income**		Home England conditions					
	C2. Complexity of Delivery	44	Highways	0	-1	-2	-2	1
		45	Risk of Budget Increases	0	-1	-2	-2	1
		46	Opportunity	0	0	1	1	0
	C2. Complexity of Delivery	47	Breaking down of schemes to ease the delivery (specialist partners for example). Include consideration of things such as D&B	0	-1	-2	-2	2
	Score - Commerical Case	**Score out of 8**		**0**	**-3**	**-5**	**-5**	**4**

Business Case - Elements	Category	#	Sub-criteria/ details	Option 0 Do Nothing	Option 1.2b Utilising Space	Option 1.4b North Side Bridge	Option 1.5c South Side Bridge	Option 0.1 Bus Gate
Total - Score				**-17**	**0**	**-14**	**-14**	**-3**

Appendix E **Alignment of Policy Documents and the Scheme**

Alignment between identified policies and the Duke's Cut scheme

Policy Document	Alignment
National Policy Planning Framework	Moderate
Major Road Network	Strong
Industrial Strategy White Paper	Strong
Transport Investment Strategy	Strong
Gear Change: A bold vision for cycling and walking report	Moderate
A Better Deal for Bus Users	Strong
Housing White Paper – Fixing Our Broken Housing Market	Moderate
Strategic Economic Plan for Oxfordshire 2016	Moderate
Oxfordshire Local Industrial Strategy	Moderate
Oxfordshire Investment Plan	Strong
Oxfordshire's Housing and Growth Deal	Moderate
Connecting Oxfordshire: Local Transport Plan 2015-2031	Strong
Oxfordshire Infrastructure Strategy	Strong
West Oxfordshire Adopted Local Plan (2011-2031)	Strong
Oxford Transport Strategy	Moderate
Bus and Rapid Transit Strategy	Strong
Active and Healthy Travel Strategy	Moderate
A40 Corridor Strategy	Strong
Oxford Park and Ride Strategy	Strong
Oxfordshire Cotswolds (Salt Cross) Garden Village Area Action Plan	Strong

Appendix F **NCN5 Addendum**

Addendum – National Cycle Network Route 5 Cycleway Link

***Note**: this Addendum forms part of the Duke's Cut OAR.*

1 Introduction

As part of the A40 Smart Corridor HIF Bid, the Duke's Cut scheme is described as "A40 capacity and connectivity improvements at Duke's Cut canal and railway bridges that will widen the existing A40 bridges over the railway and canals and/or provide new pedestrian/cycle bridges adjacent to these existing A40 bridges. These works will create space for a new eastbound bus lane and an improved cycleway along this section of the A40. It further includes a cycleway link between the A40 and the National Cycle Network 5 (NCN5)".

The main body of the Duke's Cut Options Assessment Report (OAR) has considered the capacity improvements at Duke's Cut and the potential options to provide an eastbound bus lane through Duke's Cut. It documented the optioneering undertaken to recommend the preferred Duke's Cut bus lane options. However, both the preferred Duke's Cut bus lane options, Option 1.2b and Option 0.1, do not include a cycling / walking link (shared use facility) between A40 (north side) and NCN5. Thus, a preferred Duke's Cut bus lane option won't address the issue of lack of shared use facilities providing connectivity to the NCN5 from Cassington. Therefore, this addendum has been developed to document the optioneering assessment approach for a shared use link scheme between NCN5 and the A40.

The shared use facilities (links between the A40 to NCN5) along with a preferred Duke's Cut mainline option will provide connections on both sides of A40, which will improve current and future movements. The shared use facilities have already received funding through the HIF bid and aligns with the policies (OCC and national) to promote sustainable / active travel.

As agreed with OCC, the optioneering and assessment approach for the scheme has been undertaken separately to the capacity improvements scheme as there is limited dependency between the two schemes.

This addendum describes the option development and appraisal process of the NCN Route 5 link scheme, setting out the decision-making process that was used select the preferred option. Overall, this is very similar to the process followed as described in the main report and as such the policy context, current and future conditions and objectives identified in Chapter 2 remain relevant.

This addendum includes an overview of the following:

- An overview of the local context (Section 2);
- Adopted appraisal method (Section 3);
- Option development and sifting (Section 4); and
- Preferred option and next steps (Section 5).

The optioneering assessment for the NCN5 link outlined in Sections 3-5 of this addendum was undertaken at Stage 1- Option Development and Sifting. However, due to insufficient details available at Stage 1, further design assessment was undertaken during the preliminary design stage of the project to determine the preferred option for the Southern NCN5 Link.

2 Local Context

Prior to discussion of the proposals for the NCN Route 5 link, it is of importance to consider the existing situation. At present, NCN5 runs alongside the western bank of the Oxford Canal whilst passing under the A40 and then the A34, as shown in Figure 1 (NCN5 is shown in orange).

Furthermore, it is important to consider the link in the context of the existing network, as described in the Section 'Existing Highways and Public Transport Infrastructure' and shown in Figure 3-2 in the main OAR document. The NCN Route 5 link is on the eastern end of the A40, prior to the Wolvercote Roundabout, north of Oxford. Also, of interest is development near to the NCN Route 5 Link, such as the proposed A40 Oxford North development, which will increase traffic (Including pedestrian and cycle movements) along the A40 near to Duke's Cut exacerbating existing issues if no mitigating measures are taken. This is described in more detail in Section 3.4.5 of the Duke's Cut OAR.

As outlined in the 'Environment' section of the Duke's Cut OAR, there is a Special Area of Conservation located just south of Duke's Cut, and this is important to consider as part of scheme design as encroachment into the designated area by transport infrastructure is unlikely to be permitted. In addition, the lock gates along Duke's Cut Canal near the rail bridge are Grade II listed and works around them should be avoided to prevent disturbing them. Further discussion of the environment near the scheme can be found in the Duke's Cut OAR, section 3.3.45 -3.3.50.

As a part of the A40 connection with the NCN 5, the aim is to widen the path however, there are no plans to upgrade or enhance any Canal & River Trust (CRT) infrastructure such as the listed towpath bridge, and the tilted bridges over canal. The width of the Grade II listed CRT lift bridge & towpath bridge are substandard from a shared cycle/footway perspective and the gated locks are a pinch point requiring the dismounting of cyclists.

In addition, there are two existing sets of steps that provide access from both the northern and southern side of the A40 to the Oxford Canal towpath. These steps are not compliant with the Disability Discrimination Act requirements for access as they cannot provide access to pushchairs and wheelchair users. The steps are relatively steep, and it's considered they provide access only to able bodied people, users of walking aids may struggle to use the steps. Handrails are provided but only on one side and there are limited landing platforms on the steps to provide suitable resting places.

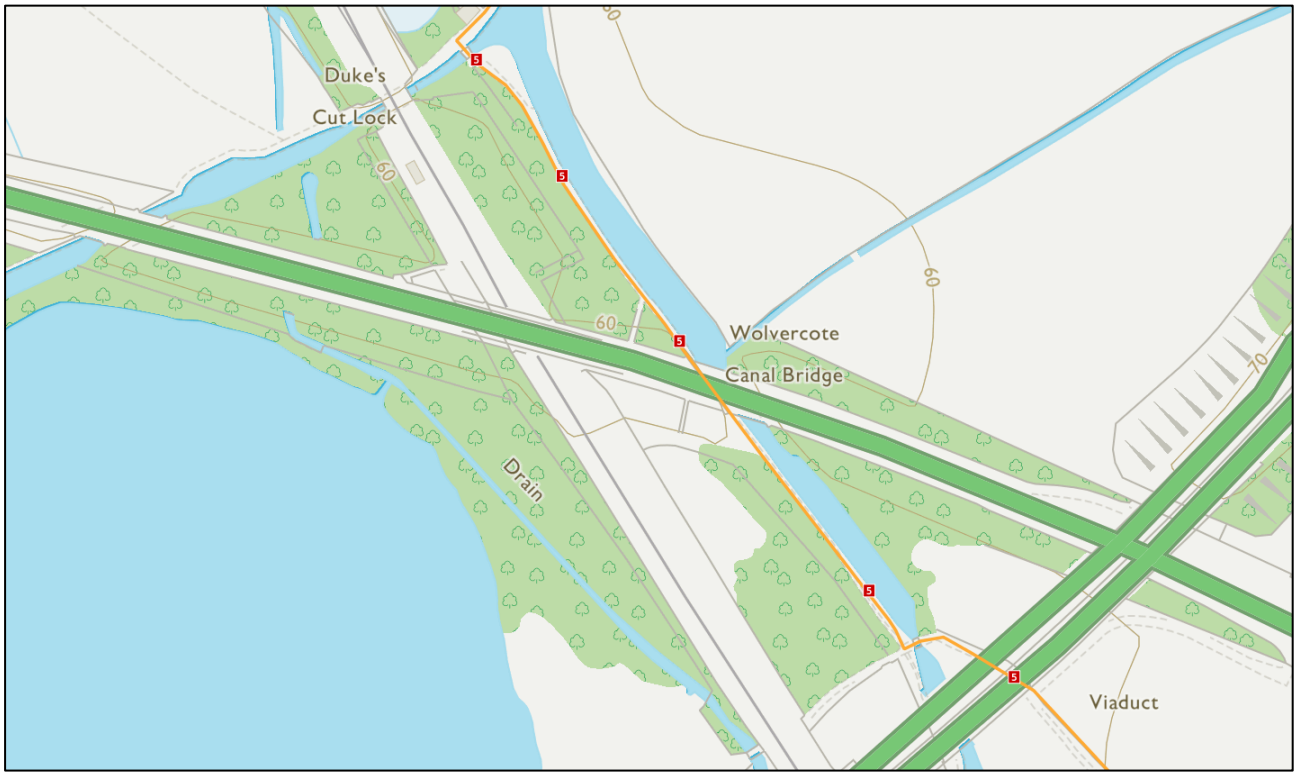

Figure 1: Location of NCN Route 5

Source: https://osmaps.ordnancesurvey.co.uk/ contains Ordnance Survey data © Crown copyright and database right 2018.

3 Method

Unlike the two stage (option development and sifting) method adopted for the main Duke's Cut scheme, only one stage option development and sifting (Stage 1) method was adopted for the NCN Route 5 Link scheme as the first sift identified a preferred option.

Stage 1 – option development and sifting: Three 'Do Something' (DS) options for the North Access and five options for the South Access were developed and assessed against the 'Do Nothing' (DN) scenario which assumes no interventions are undertaken. The options have been derived based on the following assessment of current and forecast travel patterns, development and growth, and identified challenges; previous and current proposals from relevant local authorities and stakeholders; and professional judgement based on experience elsewhere, within Oxfordshire and across the UK. Each option has been assessed against the following criteria; the evidence available to base the assessment of the options reflects the following criteria:

- Cost Estimate
- Land Requirements
- Construction programme duration estimate
- Constructability
- To what extent the option delivers against the requirements/benefits
- Impact on utilities
- Impact and interfaces with Network Rail (NR) and CRT
- Any departures or relaxations from standards
- Key risks and assumptions.

In the next section, the sifting process for each option is outlined, along with a recommendation for the option.

4 Option Development and Sifting

Each option is defined below, with an overview of the benefits and issues (related to the criteria outlined above), as well as a recommendation for that option. For context, Figure 2 shows the location and alignment of each of the options. The scoring assessment has been undertaken for each option for the following criteria:

A) Initial Sift
1. Volume of demand served
2. Directness of connection to desire lines
3. Connectivity and gradient (to consider risk of flooding, narrowed widths, required crossings etc).

B) Further assessment:
1. Land agreements required
2. Status (Whether it is existing Public Right of Way (PROW) or new thoroughfare in need of approval)
3. Technical complexity
4. Cost of provision
5. Lighting/Surveillance

Assessment can be seen in Appendix A below.

Option 0 – Do Nothing

This option includes no change to the existing layout at Duke's Cut for the NCN Route 5. The existing north and south side steps between Wolvercote Railway Bridge and Wolvercote Canal Bridge are available to reach the NCN5 route. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 1.

Table 1: Option 0 – Do Nothing

Benefits	Issues	Recommendation
No construction costs but may incur a cost for required maintenance work and updating to meet required standards to two sets of steps that provide access from the A40 down to the existing tow path. No land requirements. No construction required. No impact on utilities. No impact on NR/CRT.	This option will not deliver against any of the requirements of the scheme objectives, as the steps do not provide access for cyclists/ prams or wheelchairs. (Not DDA compliant) The steps have been inspected and are considered to be in a good condition other than the handrail to the northern steps. Repairs are planned to be carried out. Once inbound barriers are removed, access to steps may need to be removed to provide suitable vehicle restraint system. Due to the carriageway lane width constraints in the preferred option, the proposed northern NMU provision will be assigned as a footway only, therefore it will not suitable for cyclists, especially for those heading eastbound. Eastbound travelling cyclists will likely have to cross over onto the southern footway at Cassington, 3.7km from Duke's Cut, otherwise there is no other suitable point to cross over. The proposed Oxford North Scheme will provide crossing provisions just east of the A34 overbridge. Cyclists travelling westbound on the northern footway will have suitable opportunity to cross over and continue travelling along the southern footway.	**OPTION REJECTED** – Does not deliver suitable access to NCN5.

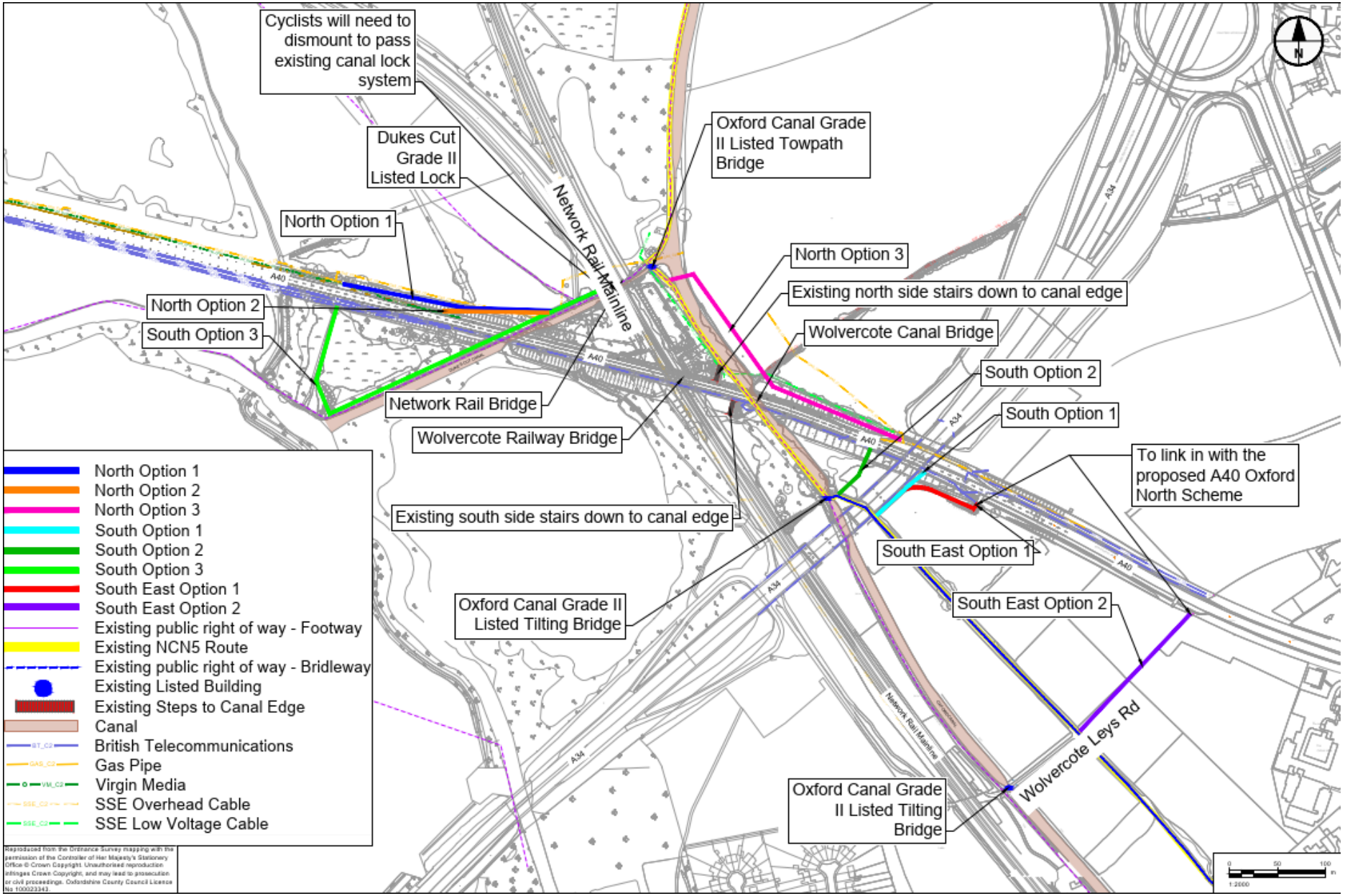

Figure 2: NCN 5 Cycleway Link Options

Option 2.1 – North Option 1

Under this option, shown in dark blue in Figure 2, the path from the A40 to NCN5 will be a non-segregated 'shared-use' path (for both cyclists and pedestrians). The path has a proposed width of up to 2.5m from the A40 junction into the public footpath along the edge of the canal, where the path will reduce to accommodate the CRT infrastructure. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 2. The path passes through a Local Wildlife Site, and discussions are ongoing at present with the various environmental and biodiversity teams. The construction is proposed to be that suitable for a hardened route rather than a full bound bituminous cycleway. The proposed materials would consist of a timber edging, granular base with a granite chipping finish.

Table 2: Option 2.1 – North Option 1

Benefits	Issues	Recommendation
Construction programme is likely to be compatible with Option 1.2b timescale of the Duke's Cut Improvement scheme. Limited construction complexity. The option delivers the objective to provide a link to the NCN5 network. This complies with OCC walking and cycling standards to provide a 2.5m shared use cycle/footpath which is standard for a shared use footway. However, it only provides access for the north side footway with no crossing facility provided from the south side of A40 in the local area. Only interfaces with NR and CRT at tie in location near Duke's Cut Locks.	Land take required as new alignment is outside highway boundary, this will have an impact on the scheme cost. Significant issue as the proposed works may interact with the intermediate gas main that is in the vicinity. Not thought to be a major issue due to the proposed construction. Converting the existing footway to a cycleway would require a legal order to be fully legal. (Section 65 of the Highways Act Notice) Cyclists will need to dismount to pass existing canal lock system. Passes through sensitive Local Wildlife Site	**PREFERRED OPTION** – One of the only areas that is identified to be able to link into the NCN5 route that would be accessible on the northern side. Risk/assumption: Landowners, developers, environmental teams and CRT not agreeing to the proposal. Pinch point on the gate lock located next to the NR structure, this is also a grade II listed building/ structure. Proposed route runs through sensitive wildlife sites, which may not be acceptable.

Option 2.2 – North Option 2

This option is shown in orange in Figure 2, the path from the A40 to NCN5 will be an unsegregated 'shared-use' path (for both cyclists and pedestrians). The path has a proposed width of 3m for the section the A40 and the canal where it will reduce to 2.5m wide with a 0.5m verge. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 3.

Table 3: Option 2.2 – North Option 2

Benefits	Issues	Recommendation
The option delivers the objective to provide a link to the NCN5 network. This complies with OCC walking and cycling standards to provide a 3m footway which is standard for a shared use footway. However, the	Land take will be required and vegetation clearance. Embankment slope is of significant height. Difficult to provide a suitable gradient for proposed route.	**OPTION REJECTED** – Significant embankment height plus existing environmental/ land constraints will likely prevent design of route

Benefits	Issues	Recommendation
gradient will not be compliant with standards. Only interfaces with NR and CRT at tie in location, but route uses the existing Duke's Cut lock that would require cyclists to dismount. Follows the same route from the bottom of the embankment to that of North option 1	Significant issue as the proposed works may interact with the intermediate gas main that is in the vicinity. Not through to be a major issue due to the proposed construction. Converting the existing footway to a cycleway would require a traffic regulation order to be fully legal. Cyclists will need to dismount to pass existing canal lock system.	with appropriate gradient.

Option 2.3 – North Option 3

This option is shown in pink in Figure 2 and includes a proposed access from the northern side of the A40. The access would run parallel to the A40 just west of the A34 flyover and then along the canal, it will then cross the canal to link into the NCN5 network. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 4.

Table 4: Option 2.3 – North Option 3

Benefits	Issues	Recommendation
The option delivers the objective to provide a link to the NCN5 network. This complies with OCC walking and cycling standards to provide a 3m footway which is standard for a shared use footway.	Cost likely to be high due to a new bridge over the canal being required. Land take will be required, and likely to be extensive for new canal bridge location to provide suitable ramp gradients. Unknown construction programme duration at this time but likely to be longer than other options due to canal bridge approval and construction process. Potential utilities conflict with SSE Energy Services and SGN IP Gas main to the north Only interfaces with NR and CRT at tie in location, needs to ensure clearance is met but will require space either side of bridge for access. Converting the existing footway to a cycleway would require a traffic regulation order to be fully legal.	**OPTION REJECTED** – Likely high cost and design/construction complexity. Potential interface with existing utilities.

Option 2.4 – South Option 1

This option is shown in light blue in Figure 2. It includes the proposed access from A40 located adjacent to the eastern side of the A34 underpass, and from there the proposed route connects to the NCN5 link. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 5.

Table 5: Option 2.4 – South Option 1

Benefits	Issues	Recommendation
The option delivers the objective to provide a link to the NCN5 network. This complies with OCC walking and cycling standards to provide a 3m footway which is standard for a shared use footway. Desire line for NMU's.	Potential conflict with BT Apparatus in southern verge but construction is for footway only (max 300mm). Converting the existing footway to a cycleway would require a traffic regulation order to be fully legal. Existing Vehicle Restraint System (VRS) on A40 would need to be modified to create gap for pedestrians/ cyclists. This would leave a gap within the barrier thus jeopardising the integrity of the system. Departure likely required. Appears VRS protects A34 viaduct bridge piers. Approval from Highways England will likely be required since the viaduct is their asset. Embankment slope is of significant height. Difficult to provide a suitable gradient for proposed route without significant land take.	The route falls under development land. The Thomas White Oxford (TWO) developers detailed plans show this area to be an attenuation pond with the track around the outside of the pond. Further information from the developer would be required to put this option forward However, **OPTION REJECTED** since appropriate VRS cannot be provided to protect bridge piers and footpath. Significant embankment height will likely prevent design of route with appropriate gradient.

Option 2.5 – South Option 2

This option, shown in dark green in Figure 2, includes the proposed access from A40 located adjacent to the western side of the A34 underpass, then the proposed route connects to the NCN5 link. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 6.

Table 6: Option 2.5 – South Option 2

Benefits	Issues	Recommendation
The option delivers the objective to provide a link to the NCN5 network. This complies with OCC walking and cycling standards to provide a 3m footway which is standard for a shared use footway. Desire line for NMU's especially for those heading east.	Cost likely to be high due to significant earthworks and provisions to allow proposed ditch to run under footway. Land take will be required and significant vegetation clearance. Potential conflict with BT Apparatus in southern verge but construction is for footway only (max 300mm).	The route falls under development land. The Thomas White Oxford (TWO) developers detailed plans show this area to be an attenuation pond with the track around the outside of the pond. Further information from the developer

Benefits	Issues	Recommendation
	Converting the existing footway to a cycleway would require a traffic regulation order to be fully legal. Conflict with existing ditch. Culvert/headwall will likely be required.	would be required to put this option forward. However, this option is an **OPTION TO BE CONSIDERED** – as it provides a suitable link to the NCN5 for users near the desire line. Further assessment is needed to determine if the benefits of the favourable desire line outweighs cost associated with significant earthworks and implications of the existing ditch. Environmental concerns to be assessed due to significant vegetation required.

Option 2.6 – South Option 3

This option is shown in light green in Figure 2 and it includes a proposed access from A40 located approximately 170m to the west of the Duke's Cut Canal bridge. The route utilises the existing gated access to a maintenance area then continues through existing path joining the Duke's Cut canal and eventually joins the NCN5. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 7.

Table 7: Option 2.6 – South Option 3

Benefits	Issues	Recommendation
The option delivers the objective to provide a link to the NCN5 network. This complies with OCC walking and cycling standards to provide a 3m footway which is standard for a shared use footway. Construction cost.	Land take will be required. Potential conflict with BT Apparatus in southern verge but construction is for footway only (max 300mm). Ties into existing canal path but utilises section under the Duke's Cut canal bridge which has low clearance and this section is susceptible to flooding. Converting the existing footway to a cycleway would require a traffic regulation order to be fully legal. Cyclists will need to dismount to pass existing canal lock system.	**OPTION REJECTED** – Route susceptible to flooding. Not appropriate for NCN5 desire line, specifically for users heading from the east.

Option 2.7 – South East Option 1

This option, shown in red and light blue in Figure 2, includes the proposed access from A40 located approximately 70m to the east of the A34 underpass, then the proposed route connects to the NCN5 link. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 8.

Table 8: Option 2.7 – South East Option 1

Benefits	Issues	Recommendation
A straightforward approach to construct this option. The option delivers the objective to provide a link to the NCN5 network. This complies with OCC walking and cycling standards to provide a 3m footway which is standard for a shared use footway.	Land take will be required. Potential conflict with BT Apparatus in southern verge but construction is for footway only (max 300mm). Converting the existing footway to a cycleway would require a traffic regulation order to be fully legal.	The route falls under development land. The Thomas White Oxford (TWO) developers detailed plans show this area to be an attenuation pond with the track around the outside of the pond. Further information from the developer would be required to put this option forward However, this option is an **OPTION TO BE CONSIDERED** – as it provides a suitable link to the NCN5 for users near the desire line. Risk/assumption: Option is near a flood risk area. Landowners/ developers and CRT not agreeing to the proposal. Gated lock is a pinch point and is grade II listed.

Option 2.8 – South East Option 2

This option, shown in purple in Figure 2, would utilise the proposed A40 Oxford North junction and provide a new link to Wolvercote Leys Road. This already provides access via an existing bridge over the canal to the south side of the canal. The issues and benefits identified for this option, as well as the recommendation, are outlined in Table 9.

Table 9: Option 2.8 – South East Option 2

Benefits	Issues	Recommendation
A straightforward approach to construct this option. The option delivers the objective to provide a link to the NCN5 network. This complies with OCC walking and cycling standards to provide a	Land take will be required. May have an impact on utilities. Converting the existing footway to a cycleway would require a traffic regulation order to be fully legal.	The route falls under development land. The Thomas White Oxford (TWO) developers detailed plans show this area to be an attenuation pond with the track around the

Benefits	Issues	Recommendation
3m footway which is standard for a shared use footway. The link is likely to join the existing NCN5 link and make use of the existing connection to the CRT via existing gate II listed bridge.	The route falls under proposed development and depends on developers' plans.	outside of the pond. Further information from the developer would be required to put this option forward.

5 Preferred Option and Next Steps

The sifting process for the A40-NCN5/Oxford Canal potential links has thus far only identified a preferred active travel connection on the A40 north side, Option 2.1 – North Option 1, which is predicted to have low future use. This option scored the best out of the northern options. It provides a suitable link to NCN5 from the A40 near to the desire line, is the most constructible and have a limited amount land take required.

The north option will be taken forward for further assessment and design to understand the practicability of the proposal in greater detail (Preliminary Design including geotechnical ground surveys; Detailed Design). It is to be noted that this is an iterative process. Further corrections to the assessment can take place in line with feedback from relevant stakeholders, OCC and new/revised evidence. Further baseline surveys (ecological, topographical etc.) may need be undertaken to inform further option design work and impact appraisals that are required to inform the next stage of option assessment.

The Stage 1 sifting process did not reach a recommendation as to the preferred option on the south side. The predicted high use of the proposed southern link and unknown constraints/limited details at this time justifies further assessment to ensure an appropriate solution is reached. It is likely that one of the following options will be selected as the recommended main south side A40-NCN5 link provided by the HIF2 scheme:

- Option 2.5 - South Option 2 (scored a -1); or
- Option 2.7 - South East Option 1 (scored best with a 5).

However, the alignments South East Option 1 run through land planned for development by Thomas White Oxford and discussions on the development plans and the access arrangements for the required south side A40-NCN5 link are still required.

A link along the alignment of South East Option 2 from the A40 and linking to Joe White's Lane (Bridleway and NCN5 route) is planned to be provided as part of the Thomas White Oxford development. This link however may not be suitable as the primary connection between the A40 and the NCN5-route. Options and assessments are to be developed further during the Preliminary Design stage before a final preferred option is selected. The further assessment has been carried out following further design work in August-September 2021 and summarised in Section 5.1 below.

5.1 Further Option Assessment

As described above, the southern options; South Option 2 and South East Option 1, were identified for further assessment due to insufficient details at Stage 1 - option development and sifting. The aim was to gather further details to allow an appropriately assessed selection of the preferred option. Further assessment included 3D modelling, high level construction costs/duration, construction complexity, environmental impact and land acquisition (TWO developer).

3D Modelling

Outline 3D modelling was undertaken for both options. 3D modelling was required for two reasons. Firstly, to ensure the alignment can be designed as per the guidance set out in Department for Transport guidance document LTN 1/20. The revised alignment of South Option 2 has evolved as a result. The alignment was designed to avoid an existing Flood Zone 2 to the west and the A34 piers to the east. See Figure 3 updated alignment for South Option 2. The alignment of South East Option 1 remained unchanged following 3D modelling, see Figure 4. The second reason for 3D modelling was to provide the ECI contractor with the necessary information to prepare high level construction costs.

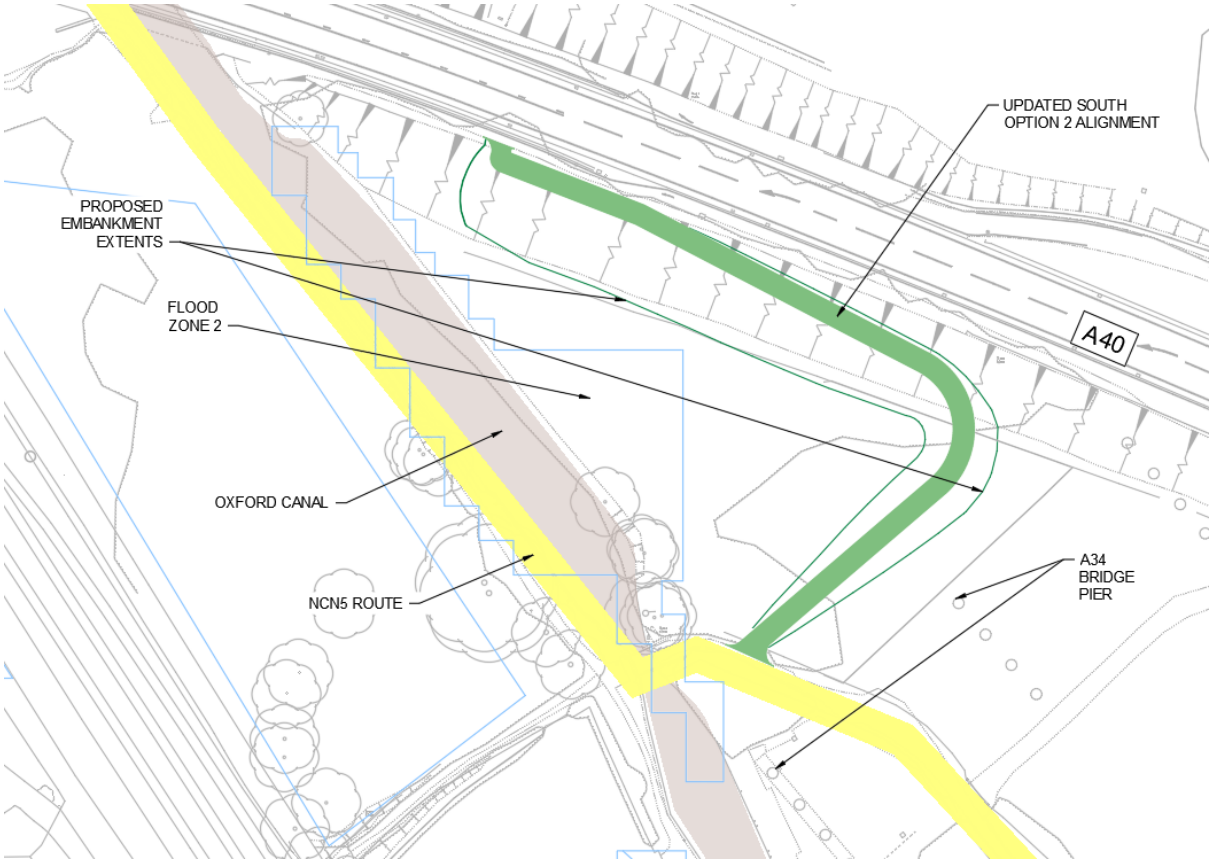

Figure 3: Updated South Option 2 Alignment and Proposed Embankment Extents

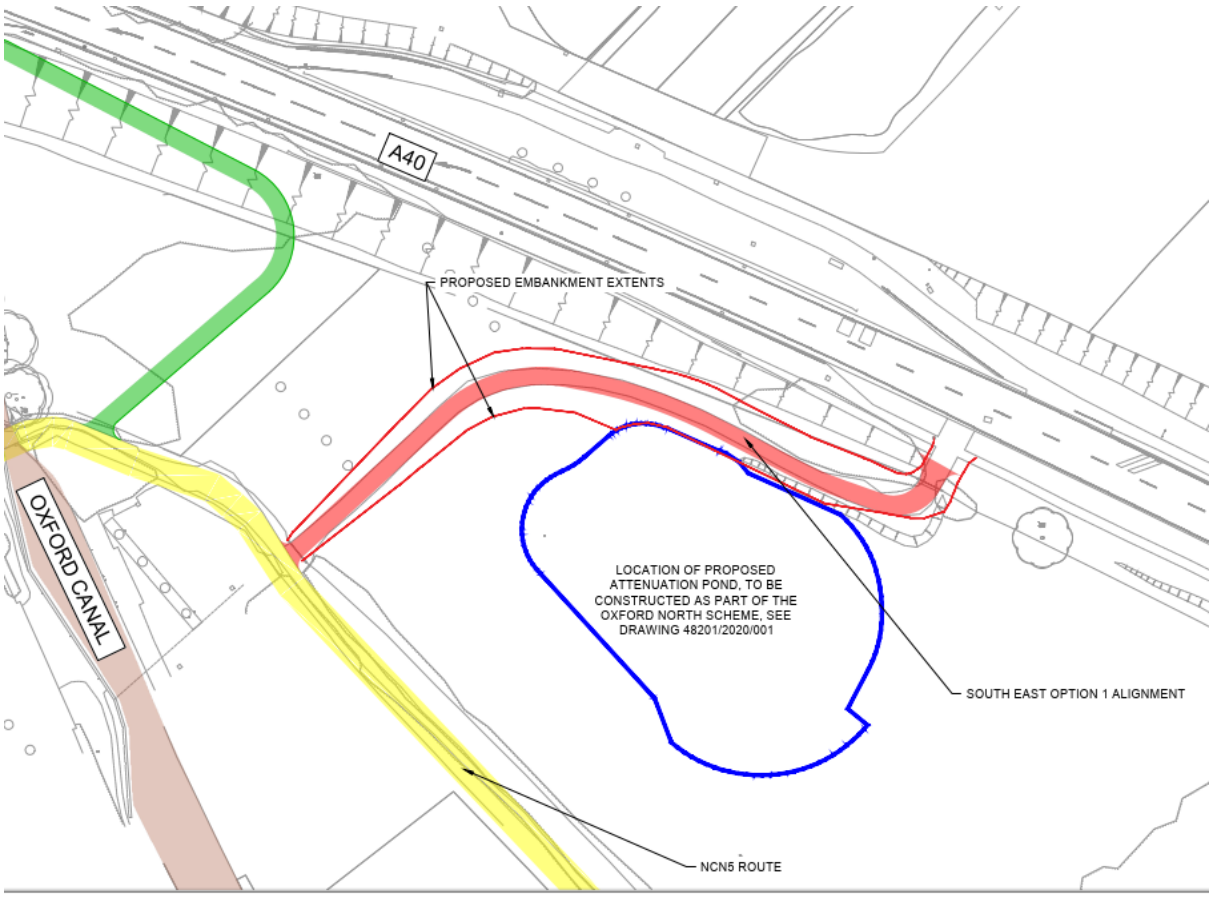

Figure 4: South East Option 1 Alignment and Proposed Embankment Extent

High Level Construction Costs/Duration

Details were provided to the ECI contractor to prepare high level construction costs and duration of the works, see Table 10. See Appendix B for breakdown on costing provided by the ECI contractor. The ECI contractor also confirmed there is very little difference in the construction methodology for either option based on the information provided.

Table 10: High Level Construction Cost/Duration

Option	Construction Cost	Construction Duration (Days)
South Option 2	£127,944.69	38
South East Option 1	£81,381.71	22

Environmental Impact

Following update to the alignment of South Option 2, the amount of vegetation clearance is significantly more than originally anticipated. This will need to be accounted for in arboricultural impact assessment and biodiversity net gain calculations. South East Option 1 has minimum/no vegetation clearance required as route would utilise an existing gap in hedgerow.

Land Acquisition (TWO developer)

Details unknown however it is understood that the necessary land can be acquired for both options. Land for South East Option 1 will come at a greater cost due to requiring a larger area. Actual costs per square metre will most likely be similar.

Other Considerations

Indicative NMU volumes along the A40 between Cassington and Wolvercote were provided by OCC. It is estimated 50 users, mainly cyclists, per peak hour (AM/PM) (2 way) for the proposed southern link. The remaining NMU's will either continue along the A40 (approx. 150 users) or the proposed northern NCN5 link (approx. 10 users). The flows for westbound and eastbound are expected to reverse at the AM/PM peaks. Essentially it is expected those travelling east in the AM peak will then travel west in the PM peak. Based on this expectation, there is limited benefit of overall desire line assessment since a certain route will be favourable in one direction for cyclists but detrimental in the other.

Table 11 summaries distance travelled between the two options to/from the A40/NCN5 route. As the assessment finds there is no clear preference between the two options since the required distance to travel is the same. However, this is based on a 50/50 split of flow traveling north/south along the NCN5 route. If the primary route is the NCN5 northbound than South Option 2 is the preferred option from a transport planning perspective. Similarly, if NCN5 southbound is the primary route than South East Option 1 is preferred option.

South East Option 1 utilises an existing dirt track. The track is used for maintenance purposes by Highways England and CRT. The track is also used to access the field. The track will also form part of an access to proposed attenuation pond. Further design work to the alignment may be required to consider existing/proposed use of the track once details of the use of the track is known.

Table 11: NMU Distance travelled

To / From	To / From	South Option 2	South East Option 1
A40 Cassington (Eastbound)	NCN5 Northbound	130m	370m
A40 Cassington (Eastbound)	NCN5 Southbound	170m	330m
A40 Wolvercote (Westbound)	NCN5 Northbound	330m	170m
A40 Wolvercote (Westbound)	NCN5 Southbound	370m	130m

NCN5 Southern link Preferred Option

After evaluating all options, and based on scoring, construction cost/duration, and environmental impact, **South East Option 1** will be advanced to Preliminary Design to further understand the proposal's practicability.

Further design work will be required in an iterative process based on feedback from relevant stakeholders, OCC, design standard and new/revised evidence. A key stakeholder is TWO Developer, who are constructing a proposed antennation pond near the proposed link. Details and coordination will be required to minimise disruption/conflict.

Appendix A: Scoring for NCN5 Link

			Scoring Assessment								
				North Options			South Options				
Category	**#**	**Sub-criteria/ details**	Do Nothing	North Option 1	North Option 2	North Option 3	South Option 1	South Option 2	South Option 3	South East Option 1	South East Option 2
				Dark Blue	Orange	Pink	Light blue	Dark Green	Light green	Red+light blue	Purple
A) Initial Sift	1	Volume of demand served	-2	0	0	-1	2	2	2	2	0
	2	Directness of connection to desire lines	-2	1	2	-2	1	2	-2	-1	-2
	3	Connectivity and gradient	-2	0	-2	0	-2	1	-2	1	2
Initial Sift	**Score out of 6**		**-6**	**1**	**0**	**-3**	**1**	**5**	**-2**	**2**	**0**
B) Further assessment:	4	Land agreements required	2	-2	-1	-2	-1	-1	-1	-1	-1
	5	Status	0	-1	-1	-2	-2	-2	1	-1	-2
	6	Technical complexity	2	2	-1	-2	-2	-1	1	2	2
	7	Cost of provision	2	2	-1	-2	-1	-1	1	2	2
	8	Lighting/Surveillance	0	-2	-1	-2	1	-1	-2	1	1
Further assessment	**Score out of 10**		**6**	**-1**	**-5**	**-10**	**-5**	**-6**	**0**	**3**	**2**
Total - Score			**0**	**0**	**-5**	**-13**	**-4**	**-1**	**-2**	**5**	**2**

Appendix B: High Level Construction Cost Details

	Qty	Unit	Rate	£ p
South Option 2				
Additional Ecology Surveys	1	item	2,500.00	2,500
Site clearance - field	0.1209	HA	3,000.00	363
Clear vegetation and trees	1	item	25,000.00	25,000
Excavate topsoil	1,209	m2	2.50	3,021
Disposal of topsoil	241	m3	38.00	
Imported acceptable material Class 6F2 in embankments and other areas of fill	910	m3	58.00	52,803
Terram to filled areas	1,209	m2	2.50	3,021
Ditch Crossing	8	m	450.00	3,600
Sandbag headwalls	2	Nr	950.00	1,900
Imported type 1 material to sub-base	99	m3	65.00	6,451
Surfacing to shared facility	397	m2	45.00	17,865
Timber Edgings	270	m	16.00	4,320
Tie in new shared space footpath to existing	8	m	75.00	600
Allowance for signs and markings	1	item	1,500.00	1,500
General landscaping (allowance) including hard landscaping	1	Sum	5,000.00	5,000
Total Measured Works				**£127,944.69**

	Qty	Unit	Rate	£ p
South East Option 1				
Site clearance - field	0.0927	HA	3,000.00	278
Clear vegetation and trees	1	item	2,500.00	2,500
Excavate topsoil	927	m2	2.50	2,317
Disposal of topsoil	197	m3	38.00	
Imported acceptable material Class 6F2 in embankments and other areas of fill	671	m3	58.00	38,945
Terram to filled areas	927	m2	2.50	2,317
Imported type 1 material to sub-base	97	m3	65.00	6,305
Surfacing to shared facility	388	m2	45.00	17,460
Timber Edgings	260	m	16.00	4,160
Tie in new shared space footpath to existing	8	m	75.00	600
Allowance for signs and markings	1	item	1,500.00	1,500
General landscaping (allowance) including hard landscaping	1	Sum	5,000.00	5,000
Total Measured Works				**£81,381.71**

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