Didcot Garden Town HIF 1 Scheme

Environmental Statement

Volume I

Chapter 16 – Transport

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Prepared for:

Oxfordshire County Council
County Hall
New Road
Oxford
OX1 1ND

Prepared by:

AECOM Limited
AECOM House
63-77 Victoria Street
St Albans
Hertfordshire AL1 3ER
United Kingdom

T: +44(0)1727 535000
aecom.com

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16.1 Introduction

16.1.1 This chapter of the Environmental Statement (ES) presents the likely significant transport effects as a result of the Housing Infrastructure Fund (HIF1) Scheme during construction and operation, on receptors within the study area. This chapter should be read in conjunction with chapters 1 to 5 of this Environmental Statement (ES).

16.1.2 Using the methodology outlined in Section 16.4 of this chapter, likely significant effects (adverse and beneficial) have been identified and are described in Sections 16.10. A summary of these likely significant effects is provided in Section 16.12 but must be read in conjunction with the whole chapter.

16.1.3 A comprehensive Transport Assessment (Ref 16.1) has been carried out and has been submitted as part of suite of planning application documents.

Competent expertise

16.1.4 This chapter of the ES has been prepared by competent experts with relevant and appropriate experience. The technical lead for this traffic and transport chapter has 17 years of relevant experience and has professional qualifications as summarised in Appendix 1.1.

16.2 Legislative and policy framework

16.2.1 The following sub-sections provide further specific details of the legislation and policies that are of most relevance to the traffic and transport assessment, namely where these have informed the identification of receptors and resources and their sensitivity; the assessment methodology; the potential for significant environmental effects; and required mitigation.

National planning policy

National Planning Policy Framework (2021)

16.2.2 The National Planning Policy Framework (NPPF) (Ref 16.2) sets out the Government's planning policies for England, providing a framework within which local people and councils can encourage development which reflects the needs and priorities of their communities.

16.2.3 A key principle of the NPPF is the presumption in favour of sustainable development that contributes to the economic, social, and environmental aspects of a community. The use of sustainable transport modes for the movement of goods and people is widely encouraged.

16.2.4 Chapter 9 sets out Promoting Sustainable Transport (paragraph 104 to 109). This chapter explains the variety of ways in which transport should be considered as part of the planning process. This includes setting out that transport issues should be considered from the earliest stages of the plan-making and development proposals.

16.2.5 Paragraph 106 states that planning policies should 'be prepared with the active involvement of local highways authorities, other transport infrastructure providers and

operators and neighbouring councils, so that strategies and investments for supporting sustainable transport and development patterns are aligned'.

16.2.6 Policies on assessing the transport impact of development proposals are identified in paragraphs 110 to 112. These refer to highway safety as well as capacity and congestion to make clearer that pedestrian and cycle movements should be prioritised, followed by access to high quality public transport, to reflect the importance of creating a well-designed place.

16.2.7 Paragraph 113 states that a development that generates a significant amount of movement should be supported by a Transport Statement or Transport Assessment and should be required to provide a travel plan.

Planning Practice Guidance (2015)

16.2.8 The National Planning Practice Guidance (PPG) (Ref 16.3) is a resource to use alongside the NPPF. The PPG provides advice on when Transport Assessments and Transport Statements are required, and what information they should contain. The PPG covers the overarching principles on Travel Plans, Transport Assessments and Statements.

16.2.9 The Government considers that when combined these documents can positively contribute to:

- *"Encouraging sustainable travel;*
- *Lessening traffic generation and its detrimental impacts;*
- *Reducing carbon emissions and climate impacts;*
- *Creating accessible, connected, inclusive communities;*
- *Improving health outcomes and quality of life;*
- *Improving road safety; and*
- *Reducing the need for new development to increase existing road capacity or provide new roads."*

Regional planning policy

Oxfordshire County Council Local Transport Plan 4 2015-2031 (2016)

16.2.10 The Oxfordshire County Council (OCC): Local Transport Plan 4 (LTP4) outlines the policy and strategy for developing the transport network in Oxfordshire between 2015 and 2031. The LTP4 was adopted in September 2015 following public consultation and was updated in 2016, with emphasis on improving air quality and making better provision for walking and cycling.

16.2.11 The LTP4 has identified three overarching goals relating to transport with ten supporting objectives, which are outlined below:

- **Goal 1:** Support jobs and housing growth and economic vitality:
  - **Objective 1**: Maintain and improve transport connections to support economic growth;
  - **Objective 2**: Make the most effective use of all available transport capacity through innovative management of the network;
  - **Objective 3**: Increase journey time reliability and minimise end-to-end public transport journey times on main routes; and

  - **Objective 4**: Develop a high-quality integrated transport system.
- **Goal 2:** Reduce emissions, enhance air quality and support transition to a low carbon economy:
  - **Objective 5**: Minimise the need to travel;
  - **Objective 6**: Reduce the private car proportion of journeys and make public transport, walking and cycling more attractive;
  - **Objective 7**: Maximise the use of existing and planned sustainable transport investments through influencing the location and layout of developments; and
  - **Objective 8**: Reduce carbon emissions from transport in line with the UK government targets.
- **Goal 3:** Protect, and where possible enhance Oxfordshire's environment and improve the quality of life, including public health, air quality, safety and individual wellbeing:
  - **Objective 9**: Mitigate and where possible enhance the impacts of transport; and
  - **Objective 10**: Increase the levels of walking and cycling to improve public health, reduce transport emissions, reduce casualties and enable inclusive access to jobs, education, training and services.

16.2.12 The LTP4 identifies several key policies relating to the development proposals, which include:

- **Policy 01:** Ensure the transport network supports sustainable economic and housing growth, while protecting and where possible enhancing the environment and supporting health and wellbeing of residents;
- **Policy 02:** Manage and where appropriate develop the road network to reduce congestion and minimise disruption and delays;
- **Policy 03**: Support measures and innovation that makes more efficient use of the transport network capacity by reducing the proportion of single occupancy car journeys and encouraging walking, cycling and public transport;
- **Policy 07**: Work with operators and partners to enhance the network of high quality, integrated public transport services, interchanges and supporting infrastructure;
- **Policy 08**: Work with partners towards the introduction and use of smart, integrated payment solutions for a range of transport modes;
- **Policy 11**: Manage the parking under OCC control and work with district councils to ensure the overall parking provision and controls are financially viable;
- **Policy 17**: Seek that the location of developments make the best use of existing and planned infrastructure and provides new or improved infrastructure and supports walking, cycling and public transport;
- **Policy 22**: Promote the use of low or zero emission transport, including electric vehicles and associated infrastructure where appropriate;
- **Policy 24**: Seek to avoid negative environmental impacts of transport and where possible provide environmental improvements;
- **Policy 28**: Consult from an early stage in the development of schemes;
- **Policy 30**: Identify the parts of the highway network where significant number of accidents occur and propose solutions to prevent further accidents;

- **Policy 31**: Aim to work with partners to support road safety campaigns and education programmes aimed at reducing road accidents and keep speed limits under review;
- **Policy 33**: Seek external funding to support the delivery of transport infrastructure priorities as outlined in the Strategic Economic Plan and Oxfordshire Infrastructure Strategy; and
- **Policy 34**: Require the layout and design of new developments to encourage walking, cycling and to be served by frequent, reliable and efficient public transport.

16.2.13 The LTP4 supports trials of electric buses and supports further pilots, where appropriate. It is expected that new public transport vehicles will conform to high environmental standards.

Science Vale Transport Strategy

16.2.14 The Science Vale Transport Strategy identifies that with the amount of housing and employment growth that is proposed in the Science Vale area, a number of transport schemes are required to mitigate the impact of the growth and support the area.

16.2.15 To improve journeys in the Science Vale area the following schemes are proposed:

- SV 2.1: Upgrade the cycle network and undertake maintenance on the existing network;
- SV 2.2: Secure new bus services with associated infrastructure and improve existing bus services;
- SV 2.6: Deliver the Didcot Science Bridge and widening of A4130;
- SV 2.13: Improve access to Culham Science Centre (Clifton Hampden Bypass);
- SV 2.16: Deliver the Didcot to Culham river crossing; and
- SV 2.21 and SV 2.22: Provide strategic cycle network to encourage the use of sustainable transport.

Local planning policy

South Oxfordshire Local Plan 2035 (2020)

16.2.16 The South Oxfordshire District Council (SODC) Local Plan (Ref 16.4) was adopted in December 2020 and sets out the vision and strategy for the district up to 2035.

16.2.17 Objective 4 of the Local Plan is relevant to this assessment as it states that it should ensure that essential infrastructure is delivered to support existing residents and services as well as growth and to make sustainable transport a more attractive and viable choice whilst recognising that car travel will continue to be important.

16.2.18 The relevant policies stated in the Local Plan are the following:

- **Policy STRAT1**: The Overall Strategy:
  - Development proposals should be in line with the overall strategy for South Oxfordshire. This includes *"focusing major new development in Science Vale including Didcot Garden Town and Culham so that this area can play an enhanced role in providing homes, jobs and services with improved transport connectivity."*

- **Policy TRANS1b**: Supporting Strategic Transport Investment:
  - "*The Council will work with Oxfordshire County Council and others to:*
    - *deliver the transport infrastructure which improves movement in and around Didcot, including measures that help support delivery of the Didcot Garden Town; ii) support measures identified in the Local Transport Plan for the district including within the relevant area strategies;*
    - *support delivery of the safeguarded transport improvements as required to help deliver the development required in this Plan period and beyond;*
    - *understand any cross-border transport impacts from development and plan for associated mitigation."*
- **Policy TRANS2**: Promoting Sustainable Transport and Accessibility:
  - "*The Council will support, where relevant, sustainable transport improvements in the wider Didcot Garden Town area and in and around Oxford, particularly where they improve access to strategic development locations".*
- **Policy TRANS3**: Safeguarding of Land for Strategic Transport Schemes:
  - States that land is safeguarded to support the delivery of identified transport schemes, including those forming this planning application (not exhaustive list):
    - Clifton Hampden Bypass
    - A new Thames road crossing between Culham and Didcot Garden Town
    - Science Bridge, Didcot

South Oxfordshire Infrastructure Delivery Plan (2019)

16.2.19 The Infrastructure Delivery Plan (IDP) (Ref 16.5) was produced to support the SODC Local Plan 2035 (produced for the 2034 version) Final Publication Version 2 which has now been adopted and identifies the infrastructure that is needed to support future growth in South Oxfordshire until 2035. The current IDP was last updated in January 2019 and supersedes the previous IDP published in 2017.

16.2.20 The IDP is a live document meaning it will be regularly updated and monitored as new schemes are completed or new infrastructure requirements are identified.

16.2.21 In order to support the Didcot Garden Town, the County Council has secured funding for the delivery of major transport infrastructure, including, capacity enhancements to the A4130, a new 'Science Bridge' improving access to growing areas of Didcot" "a new road crossing over the Thames between Didcot and Culham and for a bypass of Clifton Hampden. This planning application is for that infrastructure.

Vale of White Horse Local Plan 2031 Part One (2016)

16.2.22 The Vale of White Horse District Council (VoWHDC) Local Plan Part One (Ref 16.6) was adopted in December 2016 and sets out the vision for the district up to 2031.

16.2.23 Among the key challenges outlined in the Local Plan are:

- Supporting economic prosperity;
- Supporting sustainable transport and accessibility.

16.2.24 The relevant core policies applicable to this chapter include:

- **Core Policy 7: Providing Supporting Infrastructure and Services**
  - States that the Council will ensure that new infrastructure and services are delivered alongside new housing and employment.
- **Core Policy 17: Delivery of Strategic Highway Improvements with the South-East Vale Sub-Area**
  - States that contributions will be made towards transport infrastructure improvements with the South-East Vale Sub-Area including:
    - Didcot Science Bridge and A4130 re-routing through the Didcot A Power Station site;
    - A4130 dualling between Milton Interchange and Didcot Science Bridge; and
    - A new strategic road connection between the A415 east of Abingdon on-Thames and the A4130 north of Didcot, including a new crossing of the River Thames.
- **Core Policy 18: Safeguarding of Land for Transport Schemes in the South East Vale Sub-Area**
  - States that the land required to support the transport schemes identified for the South East Vale area is safeguarded.
  - Planning permission will not be granted to developments that will harm the delivery of the schemes or the effective operation of the schemes.
- **Core Policy 33: Promoting Sustainable Transport and Accessibility**
  - The Council will support improvements for accessing Oxford and support measures identified in the Local Transport Plan.
- **Core Policy 34: Promoting Public Transport, Cycling and Walking**
  - The Council will seek to support the provision of new cycling routes and ensure that proposals for major development are supported by a Transport Assessment and Travel Plan.

Vale of White Horse Local Plan 2031 Part Two (2019)

16.2.25 The VoWHDC Local Plan Part Two (Ref 16.7) was adopted in December 2019 and complements the Part 1 plan setting out policies and locations for housing up to 2031.

16.2.26 The Part 2 Local Plan includes Core Policy 16b which supports the implementation of Didcot Garden Town. This policy ensures that proposals for development support the successful implementation of the Garden Town.

16.2.27 The key relevant policies stated in part two of the Local Plan are the following:

- **Development Policy 17: Transport Assessments and Travel Plans**
  - States that proposals for large developments will need to be supports by a Transport Assessment or Statement in accordance with Oxfordshire County Council guidance.
- **Core Policy 18a: Safeguarding of Land for Strategic Highway Improvements within the South-East Vale Sub-Area**
  - States that the land required to deliver the identified transport schemes in the area is safeguarded.

- **Development Policy 31: Protection of Public Rights or Way, National Trails and Open Access Areas**
  - The Council will permit developments that can accommodate existing routes or provide alternative routes that are equally or more attractive and convenient for users.

Vale of White Horse Local Plan 2031: Part 1 & 2, Infrastructure Delivery Plan (IDP)

16.2.28 The VoWHDC Infrastructure Delivery Plan (Ref 16.8) was prepared to support the Local Plan 2031: Part 1 (2016-produced for the 2015 version) which identifies the vision for the area up to 2031 and the infrastructure required to accommodate the growth of the area and Part 2 (2018), a reviewed and updated version of Part 1. The IDP is intended to be a live document that will be updated as necessary.

16.2.29 "The council has been working closely with Oxfordshire County Council and South Oxfordshire District Council so that cross-border infrastructure requirements are fully taken into account and that the Science Vale area is planned holistically."

16.2.30 To achieve a sustainable transport network in the VoWHDC area, the Council is working in partnership with OCC, SODC, Oxfordshire Local Enterprise Partnership (OxLEP) and Oxfordshire Growth Board. The relevant required transport infrastructure that has been identified includes:

- Delivering Didcot Science Bridge and widening of the A4130;
- A river crossing over the Thames between Didcot and Culham; and
- Providing new and substantially upgraded strategic cycle routes to Milton Park, Harwell and Culham Science Centre (CSC) through the Science Vale cycle strategy.

16.3 Consultation with relevant stakeholders

16.3.1 An EIA Scoping Opinion Request was submitted by OCC (as the promoter) to OCC in its capacity as the Local Planning Authority (LPA) in April 2020, which sought the opinion of the LPA regarding the approach for the assessment of environmental effects resulting from the construction and operation of the Scheme. In accordance with the EIA Regulations, the LPA consulted statutory stakeholders and non-statutory stakeholders where they considered it applicable. The consultation responses detailed in Table 16.1 were received in relation to traffic and transport.

Table 16.1: Scoping Opinion and responses

Scoping Opinion	Where addressed within the ES
OCC Transport Development Management (TDM)	
A comprehensive Transport Assessment (TA) will be required to inform any future Environmental Impact Assessment (EIA). The scope of the TA and the study area of the transport assessment work will need to be agreed with OCC and pre-app discussions are welcomed. Impact upon the network from the HIF schemes is not to be treated in the same manner as your usual development proposal which assesses the percentage of additional traffic and its impact on the existing highway network regarding demand and design capacity. If the assessment assumes provision of strategic transport improvements, such as those proposed, then the impact of these schemes and their completion needs to be robustly demonstrated i.e. existing highway	A separate TA has been prepared. A Technical Note outlining the scope for the TA was submitted to OCC TDM for approval. The scope was agreed, and the TA will be submitted with the Planning Application. Future traffic has been assessed as part of the traffic modelling work which informs the TA.

Scoping Opinion	Where addressed within the ES
issues tested alongside scenarios of with and without the HIF infrastructure in future years. Future background traffic flows will be affected by traffic arising from new developments during this period and notably Local Plan site allocations. There is currently some uncertainty surrounding the SODC plan and further consideration is required to ensure the assessment reflects future patterns of growth. Construction traffic and its impact on the local and strategic network is expected to be significant and how this is managed will form an essential part of a future planning submission. Issues such as traffic management, working hours, construction traffic management plans and routeing/ delivery restrictions will require careful consideration.	The effects of construction traffic have been included in this Transport chapter 16, based on preliminary construction traffic management plans, and routeing proposals as prepared by the Early Contractor Involvement (ECI) Contractor.
Highways England	
We acknowledge that these improvements are included in the adopted Local Transport Plan, scheme proposals "SV 2.6 Delivering Didcot Science Bridge and widening of A4130" and "SV 2.13 Delivering improved Access to Culham Science Park", and as such we have no comments other than we will expect that any subsequent Transport Assessment (TA) will assess any potential impacts to the A34.	An assessment of impacts on the A34 at Milton Interchange is included in the TA.
Clifton Hampden Parish Council	
The scope of the EIA set out in paragraphs 1.5.1 and 5.6.2 omits two significant requirements from the EIA planning regulations guidance: • land use • transport and access	The EIA follows Design Manual for Roads and Bridges (DMRB) guidance which does not include guidance for the assessment of transport impacts. However, OCC has requested that a transport chapter is included in the ES, in addition to the TA that will be submitted with the planning application. Land Use is covered in ES Chapter 13: Population and Human Health

16.4 Assessment methodology

16.4.1 The methodology for this assessment was developed from guidance given in the Institute of Environmental Management and Assessment (IEMA) 'Guidelines for the Assessment of Road Traffic 1993' (Ref 16.9) and Highways England 'LA 104 Environmental Assessment and Monitoring' (2020) (Ref 16.11). In accordance with the IEMA guidance, issues including driver delay and accident and safety associated with the Scheme have been investigated and are reported herein.

16.4.2 In addition, a review and qualitative assessment has been carried out of the effects of the Scheme on the public transport. The IEMA guidelines do not include advice on assessing the effects on public transport users.

16.4.3 The environmental effects relating to air pollution, noise and vibration, non-motorised users and severance, associated with traffic using the Scheme are considered in ES ES Chapters 5: Air Quality, ES Chapter 15: Climate; ES Chapter 10: Noise and Vibration; ES Chapter 13: Population and Human Health respectively.

Sources of Information/Data

16.4.4 Traffic flow data has been obtained from the Paramics model for the area, produced by Systra. AM peak (08:00 to 09:00) and PM peak (17:00 to 18:00) hour traffic flows and average journey speeds for several routes within the road network have been provided. Annual Average Daily Traffic (AADT) flows were calculated based on modelled AM peak period (07:00-10:00) and PM peak period (16:00-19:00) flows and factors obtained from Automatic Traffic Count (ATC data) for counts on the local highway network. Further details of the traffic modelling are provided in the Transport Assessment (Ref 16.1).

16.4.5 The extent of the Paramics model is illustrated in Figure 16.1.

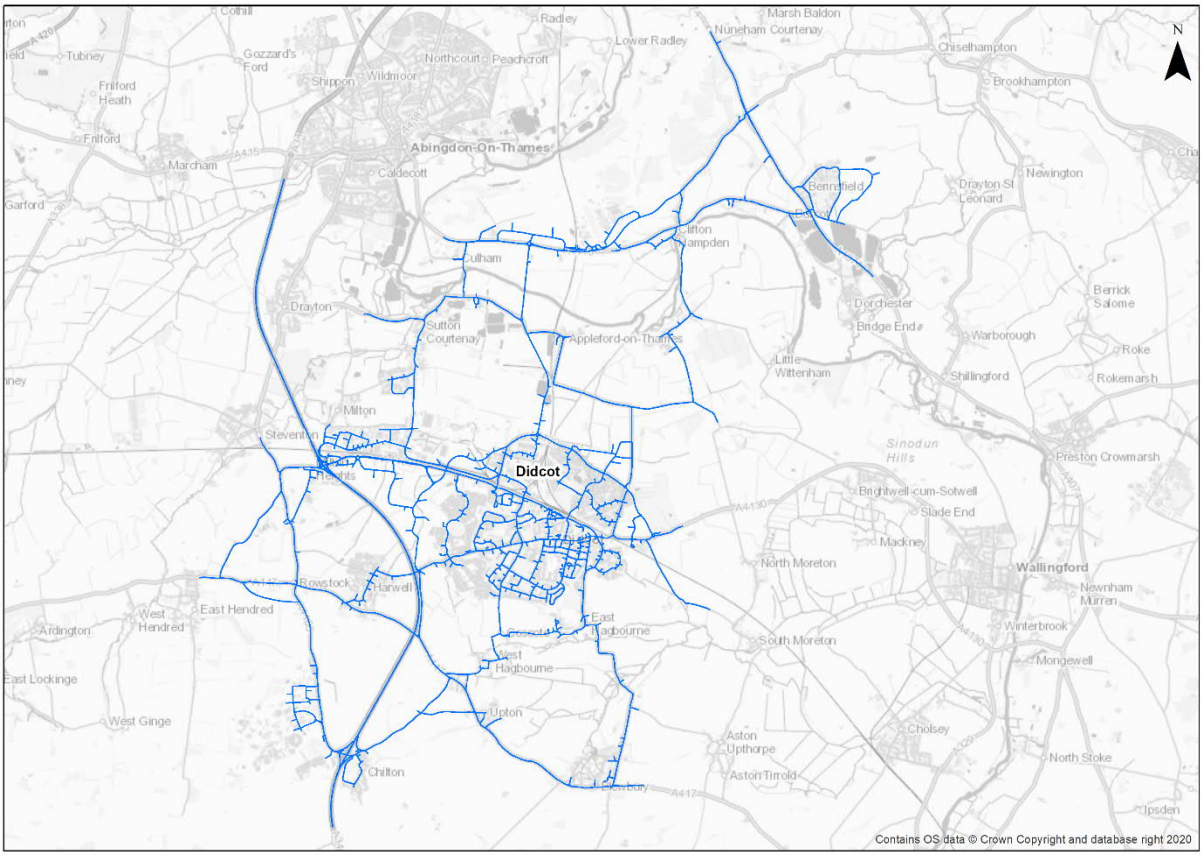

Figure 16.1: Paramics model extent

16.4.6 Collision data has been obtained from OCC for a five-year period between 9th June 2014 and 8th June 2019.

Methodology for Determining Baseline Conditions and Sensitive Receptors

Baseline

16.4.7 The baseline describes the existing highway network, existing traffic flows, accidents and road safety and public transportation (bus, rail etc).

16.4.8 The baseline considers the current year (2020), the Scheme opening and peak construction year (2024) and a future year (2034). Data extracted from the Didcot Paramics microsimulation model has been provided by OCC/Systra for the assessment of impacts. The model includes housing and employment completion trajectories as supplied by the relevant local planning authorities (VoWHDC and SODC). The baseline flows are therefore considered to include cumulative developments.

16.4.9 The Transport Assessment (TA) (Ref 16.1) forms the basis of this chapter. The scope of the TA was agreed with the OCC Transport Development Control (TDC) officers.

Assessment of Sensitivity

16.4.10 The sensitivity of a link or junction is dependent on the number of receptors that will be affected by the Scheme. In transport terms, 'receptors' are the affected users of that link or service, and this will therefore vary by mode of transport.

16.4.11 The sensitivity of the receptor is measured on one of two scales, dependent upon the criteria being assessed. The sensitivity of these receptors has been expressed in terms of Ratio of Flow to Capacity (RFC) which is a measure of the utilised capacity of a junction approach arm or Degree of Saturation (DoS) defined as the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement during the baseline scenario. The worst case of the AM and PM peak assessments has been taken and thresholds for sensitivity of junctions have been defined as follows:

- Very Low: RFC under 0.85 or DoS below 85%;
- Low: RFC between 0.85-0.90 or DoS between 85% - 90%;
- Medium: RFC between 0.90-0.95 or DoS between 90% - 95%; and
- High: RFC over 0.95 or DoS above 95%.

16.4.12 In terms of accidents and safety, the sensitivity of highway links has been based on the road hierarchy and professional judgement. The link sensitivity thresholds are the following:

- Very Low: local roads intended for local traffic;
- Low: main distributor and secondary distributor roads;
- Medium: primary roads; and
- High: trunk roads.

16.4.13 A34 on-slips have been categorised as having a very low sensitivity as the traffic is not running into a junction and is merging onto free-flowing traffic. Off-slip roads for the A34 have been categorised as low sensitivity as these are considered to be more sensitive as the traffic is running into a junction and therefore, more sensitive to changes in traffic flows.

Assessment of Magnitude

16.4.14 The magnitude of traffic impacts is a function of the existing traffic volumes, the percentage increase due to the Scheme and the changes in type of traffic.

16.4.15 The IEMA guidance (Ref 16.9) identify thresholds for the magnitude of impact based on percentage change in traffic levels. The magnitude of impacts arising from the increase in traffic volumes (taken as being either the traffic flow including all vehicles, or the Heavy Goods Vehicle (HGV) traffic flow, whichever is higher) is categorised as follows:

- Major: above 90% increase in traffic levels;
- Moderate: between 60% and 90% increase in traffic levels;
- Slight: between 30% and 60% increase in traffic levels; and
- Negligible: under 30% increase in traffic levels.

Driver Delay

16.4.16 IEMA guidance states driver delay can occur *"…at several points on the network surrounding the site…"* including at the site entrance, on the highways passing the site, at other key intersections and at side roads. The guidance states that values for delay due to these elements can be determined by using junction assessment software. Modelling software such as Junctions 9 and LinSig Version 3.2.10[1] produce estimates of vehicle time and delay through junctions and, by testing each junction for the Do Minimum and Do Something scenarios, it is possible to estimate the potential vehicle delays.

16.4.17 Driver delay has been assessed using the junction modelling undertaken for the TA (Ref 16.1).

16.4.18 A comparison between the junction modelling results for the 2024 and 2034 DM and DS scenarios has been undertaken to identify the change in delay forecast. This has been based on the following magnitude of impact scale:

- Very Low: Change in junction delay of less than 10 seconds per Passenger Car Unit (PCU);
- Low: Change in junction delay of 10-20 seconds per PCU;
- Medium: Change in junction delay of 20-30 seconds per PCU; and
- High: Change in junction delay of 30 seconds or more per PCU.

16.4.19 However, to assess the driver delay during the construction period a qualitative approach and professional judgement has been used. At this time it is not known what routes construction staff and LGVs will take to travel to the different access points to the site. Estimates have been made of the routes that the vehicles will take and the proportion that will use each route, however, there is not currently enough information to undertake junction capacity assessments for the construction activity in 2024.

Accidents and Safety

16.4.20 The IEMA guidance states that in terms of accidents and safety, 'the assessment of link road accident rates can be obtained from Highway Authority records. Personal Injury Collision (PIC) data has been obtained from OCC for the most recent five-year period available for roads near the Scheme. A summary of this analysis is included in the TA (Ref 16.1).

16.4.21 Department for Transport (DfT) Transport Analysis Guidance (TAG) (Ref 16.10) indicates that a change in collisions of less than 30% has a slight impact while a change of greater than 30% has a significant impact. For the purposes of this assessment and to reflect the relatively low collision record in the study area for the five-year period, a change of less than 10% is considered very low, 10-20% is deemed to be low, while a change of 20-30% will be medium, and anything above 30% is deemed to be high. The potential change in collisions involving vehicle travellers has been assumed to be affected by changes in traffic flow and alterations to highway design. It is assumed that the collision rate will change in line with the proportional change in Annual Average Daily Traffic (AADT) flows within the Scheme extents. Professional judgement has been used to consider the implications of changes in highway design in the context of the local collision records.

[1] Capacity assessments of the junctions within the assessment area have been undertaken using industry standard assessment tools Junctions 9 for priority junctions and roundabouts and LinSig for signalised junctions

16.4.22 Regarding hazardous and dangerous loads, the IEMA guidance indicates the assessment should include a '*risk or catastrophe analysis to illustrate the potential for a collision to happen and the likely effect of such an event*'. It is understood that no hazardous or dangerous loads are anticipated associated with the proposed construction or operation of the proposed development beyond standard construction materials. Some abnormal vehicles will be required for construction, but it is likely to be limited in number and will be considered as part of a Construction Traffic Management Plan (CTMP), with routes agreed in advance.

16.4.23 DRMB guidance requires that an assessment of impacts on transport network user views should be considered. This has been considered as part of the assessment reported within ES Chapter 10: Landscape and Visual and is therefore not considered further within this chapter.

Public Transport Users

16.4.24 The magnitude of impacts on public transport users has been qualitatively assessed with consideration of the following:

- Frequency of bus services;
- Impacts on bus journey times;
- Change in access to bus services;
- Level of connectivity; and
- Journey/ vehicle quality.

Assessment of Significance

16.4.25 The significance of the effects of construction and operational trips has taken into consideration mitigation (i.e. embedded measures) where it is built into the construction methodology and the Scheme design. The effects have been characterised as follows:

- **Beneficial** - meaning that the changes produce benefits in terms of transportation and access (such as reduction of traffic, travel time or patronage, or provision of a new service, access or facility);
- **No effect/**Negligible - meaning changes are too small to meaningfully measure where changes in flows are typically less than 10%; or
- **Adverse** - meaning that changes produce adverse effects in terms of transportation and access (such as increase of traffic, travel time, patronage or loss of service or facility).

16.4.26 Beneficial and adverse effects have been further characterised as:

- **Major** - considerable effect (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards;
- **Moderate** - limited effect (by extent, duration or magnitude) which may be considered significant;
- **Minor** - slight, very short or highly localised effect of no significant consequence; or
- **Negligible** – imperceptible effect too small to measure meaningfully.

16.4.27 The duration of the effects has been defined based and agreed on the following criteria:

- **Temporary (Short-term)** - an effect with a duration from several weeks to a few months;
- **Temporary (Medium-term)** - an effect with a duration estimated to be several months to a year;
- **Temporary (Long-term)** - an effect with a duration estimated to be several years; and
- **Permanent** - non-reversible.

16.4.28 The assessment of the significance of effects was determined by combining the categories of sensitivity and magnitude in accordance with the approach outlined above, as shown in Table 16.2.

Table 16.2: Significance of Effects

Magnitude of Change	Receptor Sensitivity			
	Very Low	**Low**	**Medium**	**High**
Major (High)	Minor	Moderate	Major	Major
Moderate (Medium)	Negligible	Minor	Moderate	Major
Slight (Low)	Negligible	Negligible	Minor	Moderate
Negligible (Very Low)	Negligible	Negligible	Negligible	Negligible

16.4.29 Effects are adverse where there is an increase in predicted traffic flow associated with the development, and beneficial where there is a predicted decrease. Effects are also assessed as being either temporary or permanent. Major and moderate effects are considered significant.

16.4.30 Effects that are identified to be moderate or major, adverse or beneficial are considered to be significant.

Public Transport Users

16.4.31 The significance of effects on public transport users has been qualitatively assessed with consideration of the following:

- Frequency of bus services;
- Impacts on bus journey times;
- Change in access to bus services;
- Level of connectivity; and
- Journey/ vehicle quality.

16.5 Assessment assumptions and limitations

16.5.1 For the 2034 scenarios the model assumes 100% demand of existing trips present in the 2020 base, and 80% of demand for new growth. The demand reduction is proposed for several reasons to enable a more realistic future scenario:

- The model uses a generic trip rate across all development in the area. A demand reduction is required to align the trip generation with trip rates recently accepted by OCC TDC for planning applications sites in Didcot. This accounts for approximately half of the demand reduction.

- It is assumed that the Didcot Garden Town principles will continue to be enacted in this area over the next 14 years, increasing the usage of sustainable modes. Modal shift from these developments later in the plan period (over a decade away) is more likely as they are coming alongside significantly improved pedestrian/ cycle/ public transport provisions. The Paramics model is not multi-modal so cannot automatically account for improved non-motorised users (NMU) infrastructure, therefore a demand reduction is used as a proxy. This and the following point account for approximately half of the demand reduction.
- The largest new sites follow good spatial strategies and are in more sustainable locations near public transport hubs and/ or are located nearer the growing employment areas which will have significantly improved NMU routes.

16.5.2 It is not possible to extract meaningful results from the 2034 model without the with Scheme scenario as the model network gridlocks. To enable results to be extracted for comparisons, in the 2034 without the Scheme scenarios the model has been run at 70% total demand (70% of everything, after the demand reduction) to prevent gridlock. These values have then been factored back up to 100% to calculate the 'factored' flow e.g. how many vehicles will have wanted to go through that junction, if the network had not been gridlocked.

16.5.3 For clarity, the modelling approach methodology is summarised in Figure 16.2.

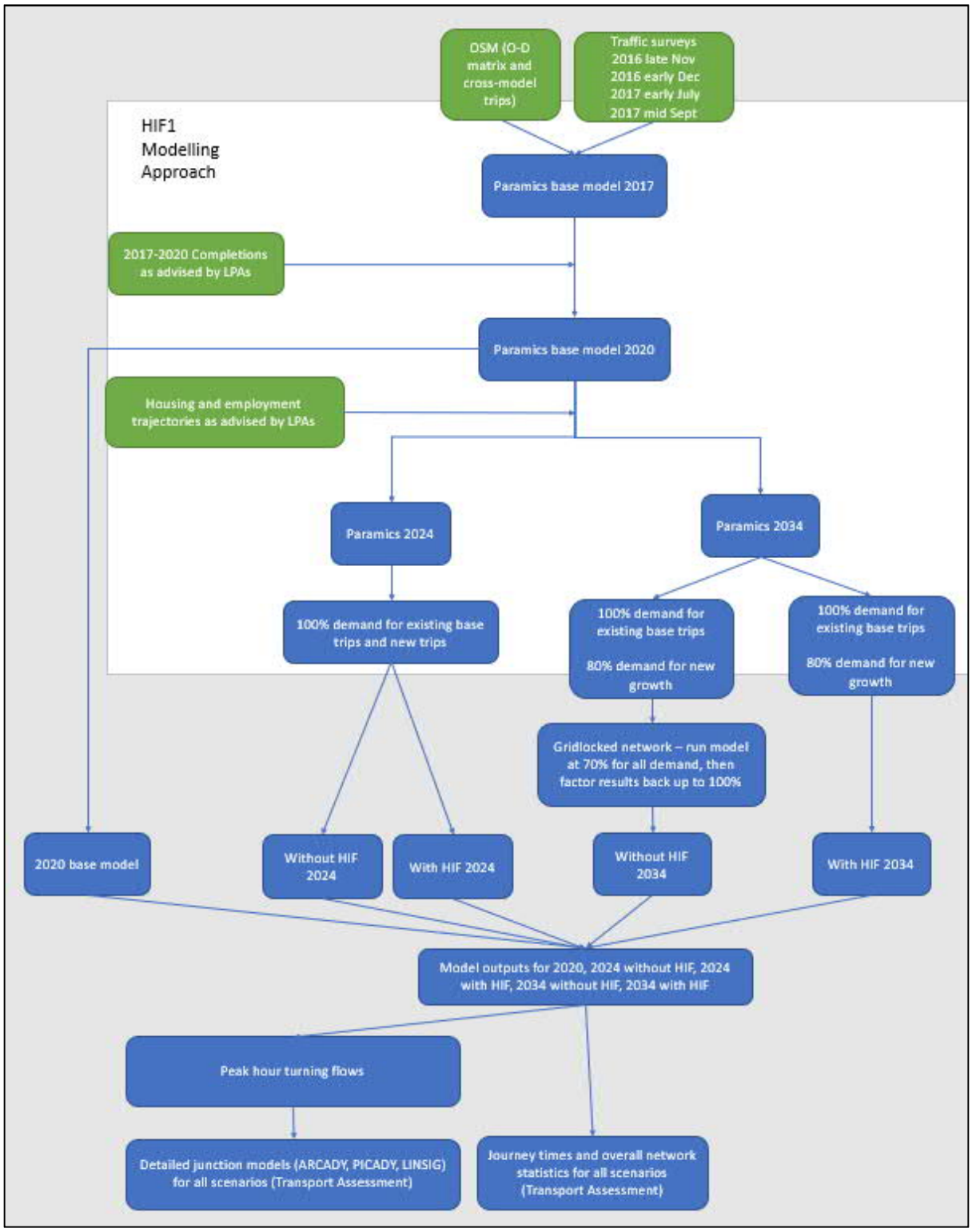

Figure 16.2: Modelling Approach Methodology Diagram

16.5.4 Further details of the modelling approach are included in the TA (Ref 16.1).

16.6 Study area

16.6.1 According to IEMA guidance (Ref 16.9), an important prerequisite of the environmental assessment to determine the geographic boundaries of the assessment. The guidance set out two rules for identifying potential links for analysis:

- **Rule 1**: include highway links where traffic flows will increase by more than 30% (or the number of HGVs will increase by more than 30%); and
- **Rule 2**: include any other specifically sensitive areas (e.g. collision clusters, conservation areas, hospitals, links with high pedestrian flows etc.) where traffic flows have increased by 10% or more.

16.6.2 However, given the large extent of the Scheme, key junctions along the alignment and in the surrounding area have been selected for assessment and agreed with OCC TDC. These key junctions are identified in Figure 16.3.

16.6.3 A selection of road links has been identified for the assessment to provide an overview of the operation of the highway network surrounding the Scheme. The selected links are close to the route of the Scheme and will therefore experience the greatest impact. The selected road links are identified in Figure 16.4.

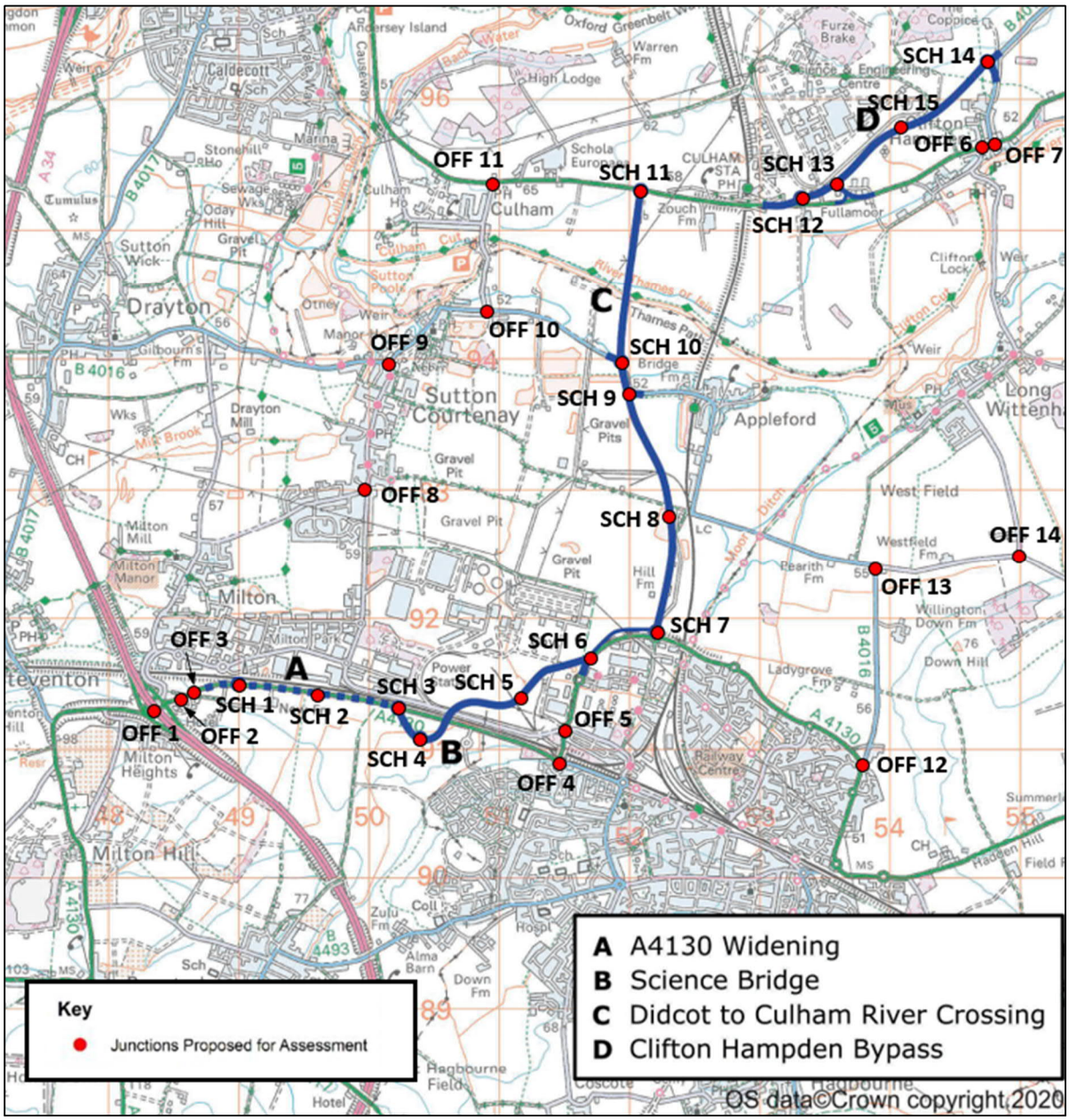

Figure 16.3: Key Junctions for Assessment

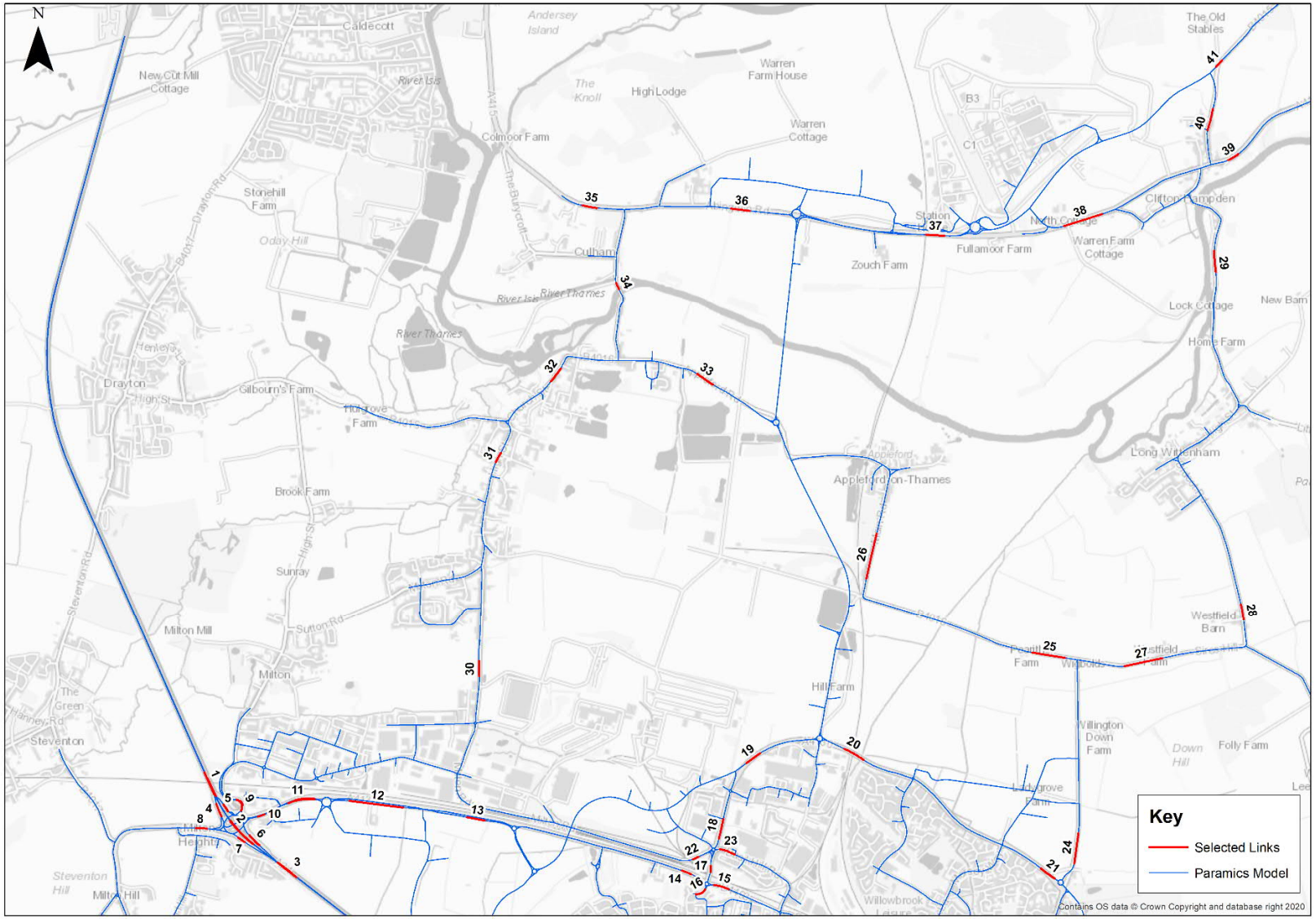

Figure 16.4: Selected Links for Assessment

16.7 Baseline conditions

Highway Network

Existing Baseline

16.7.1 With large urban extensions of the 1990s (Ladygrove) and planned housing and employment growth in the 21st Century, highway infrastructure in and around Didcot has failed to keep pace. Additionally, the location of employment centres on historic and relatively remote military bases (Harwell Science and Innovation Campus and CSC), compounds congestion in and around the town.

16.7.2 Railway lines and the River Thames create severance to effective movement and barriers to connectivity between homes and jobs. Severe congestion is evident on the A4130, on the existing river crossings between Didcot and Culham/Clifton Hampden and within Clifton Hampden.

16.7.3 Within the extent of the Scheme, the A4130 is a dual carriageway between the Milton Interchange Roundabout and the Milton Gate junction, this is subject to 40 mph speed limit.

16.7.4 The A4130 between the A4130/ B4493/ Mendip Heights roundabout and to the east of the Backhill Tunnel is subject to the national speed limit.

16.7.5 The B4493 is a 40 mph single carriageway road which runs between the A4130 and Station Road. There is a 2 m wide shared footway and cycleway on the south side of the carriageway with street lighting present.

16.7.6 Mendip Heights is a 30 mph single carriageway road which serves a residential area. A 2 m wide shared footway and cycleway are present on the eastern side of the carriageway with street lighting.

16.7.7 The A4130 between the A4130/ B4493/ Mendip Heights roundabout and A4130/ Milton Road/ Basil Hill Road roundabout is a 50 mph single carriageway road with a narrow circa. 1 m footway present on the eastern side of the carriageway. Street lighting is present along the A4130.

16.7.8 Milton Road is a 40 mph single carriageway road with a 2.5 m wide shared footway and cycleway along the southern side of the carriageway. Street lighting is present.

16.7.9 Basil Hill Road is a 30 mph single carriageway road with 2.2 m shared footway and cycleway on the northern side of the carriageway near the A4130/ Milton Road/ Basil Hill Road roundabout which leads into an 0.8 m on-street cycle lane. A 0.8 m cycle lane is also present on the southern side of the carriageway with street lighting provided.

16.7.10 The A4130 between the A4130/ Milton Road/ Basil Hill Road roundabout and the A4130/ Purchas Road/ Hawksworth junction is a 50 mph single carriageway road. There is a 2.2 m footway present on both sides of the carriageway with street lighting provided.

16.7.11 Hawksworth is a 30 mph road which serves an industrial estate. Footways 1.5 m wide are present on both sides of the carriageway with street lighting.

16.7.12 The A4130 between the A4130/ Milton Road/ Basil Hill Road roundabout and the A4130/ Collett Roundabout is a 50 mph single carriageway road. A narrow 1 m footway is present on the eastern side of the carriageway with street lighting provided.

16.7.13 The B4016 within the extent of the Scheme is a single carriageway road with a national speed limit restriction that runs in an east-west direction between Appleford and Sutton Courtenay.

16.7.14 The A415 Abingdon Road is a single carriageway road which runs between Abingdon and Burcot. It is subject to the national speed limit west of Clifton Hampden. It is subject to a 30 mph speed limit through Clifton Hamdpen and a 40 mph speed limit through Burcot. There is a 1.2 m shared footway/ cycleway along the northern side of the carriageway between Thame Lane and CSC. A 2 m wide shared footway/cycleway is present on the south side of the A415 Abingdon Road from CSC to Clifton Hampden. Street lighting is present at the CSC.

16.7.15 The key junctions within the Scheme extents are:

- A34/ A4130 Milton interchange is a five-arm signalised hamburger roundabout with a three-lane circulatory flaring to four lanes between the A34 north approach and A34 south exit arms. The A34 north approach widens to four lanes with a dedicated lane for Milton Park. There is a cut-through from the A4130 east arm providing access to the A34 northbound. The A34 approach arm flares to three lanes at the approach including a slip road leading to the A34 southbound arm. Park Drive provides access to Milton Park flaring to four lanes at the approach to Milton Interchange;
- A4130/ Milton Gate is a signalised priority T-junction. Milton Gate is the minor arm at this junction, providing access to several car dealerships and food retail units;
- A4130/ B4493/ Mendip Heights roundabout has a one lane circulatory with all arms having one lane apart from the A4130 west arm that flares to two lanes at the approach;
- A4130/ Milton Road/ Basil Hill Road roundabout has a one lane circulatory with the A4130 south arm widening to two lanes at the approach;
- A4130/ Hawksworth/ Purchas Road roundabout has a one lane circulatory with the A4130 north and south arms widening to two lanes at the approach;
- A4130/ Collett roundabout is a single circulatory roundabout with the A4130 and Collett approach arms widening to two lanes at the approach;
- Culham Station access junction is a priority T-junction with single lanes at each arm;
- The eastern access to the Culham Station is a priority junction with a right turn ghost island;
- CSC priority T-junction with right turn ghost island. The CSC access widens to two lanes at the approach with a dedicated right turn lane;
- A415/ High Street (Clifton Hampden) and A415/ B4015 Oxford Road is a staggered signalised junction. The A415 west arm widens to two lanes at the junction to provide a narrow dedicated right turn lane. The southern arm from long Wittenham travels over the historic narrow bridge which operates under signalised shuttle-working. The northern and eastern arms have single lane approaches, providing access to north Clifton Hampden/A4074 and the Burcot/Berinsfield/A4074 respectively; and
- The existing river crossing at Culham Village (Sutton Bridge and Culham Cut) is a historic narrow bridge crossing which operates under signalised shuttle-working. At the northern end is the A415/ Tollgate Road signalised junction and at the southern end B4016 Appleford Road/ Abingdon Road priority T-junction.

Public Transport

Bus

16.7.16 There are eight bus stops (four pairs) located along or close to the Scheme. There are two bus stops located on the A415 Abingdon Road opposite Clifton Hampden Village Hall, a bus shelter is provided at the westbound bus stop. There are two bus stops located on A415 Abingdon Road opposite the CSC which have bus shelters present at both bus stops. A pair of bus stops are located on Basil Hill Road with bus shelters located present at both bus stops. Live bus information is available at the westbound bus stop. In Milton Park along Park Drive a pair of bus stops with bus shelters are present. These bus stops are shown in Figure 16.5.

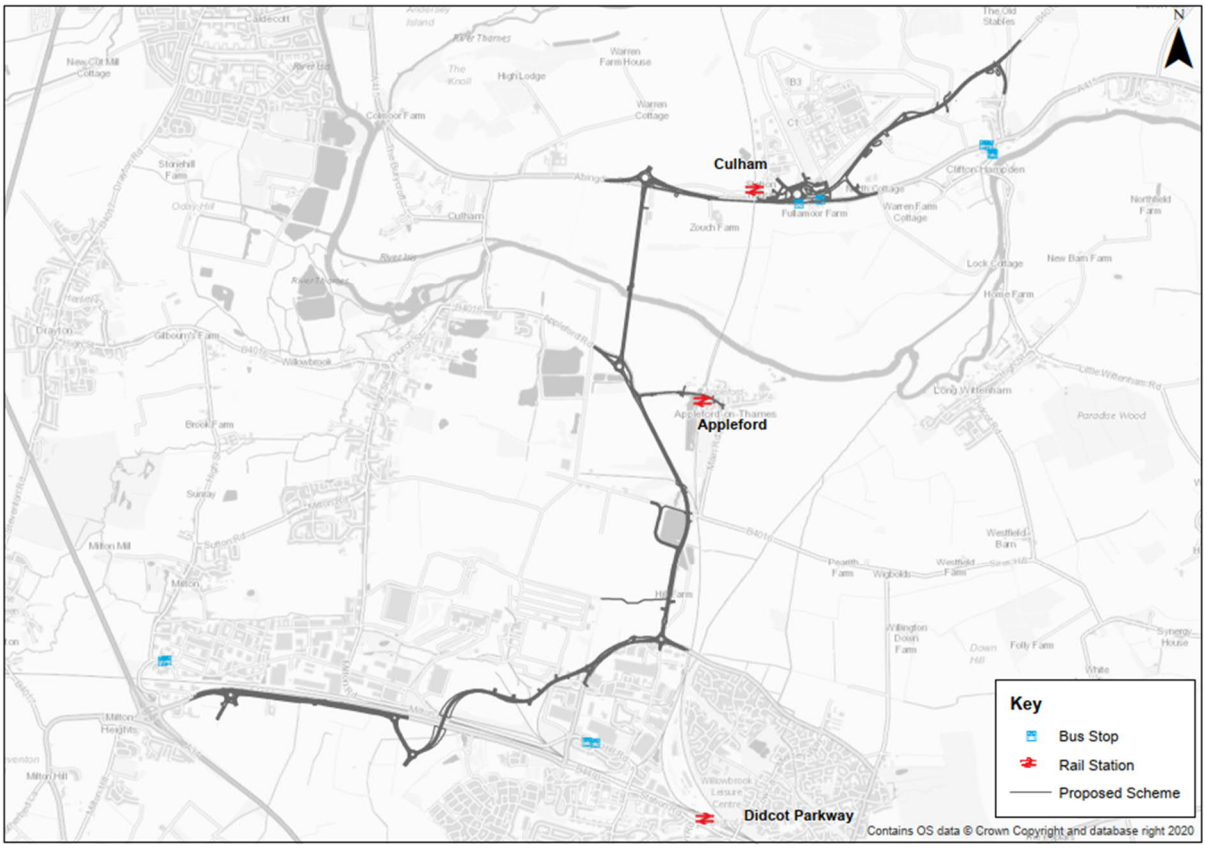

Figure 16.5: Public Transport Facilities

16.7.17 Table 16.3 presents the bus routes that serve the bus stops along or near the Scheme whilst Table 16.4 presents the route and frequency of these services.

Table 16.3: Local Bus Stops and Bus Routes

Bus Stop Name	Direction	Bus Routes
Milton Park, Sutton Courtenay Road Milton Park, Stop 14	Eastbound	33, 99C, X2, X32, X36
	Westbound	33, 99A, X2, X32, X36
Foxhall Manor Park	Eastbound	33, 99C, X2, X32, X36
	Westbound	33, 99A, X2, X32, X36
Science Centre Entrance	Eastbound	45, 95
	Westbound	45, 95
Clifton Hampden Village Hall	Eastbound	45, 95
	Westbound	45, 95

Source: https://www.google.com/maps

Table 16.4: Frequency of Local Bus Routes (Single Direction)

Service	Route	AM Peak 0800-0900	Off-Peak[2]	PM Peak 1700-1800
33	Abingdon – Sutton Courtenay – Milton Park – Didcot – Wallingford	1	1	2
99A	Didcot – Milton Park – Great Western Park – Didcot	0	1	2
99C	Didcot – Great Western Park – Milton Park – Didcot	2	1	0
X2	Oxford – Abingdon – Steventon – Milton Park – Didcot	3	3	3
X32	Oxford – Milton Park – Didcot – Harwell – Wantage	2	2	2
X36	Wantage – Grove – Steventon – Milton Park – Didcot	1	2	2
45	Abingdon – CSC Centre – Berinsfield – Cowley	2	0.5	2
95	Didcot – CSC	1	0	1

Source: https://www.google.com/maps

16.7.18 Bus routes in Didcot are shown in Figure 16.6 (extract from Thames Travel website; https://www.thames-travel.co.uk/maps-guides/).

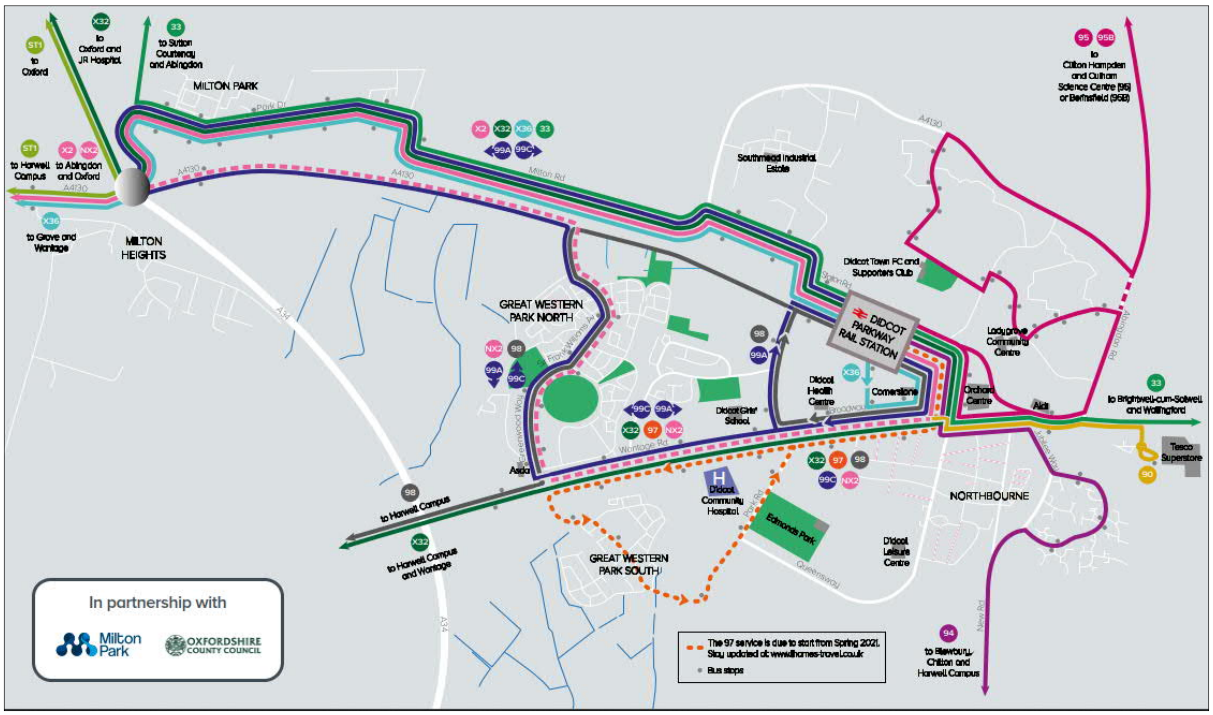

Figure 16.6: Bus Routes in Didcot

16.7.19 From January 2021 the 33, X2 and X32 bus services are running on enhanced timetables. The X32 service operates every 30 minutes between Oxford and Wantage via Didcot. The 33 service operates every 30 minutes between Wallingford and Didcot Parkway with one bus per hour continuing to Abingdon via Sutton Courtenay and Culham. The X2 service operates every 20 minutes between Oxford, Abingdon and Didcot.

[2] Average number of buses per hour take between 0900-1700

16.7.20 Due to the severance created by the River Thames and the historic road network, there are poor opportunities for bus routes to offer good journey time reliability north / south in this area. Prior to January 2021, the only service operating over Clifton Hampden Bridge was a less-than-daily service providing access to Didcot from local villages. Route 95 is a new service which commenced in January 2021 to provide a peak hours service from Didcot to CSC - two morning journeys and three evening journeys. There is no off-peak service. The service is funded using S106 contributions from CSC. Between peak times, three journeys in each direction operate a similar route from Didcot until Clifton Hampden, where they then go to Berinsfield (instead of CSC). These journeys are numbered 95B and are operated with the bus that operates route 95, which will otherwise be unoccupied.

16.7.21 The 33 is the only bus service that uses the Culham Cut and Sutton Bridge crossing of the River Thames. It operates a broadly hourly service running between Didcot and Abingdon via Sutton Courtenay and Culham village.

Rail

16.7.22 The nearest rail stations are Didcot Parkway, Appleford and Culham Stations. Didcot Parkway is approximately 2.3 km from the Scheme. The station is served by Great Western Mainline and Cherwell Valley Railway Line, providing services to London Paddington, Oxford, Ealing Broadway, Bristol Temple Meads, Banbury and Cheltenham Spa. This station has an average of ten services per hour.

16.7.23 Appleford Station is located along the B4016 to the east of the Proposed Scheme serves the Cherwell Valley Line, providing services to Banbury, Didcot, and Oxford, and has an average of one-two services per hour in the day, and fewer off-peak.

16.7.24 Culham Station is located in between Culham and Clifton Hampden and is served by Great Western Railway. Culham Station serves the Cherwell Valley Railway Line, providing services to Banbury, Morton-in-Marsh, Oxford and Reading. and has an average of one-two services per hour in the day, and fewer off-peak.

Existing Junction Operation

16.7.25 Capacity assessments of the junctions within the assessment area have been undertaken using industry standard assessment tools Junctions 9 version 9.5.1.7462 for priority junctions and roundabouts and LinSig Version 3.2.10 for signalised junctions. The following section provides a summary of the junction capacity modelling results, based on the 2020 traffic flows, and a commentary on junction operation.

16.7.26 A summary of the 2020 base junction capacity assessment results are set out in Table 16.5.

Table 16.5: 2020 Base Junction Capacity Assessment Summary (Maximum RFC/DoS)

No.	Junction	Type	AM	PM
OFF2	A4130/ Service Area	Priority junction	0.60	0.55
OFF3	A4130/ Milton Gate	Signalised junction	88%	92%
OFF4	A4130/ B4493/ Mendip Heights	Roundabout	0.62	0.73
OFF5	A4130/ Basil Hill Road/ Milton Road (Power Station)	Roundabout	0.79	1.16
OFF 6	A415/ High Street (Clifton Hampden)	Signalised junction	307%	336%
OFF 7	A415/ B4015 Oxford Road (Clifton Hampden)	Signalised junction		

No.	Junction	Type	AM	PM
OFF 8	Harwell Road/ Milton Road/ High Street	Mini roundabout	0.39	0.54
OFF 9	B4493/ Foxhall Road	Priority junction	0.58	1.19
OFF 10	B4016 Appleford Road/ Abingdon Road	Priority junction	110%	103%
OFF 11	A415/ Tollgate Road	Signalised junction		
OFF 12	A4130/ Lady Grove	Priority junction	0.68	0.97
OFF 13	Lady Grove/ Sires Hill	Priority junction	0.95	0.48
OFF 14	Sires Hill/ Didcot Road	Priority junction	0.26	0.29

16.7.27 The results indicate that several junctions are operating over capacity, including the A4130/ Basil Hill Road/ Milton Road roundabout (in the PM peak), the staggered signalised junctions on Clifton Hampden High Street, the B4493/ Foxhall Road priority junction (in the PM peak) and the B4016 Appleford Road/ Abingdon Road and A415/ Tollgate Road junctions in both peaks. Other junctions are operating at close to capacity, including the Lady Grove/ Sires Hill priority junction (AM peak), and the B4016 Appleford Road/ Abingdon Road priority junction.

16.7.28 The Sutton Bridge and Culham Cut crossing of the River Thames and junctions at both ends (OFF 10 and OFF 11) currently experiences high levels of congestion. The historic bridges are only wide enough for one lane of traffic so operate by signalised shuttle-working, resulting in long queues during the AM and PM peak hours.

Existing Link Flows

16.7.29 A summary of the 2020 base two-way link flows obtained from the Paramics model for the area of assessment are set out in Table 16.6 below. Total flows and HGV percentage figures are included in the table. The HGV percentage figure includes Medium Goods Vehicles (MGVs), Heavy Goods Vehicles (HGVs) and Passenger Service Vehicles (PSVs, i.e. buses/coaches).

Table 16.6: 2020 Base Traffic Flows

Link		2020 AM Peak		2020 PM Peak	
		Total Traffic (2-Way)	HGV %	Total Traffic (2-Way)	HGV %
1	A34 (North)	6,532	8%	6,892	4%
2	A34 (mid-junction)	3,628	7%	4,071	3%
3	A34 (South)	4,453	9%	4,852	4%
4	A34 On-Slip (NB)	1,352	5%	1,622	3%
5	A34 Off-Slip (SB)	1,534	4%	1,195	4%
6	A34 On-Slip (SB)	271	12%	438	4%
7	A34 Off-Slip (NB)	522	6%	347	5%
8	A4130 (W)	1,677	8%	1,793	4%
9	Park Drive	1,937	9%	1,903	6%
10	A4130 (E)	2,546	17%	2,219	12%
11	A4130	2,179	17%	1,885	11%
12	A4130	2,158	17%	1,827	11%
13	A4130	2,163	17%	1,797	11%

Link		2020 AM Peak		2020 PM Peak	
		Total Traffic (2-Way)	HGV %	Total Traffic (2-Way)	HGV %
14	A4130	1,758	20%	1,939	10%
15	B4493	1,428	8%	1,494	4%
16	Mendip Heights	87	4%	123	0%
17	A4130	1,100	33%	1,062	17%
18	A4130	1,400	19%	1,242	12%
19	A4130	1,169	15%	1,134	9%
20	A4130	1,125	7%	1,144	7%
21	A4130	914	7%	823	6%
22	Milton Road	1,400	14%	1,391	5%
23	Basil Hill Road	534	19%	705	7%
24	Lady Grove	819	3%	918	4%
25	B4016	417	7%	596	2%
26	B4016	417	7%	593	2%
27	Sires Hill	838	1%	1,067	1%
28	Saxons Heath	749	0%	927	0%
29	B4016 High Street	764	2%	940	1%
30	Harwell Road	614	10%	800	3%
31	High Street	577	11%	766	4%
32	B4016 Church Street	780	11%	996	3%
33	B4016 Appleford Road	405	7%	600	2%
34	Tollgate Road	796	10%	802	4%
35	A415 Abingdon Road	1,111	6%	924	4%
36	A415 Abingdon Road	1,171	8%	1,120	5%
37	A415 Abingdon Road	1,172	8%	1,085	4%
38	A415 Abingdon Road	1,108	8%	1,136	4%
39	A415 Abingdon Road	861	8%	761	4%
40	B4015 Oxford Road	748	4%	823	1%
41	B4015 Oxford Road	734	4%	821	1%

Road Safety

16.7.30 Collision data has been obtained from OCC for a five-year period between 9th June 2014 and 8th June 2019. There was a total of 150 collisions recorded within the Scheme extents resulting in 189 casualties. The injury severity is summarised by year for collisions in Table 16.7 and casualties in Table 16.8. The data does not show any clear evidence of deterioration or improvement in road safety in the study area.

16.7.31 The collision data includes part of the A34 road and the Milton Interchange roundabout. Consequently, the results show more collisions than the immediate

Scheme area as the Milton Interchange roundabout is not within the extent of the Scheme. Plans showing collision locations are presented in the TA (Ref 16.1).

Table 16.7: Total Collisions by Severity

Severity/ Year	2014 (part)	2015	2016	2017	2018	2019 (part)	Total
Fatal	0	0	0	0	1	0	**1**
Serious	4	6	7	7	3	0	**27**
Slight	24	26	19	28	15	10	**122**
Total	28	32	26	35	19	10	**150**

Table 16.8: Total Casualties by Severity

Severity/ Year	2014 (part)	2015	2016	2017	2018	2019 (part)	Total
Fatal	0	0	0	0	1	0	**1**
Serious	4	6	7	8	3	0	**28**
Slight	33	31	29	34	22	11	**156**
Total	37	37	36	42	26	11	**189**

16.7.32 A summary of the locations where collisions have occurred within the extent of the Scheme between 9th June 2014 and 8th June 2019 is set out in Table 16.9 in Appendix 16.1.

16.7.33 There was one fatal collision recorded which involved a car and a motorcycle rider at the A4130 Milton Interchange Roundabout junction with the A4130. The contributory factor assigned was disobeying of road signals. The speed limit of the road was 40 mph.

16.7.34 For the purposes of this assessment, a cluster site has been defined as an area with seven or more collisions within a 100 m radius over a five-year period. A single cluster site was identified in the study area at the A4130/ Milton Road roundabout. A total of 12 collisions were reported within the study period, of which five were serious and seven were slight in severity. All five serious collisions involved vehicles entering the roundabout from the A4130 and failure to give way to cyclists negotiating the roundabout from Milton Road on the west towards Basil Hill Road on the east. Three of these collisions occurred during the hours of darkness and two during daylight hours. One collision reported glare from the sun as a possible contributory factor. Of the seven slight collisions, five collisions involved a vehicle entering the roundabout from the A4130 and failure to give way to cyclists negotiating the roundabout from Milton Road on the west towards Basil Hill Road on the east. All these collisions occurred during daylight hours, and three of these took place in wet conditions. The two remaining slight collisions involved an HGV failing to give way to a motorcyclist during dry, dark conditions, and an incident involving a vehicle colliding with a cyclist travelling on the nearside on the A4130 approach to the Milton Road roundabout.

Opening Year Baseline (2024)

16.7.35 The baseline assessments consider the planned future growth in the local area up to 2024 as informed by the Local Planning Authorities, including sites identified in the SODC adopted Local Plans (Ref 16.4) and the VoWH Local Plan Part 1 and Part 2 as appropriate. These junction assessments forecast the future operation of the key junctions without the Scheme.

16.7.36 The assessment has been undertaken for the AM peak (0800-0900) and PM peak (1700-1800) hours. Further details are provided in Section 5 of the TA (Ref 16.1). Table 16.9 presents the maximum flow against capacity (RFC for priority junctions and DoS for signalised junctions) forecast on approaches to the junctions.

Table 16.9: Forecast Junction Operation 2024 Do Minimum (RFC/DoS)

Junction		AM	PM
OFF2	A4130/ Service Area	0.61	0.59
OFF3	A4130/ Milton Gate	94%	92%
OFF4	A4130/ B4493/ Mendip Heights	1.02	1.02
OFF5	A4130/ Basil Hill Road/ Milton Road (Power Station)	0.73	0.83
OFF 6	A415/ High Street (Clifton Hampden)	333%	199%
OFF 7	A415/ B4015 Oxford Road (Clifton Hampden)		
OFF 8	Harwell Road/ Milton Road/ High Street	0.47	0.63
OFF 9	B4493/ Foxhall Road	1.35	1.47
OFF 10	B4016 Appleford Road/ Abingdon Road	113%	75%
OFF 11	A415/ Tollgate Road		
OFF 12	A4130/ Lady Grove	0.53	0.50
OFF 13	Lady Grove/ Sires Hill	0.79	0.43
OFF 14	Sires Hill/ Didcot Road	0.35	0.38

16.7.37 The operation of the B4016 Appleford Road/Abingdon Road junction (OFF 10) and A415 / Tollgate Road junction (OFF 11) have been assessed based on a LinSig network that includes both junctions as well as the traffic signals that control single lane running across the Culham Bridges located between the two junctions. Further details are provided in the TA (Ref 16.1).

16.7.38 Table 16.9 indicates that that overall network performance deteriorates between 2020 and 2024, and several junctions are forecast to operate over capacity in 2024 without the Proposed Scheme, including the A4130/B4493/Mendip Heights, the A4130/ Basil Hill Road/ Milton Road roundabout, the staggered signalised junctions on Clifton Hampden High Street, and the B4493/ Foxhall Road priority junction and the A415/Tollgate Road junction. Other junctions are operating at close to capacity, including the A4130/Milton Gate junction. For the assessment of the A4130/B4493/ Mendip Heights (OFF4) and A4130/Basil Hill Road/Milton Road (OFF5) junctions, it has been assumed that improvement schemes proposed as part of S278 works related to a nearby residential development will have been implemented by 2024. Further details are set out in the TA (Ref 16.1).

Future Year Baseline (2034)

16.7.39 The VoWHDC Local Plan Part 1 and 2 (Ref 16.6 & 16.7) period ends in 2031. SODC Local Plan (Ref 16.4) period ends in 2035. As per guidance and agreed through the scoping exercise with OCC TDC, 10 years after scheme opening is used for the future year assessments.

16.7.40 The assessment has been undertaken for the AM peak (0800-0900) and PM peak (1700-1800) hours. Further details are provided in Section 5 of the TA (Ref 16.1), with Table 16.10 identifying the maximum flow against capacity (RFC for priority junctions and DoS for signalised junctions) forecast on approach to the junctions.

Table 16.10: Forecast Junction Operation 2034 Do Minimum (RFC/DoS)

Junction		AM	PM
OFF2	A4130/ Service Area	1.07	0.77
OFF3	A4130/ Milton Gate	137%	220%
OFF4	A4130/ B4493/ Mendip Heights	1.60	0.60
OFF5	A4130/ Basil Hill Road/ Milton Road (Power Station)	1.57	2.28
OFF 6	A415/ High Street (Clifton Hampden)	636%	403%
OFF 7	A415/ B4015 Oxford Road (Clifton Hampden)		
OFF 8	Harwell Road/ Milton Road/ High Street	0.97	1.00
OFF 9	B4493/ Foxhall Road	2.69	2.43
OFF 10	B4016 Appleford Road/ Abingdon Road	93%	78%
OFF 11	A415/ Tollgate Road		
OFF 12	A4130/ Lady Grove	0.58	0.62
OFF 13	Lady Grove/ Sires Hill	137%	107%
OFF 14	Sires Hill/ Didcot Road	0.96	1.54

16.7.41 The results indicate that nine of the 13 junctions are forecast to operate over capacity in 2034 without the Proposed Scheme. These junctions include the A4130/ Milton Gate junction with a DoS of 137% in the AM peak and 220% in the PM peak. The A4130/ B4493/ Mendip Heights junction is forecast to operate over theoretical capacity in the AM peak hour with an RFC of 1.60. The Clifton Hampden staggered signalised junctions are forecast to operate significantly over theoretical capacity in 2034 without the Proposed Scheme with a DoS of 636% and 403% in the AM and PM peaks respectively. The B4493/ Foxhall Road junction is forecast to operate significantly over theoretical capacity with an RFC of 2.69 and 2.43 in the AM and PM peak hours. Lady Grove/ Sires Hill junction is forecast to operate over capacity in both the AM and PM peak hour without the Proposed Scheme with a DoS of 137% and 107% respectively. In addition, the Sires Hill/Didcot Road junction is forecast to operate above theoretical capacity in the PM peak hour with an RFC of 1.54.

16.8 Potential impacts

Construction

16.8.1 The typical impacts that are caused by construction vehicles during construction activities can be summarised as follows:

- Traffic congestion caused by increase in traffic flows and additional HGV's which leads to driver delay;
- Changes in potential collision rates and road safety and parking and loading resulting from construction traffic;
- Transfer of mud and materials onto the highway network;
- Disruption to traffic as a result of the movement of abnormal loads;
- Changes in air quality and noise levels as a result of additional vehicular traffic (refer to ES Chapters 6 and 10 Air Quality and Noise & Vibration); and
- Impacts on pedestrians and cyclists and severance (refer to ES Chapter 13: Population and Human Health).

Operation

16.8.2 During the Scheme operational phase, impacts can occur as a result of additional trips on the surrounding transport networks and through changes to those networks.

16.9 Design, mitigation and enhancement measures

Embedded mitigation

Construction Traffic Management Plan

16.9.1 Mitigation to reduce the impacts of construction traffic will be included in the Outline Environmental Management Plan (OEMP) (Appendix 4.1) for the Scheme. The Principal Contractor (PC) will produce a Construction Environmental Management Plan (CEMP), including CTMP.

16.9.2 The following key principles will be identified in the CTMP and the CEMP where relevant:

- The CTMP will be consulted on with the local highway authority. All proposals for off-site traffic management will be required to conform to the CTMP.
- The PC will work with OCC to identify appropriate times for vehicles to travel to/ from the Site and to minimise the impact of construction vehicles and deliveries on the local highway network, especially during peak times. This will need to take into account key sensitive receptors and the impacts on local residents and communities of different working times and practices e.g. minimising the need for night-time working where works are adjacent to properties. Some activities by their nature may need to be completed for reasons of engineering practicality and/ or public safety and so will need to be extended beyond the normal working day and will be agreed in advance with the Local Planning Authority (LPA)/ Local Highway Authority (LHA). Examples of this could include:
  - Temporary highway/ traffic management works;
  - Formwork - erection and removal;
  - Concrete pours;
  - Earthwork movements;
  - Completion of crane lifting operations;
  - Heavy lifts such as bridge decks;
  - Movement of heavy/ large components; and
  - Movement of abnormal loads.
- Routes for construction vehicles to and from the Site will be identified. The routes identified will primarily be major roads (motorways and A roads). Approvals from the local highway authority will be obtained in respect of the means and routes by which anything required for construction is to be transported by large goods vehicles (as defined in Part IV Road Traffic Act 1988) on a highway to a construction or storage site, or to a waste disposal site.
- An appropriate control system will be implemented for the dispatch of all vehicles containing excavated material or other waste material.
- All Temporary Traffic Management will be in accordance with the Traffic Signs Manual: Chapter 8, Safety at Street Works and Road Works: A Code of Practice (2013), Traffic Signs Regulations and General Directions 2016.

- Approval will be obtained from the relevant highway authorities to the formation, layout or alteration of any permanent or temporary means of access to a highway to be used by vehicular traffic. Procedures for applications for temporary interference to the highway and for any required Traffic Regulation Orders will be discussed with the local highway authority, with inputs from the LPA.
- The works will be carried out in such a way that inconvenience to the public arising from any increases in traffic flows and disruptive effects of construction traffic is limited, as far as reasonably practicable.
- The contractor will ensure appropriate pedestrian and cycling routes are maintained while ensuring any temporary closures are supported by appropriate and clearly signed alternative routes.
- The PC will ensure that all working areas are sufficiently and adequately fenced off from members of the public and to prevent animals from straying on to the working area. The standard of enclosure and screening at a particular site will be selected to maintain effective site security and achieve appropriate noise attenuation and visual effect, and limit dust accumulation. In some areas screening may be painted and may include viewing points and relevant project information.
- All reasonably practicable measures will be put in place to avoid/ limit and mitigate the deposition of mud and other debris on the highway. These measures will have regard to the nature and the use of the Site and will include:
  - Hardstanding at the access and egress points which will be cleaned at appropriate intervals;
  - Vehicle clean down points to clean vehicle wheels at each exit point on to the highway;
  - The correct loading of vehicles and sheeting of loads where necessary to avoid spillage during their journeys;
  - The use of mechanical road sweepers combined with water sprays for the suppression of dust to clean site hardstanding, roads and footpaths in the vicinity of the Site; and
  - The flushing of gullies in the vicinity of the Site.

16.9.3 Wherever practicable, concrete wash out facilities will be installed at the point of work. Where this is not practicable, concrete deliveries will be directed to the nearest available wash out facility and supervised to ensure they wash out before driving onto the live carriageway. All compound areas will have a concrete wash out facility.

16.9.4 Parking for construction staff will be provided within the Site compounds. Site access points for site personnel, construction related vehicles and emergency access will be identified and signed for both vehicular traffic and pedestrian/ cycle access.

16.9.5 The construction contractor will comply with Construction Logistics and Cyclist Safety (CLOCS) Standard requirements to manage risk associated with vehicle movements. Deliveries and construction activity will be consolidated where feasible.

16.9.6 Suppliers will be expected to be part of a best practice scheme e.g. TfL's Freight Operator Recognition Scheme (FORS), which is aligned to CLOCS requirements.

16.10 Assessment of likely significant effects

Construction

Construction Traffic Flows

16.10.1 In advance of a detailed construction programme estimates have been made of the vehicular activity anticipated to occur during the Scheme construction period. HGV movements are based on estimated volumes of material (spoil/fill and construction materials) that will be imported/exported via the highway network.

16.10.2 A total of 14 site access points has been identified along the Scheme and are illustrated in Figure 16.7 and outlined in Table 16.11.

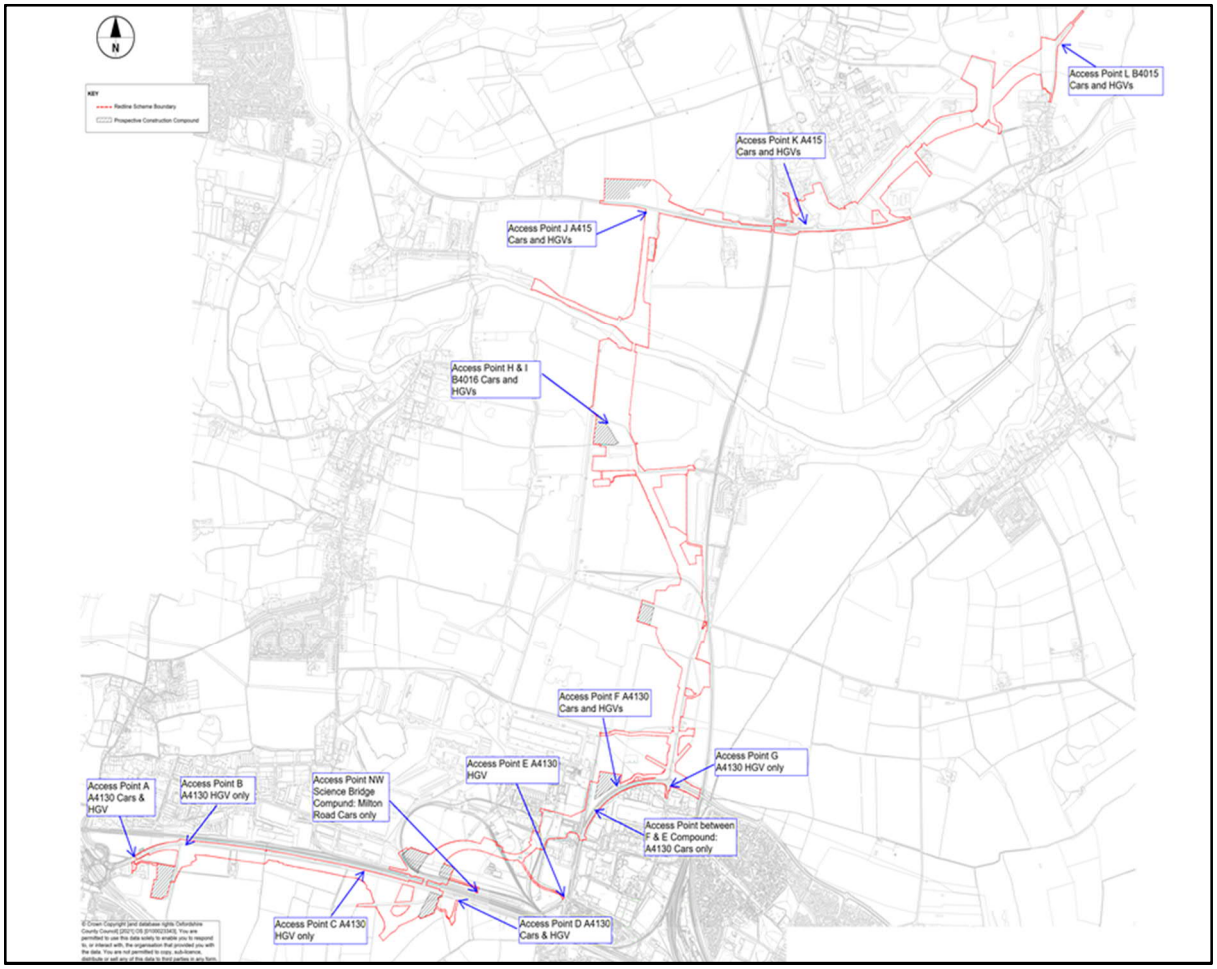

Figure 16.7: Construction Access Points

16.10.3 The ECI Contractor has provided an estimate of the monthly vehicle movements at each access point, for both cars/ Large Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGV). Car/ LGV movements are predominantly related to staff travelling to and from the Site, whilst it has been assumed that the import and export of materials is by HGV. To calculate average daily construction vehicle trips it has been assumed that the monthly vehicle trips will be equally distributed over 20 working days per month. These vehicle trips have been distributed onto the local highway network, taking into consideration existing weight and width restrictions.

Table 16.11: Construction Access Points

Access	Location	Type	Average Daily Cars / LGVs	Average Daily HGVs
Access A	A4130	HGV & Car/ LGV	130	11
Access B	A4130	HGV	-	28
Access C	A4130	HGV	-	13
Access D	A4130	HGV & Car/ LGV	80	33
NW Science Bridge Compound	Milton Road	Car/ LGV	200	-
Access E	A4130	HGV	-	10
Access Between F & E	A4130	Car/ LGV	80	-
Access F	A4130	HGV & Car/ LGV	221	46
Access G	A4130	HGV	-	6
Access H	B4016	HGV	-	44
Access I	B4016	HGV & Car/ LGV	112	22
Access J	A415	HGV & Car/ LGV	96	40
Access K	A415	HGV & Car/ LGV	220	71
Access L	B4015	HGV & Car/ LGV	20	9

16.10.4 The HGV access points and routes on the local highway network that do not have weight or width restrictions are shown in Figure 16.8.

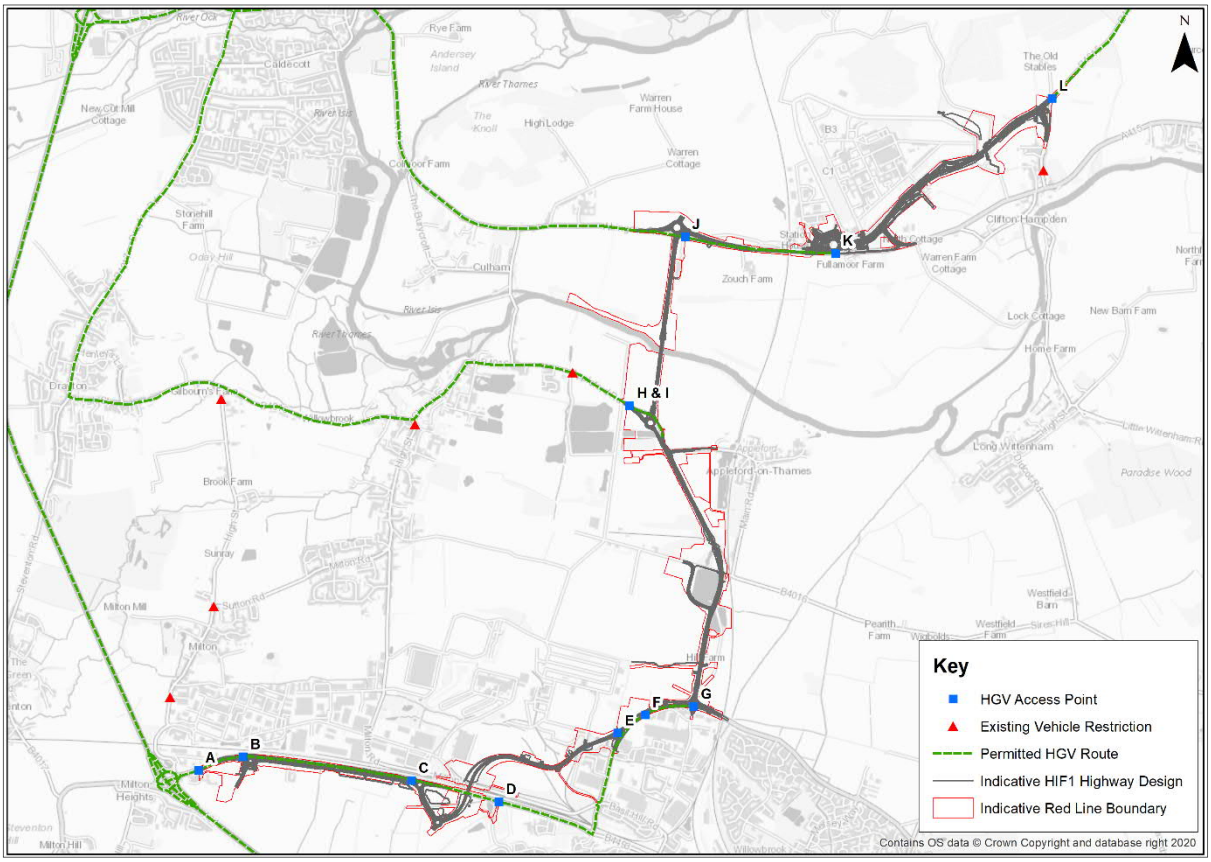

Figure 16.8: Construction HGV Access

16.10.5 It has been assumed that HGVs will use Milton Interchange and the A4130 for access points A to G. To avoid existing weight restrictions on High Street through Milton, access to access points I and H, located between Sutton Courtenay and Appleford, will be via Marcham Interchange on the A34, then the B4017 to Drayton and Drayton Road/ Appleford Road. There is an existing 7.5t weight restriction (except for access) on Appleford Road to the east of the Hanson site access. To access the Site, it has been assumed that this weight restriction will be moved temporarily to access point H, and that HGVs will not be permitted east of this point, thereby maintaining the restriction through Appleford.

16.10.6 HGVs will access Site accesses J and K via Marcham Interchange and the A415 Abingdon Road. Access to Site access L will be via the A4074. There is an existing 7.5t weight restriction (except for access) on the A4074 to the west of the Notcutts Garden Centre access. It has been assumed that this will temporarily be re-located to Site access L, with HGVs restricted to the west of this point thereby maintaining the restriction through Clifton Hampden.

16.10.7 To determine AM and PM peak hour construction vehicle trips, it has been assumed that daily HGV movements will be distributed evenly across a 10-hour day. Construction staff will generally arrive on Site between 07:00-08:00 and depart in the evening between 16:00-18:00. To estimate AM peak hour car/ LGV trips a robust estimate of 20% of vehicle arrivals has been assumed to occur between 08:00-09:00, and to estimate PM peak hour car/LGV trips it has been assumed that 60% will occur between 17:00-18:00.

16.10.8 Through the implementation of the CTMP construction traffic will be managed to minimise impacts on the local network. It is anticipated that traffic increases will be significantly below 30%, with a maximum increase of 8% on any link and less on the majority of the local network, as shown in Table 16.12, resulting in a negligible magnitude of change according to IEMA guidance.

16.10.9 Table 16.12 sets out the maximum daily construction traffic forecast to occur on each of the links in 2024 to provide a robust assessment. These levels of traffic are not forecast to be present during the entire 25-month construction period and the maximum levels of traffic on all links are also not forecast to occur during the same months. The peak number of construction HGVs for the Scheme is forecast to occur in month seven. The peak number of cars / LGVs is forecast to occur for months one to 10.

16.10.10 The vehicle profile for the vehicles associated with the construction of the Scheme is presented in Figure 16.9.

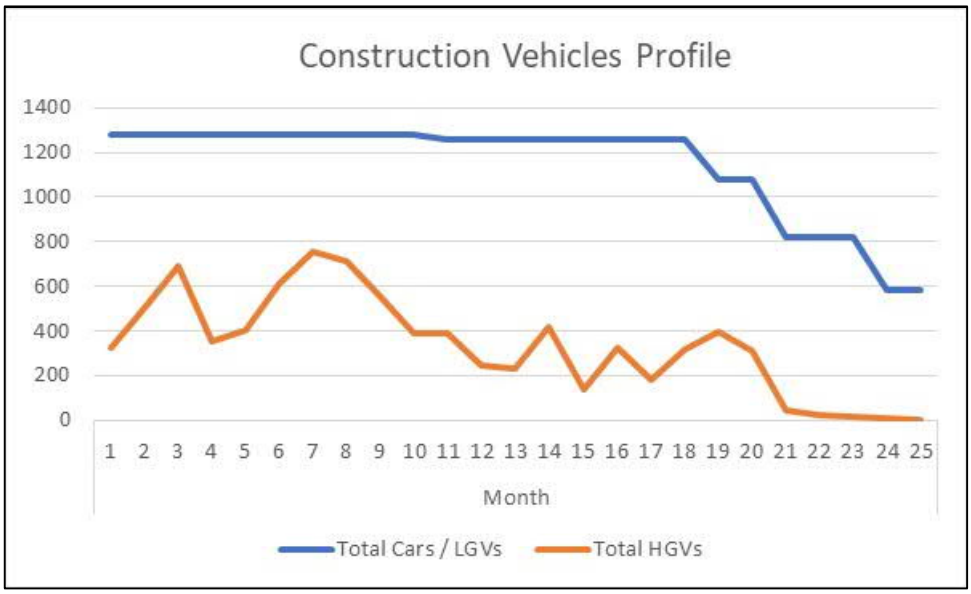

Figure 16.9: Construction Vehicles Profile

Table 16.12: 2024 Daily Construction Traffic Flows

Link		2024 DN Total Traffic (2-Way)	2024 DN + Construction Total Traffic (2-Way)	Absolute Difference	Percentage Difference	2024 DN HGVs (2-Way)	2024 DN + Construction HGVs (2-Way)	Absolute Difference (HGVs)	Percentage Difference (HGVs)
1	A34 (North)	71,116	71,804	688	1%	2,811	3,187	376	13%
2	A34 (mid-junction)	40,782	41,048	266	1%	1,218	1,484	266	22%
3	A34 (South)	49,809	50,643	834	2%	1,887	2,263	376	20%
4	A34 On-Slip (NB)	15,847	16,156	310	2%	717	870	154	21%
5	A34 Off-Slip (SB)	14,495	14,804	310	2%	875	1,029	154	18%
6	A34 On-Slip (SB)	4,212	4,595	383	9%	289	442	154	53%
7	A34 Off-Slip (NB)	4,809	5,192	383	8%	379	533	154	40%
8	A4130 (W)	21,723	21,723	0	0%	925	925	0	0%
9	Park Drive	17,666	17,972	306	2%	828	828	0	0%
10	A4130 (E)	30,989	32,067	1,078	3%	2,439	3,053	614	25%
11	A4130	26,559	27,673	1,114	4%	2,076	2,690	614	30%
12	A4130	26,567	27,537	970	4%	2,078	2,692	614	30%
13	A4130	26,390	27,194	803	3%	2,079	2,510	431	21%
14	A4130	25,256	25,754	498	2%	2,051	2,240	190	9%
15	B4493	23,788	23,944	156	1%	838	838	0	0%
16	Mendip Heights	1,444	1,444	0	0%	37	37	0	0%
17	A4130	20,890	21,439	550	3%	2,110	2,299	190	9%
18	A4130	18,187	18,697	510	3%	1,631	1,820	190	12%
19	A4130	16,055	16,564	509	3%	1,244	1,433	189	15%
20	A4130	15,240	15,307	67	0%	559	626	67	12%

Link		2024 DN Total Traffic (2-Way)	2024 DN + Construction Total Traffic (2-Way)	Absolute Difference	Percentage Difference	2024 DN HGVs (2-Way)	2024 DN + Construction HGVs (2-Way)	Absolute Difference (HGVs)	Percentage Difference (HGVs)
21	A4130	12,174	12,174	0	0%	474	474	0	0%
22	Milton Road	14,496	14,536	40	0%	844	844	0	0%
23	Basil Hill Road	2,732	2,732	0	0%	468	468	0	0%
24	Lady Grove	10,019	10,019	0	0%	141	141	0	0%
25	B4016	5,573	5,601	28	1%	112	112	0	0%
26	B4016	5,585	5,613	28	1%	112	112	0	0%
27	Sires Hill	11,545	11,573	28	0%	83	83	0	0%
28	Saxons Heath	11,059	11,059	0	0%	32	32	0	0%
29	B4016 High Street	10,914	10,914	0	0%	106	106	0	0%
30	Harwell Road	8,182	8,196	0	0%	384	384	0	0%
31	High Street	7,602	7,616	0	0%	401	401	0	0%
32	B4016 Church Street	9,957	10,215	258	3%	490	602	112	23%
33	B4016 Appleford Rd	5,565	5,789	224	4%	110	222	112	102%
34	Tollgate Road	7,650	7,796	146	2%	423	423	0	0%
35	A415 Abingdon Road	11,133	11,433	300	3%	387	541	154	40%
36	A415 Abingdon Road	11,017	11,411	394	4%	470	624	154	33%
37	A415 Abingdon Road	10,910	11,315	406	4%	464	590	126	27%
38	A415 Abingdon Road	11,423	11,603	180	2%	478	478	0	0%
39	A415 Abingdon Road	7,349	7,379	30	0%	346	346	0	0%
40	B4015 Oxford Road	9,344	9,439	95	1%	178	178	0	0%
41	B4015 Oxford Road	9,337	9,477	140	1%	178	223	45	25%

16.10.11 Table 16.12 indicates that the daily total traffic flows in the local area in 2024 are not forecast to increase more than 10% with the traffic associated with the construction of the Scheme.

16.10.12 In addition, Table 16.12 indicates that five of the 41 links are forecast to experience an increase in daily HGV traffic of greater than 30%, which meets IEMA Rule 2 for further assessment. The greatest increase in daily HGV traffic is forecast on the B4016 Appleford Road (link 33: 102%), this is located to the west of construction Access H and I. There is an existing 7.5t weight restriction (except for access) on this link to the east of the Hanson quarry access, and therefore the baseline HGV traffic on this link is low. The construction traffic will not travel east beyond the proposed site access points and through Appleford, and therefore the impact will be limited to a short section of the B4016 between the Hanson access and the proposed site access.

16.10.13 The southbound A34 On-Slip and the northbound A34 Off-Slip at Milton Interchange are forecast to experience an increase of 154 daily HGVs, equating to a 53% and a 40% increase respectively in 2024 with the construction of the Scheme. If the HGVs are spread evenly across the 10-hour working day this equates to approximately 15 HGVs per hour. This level of HGV traffic is forecast to occur on these slip roads for only month 3 of the construction period. The average number of daily construction HGVs forecast to use the southbound A34 On-Slip and the northbound A34 Off-Slip at Milton Interchange during the entire construction period is 37 HGVs which equates to 13% and 10% increase in daily HGV traffic flows in 2024.

16.10.14 Link 35 and 36 (A415 Abingdon Road) are forecast to experience an increase of 154 daily HGVs equating to a 40% and 33% increase in daily traffic flows respectively. This increase equates to approximately 15 HGVs per hour across a 10-hour working day. However, this level of construction HGVs are only forecast for month 6 of the construction period. The average number of daily construction HGVs forecast to use the A415 Abingdon Road at this location is 56 HGVs, which equates to a 14% and 12% increase in daily HGV traffic flows respectively.

Driver Delay during construction

16.10.15 During the construction of the Scheme there may be lane closures where works need to be undertaken on or adjacent to existing carriageway. This is most likely to occur at the following locations:

- On the A4130 between Milton Interchange the proposed Didcot Science Bridge as part of the A4130 Widening Scheme;
- The A4130/ Hawksworth/ Purchas Road roundabout;
- The A4130 between the A4130/ Hawksworth/ Purchas Road roundabout and the A4130/ Collett roundabout;
- B4016 Appleford Road at the location of the proposed roundabout; and
- A415 Abingdon Road between the proposed roundabouts.

16.10.16 These closures will be temporary whilst construction works on the existing highway are undertaken. It is not known at this time how long the closures at each location will last, however, these will be managed by the principal contractor and appropriate signage or alternative routes will be provided to reduce delays. Through the design process changes to some of the junctions were made, such as moving them off-line, enabling them to be constructed with less impact on the existing highway network.

16.10.17 For the majority of construction, the working hours will be between 07:30 and 18:00, and therefore it is expected that most staff will arrive at the Site before the highway peak hour. It is also anticipated that some staff will start leaving the Site before 16:00 and after 18:00, resulting in less construction staff traffic travelling during the highway peak hours and reducing any driver delay. There may be times where work outside the standard hours is required, for bridge construction, railway possessions, etc. Any work outside standard hours will be agreed in advance with the highway authority through the CEMP.

16.10.18 During the AM highway peak hour (08:00-09:00) the maximum number of cars/ LGVs forecast to be generated at a single location within the extent of the assessment is 50 vehicles which equates to less than one additional vehicle per minute. This increase in cars and LGVs is only forecast to occur on the A4130 to the east of Milton Interchange and Access A. This level of cars/ LGVs associated with the construction of the Scheme is only forecast to occur for 18 months and will therefore only have a temporary impact on driver delay.

16.10.19 In the PM highway peak hour (17:00-18:00), the construction of the Scheme is forecast to generate a maximum of 150 vehicles at a single point within the extent of the assessment. This equates to approximately 2.5 additional vehicles per minute. This is forecast to occur on the A4130 to the east of Milton Interchange and Access A. This level of cars/ LGVs associated with the construction of the Scheme is only forecast to occur for 18 months and will therefore only have a temporary impact on driver delay.

16.10.20 In terms of HGVs associated with the construction of the Scheme, these will be managed through the CTMP to reduce any impact during the highway peak hour. The HGVs will be managed to ensure that they stay on the strategic highway network for as long as possible to reduce the impact on rural roads in the local area.

16.10.21 As stated above, it has been assumed that the HGV deliveries will arrive evenly over a 10-hour working day. It is therefore forecast that the maximum number of HGVs forecast to be generated at a single point along the highway network is 61 per hour which equates to approximately one additional HGV per minute. This is anticipated to occur along the A4130 to the east of Milton Interchange and for only a short period of construction. Therefore, any impact on driver delay caused by HGVs associated with the construction will be temporary.

16.10.22 Overall, it is considered that the magnitude of impact on driver delay is negligible and the overall significance of effect during Scheme construction is negligible.

Accidents and Safety during construction

16.10.23 In accordance with the methodology outlined in Section 16.4, accidents and safety in terms of vehicle travellers has been assessed quantitatively in Table 16.13, with reference also being made to the PIC data for the most recent five-year period available.

16.10.24 The change in AADT due to the construction of the Scheme in 2024 is set out in Table 16.13 and identifies the resultant forecast magnitude of change and significance of effect in terms of accidents and safety.

Table 16.13: Accidents and Safety (2024 AADT)

Link		2024 DN (2-Way)	2024 DN + Construction (2-Way)	Absolute Difference	Percentage Difference	Magnitude	Sensitivity	Significance
1	A34 (North)	71,116	71,804	688	1%	No Impact	High	No Impact
2	A34 (mid-junction)	40,782	41,048	266	1%	No Impact	High	No Impact
3	A34 (South)	49,809	50,643	834	2%	No Impact	High	No Impact
4	A34 On-Slip (NB)	15,847	16,156	310	2%	No Impact	Very Low	No Impact
5	A34 Off-Slip (SB)	14,495	14,804	310	2%	No Impact	Low	No Impact
6	A34 On-Slip (SB)	4,212	4,595	383	9%	No Impact	Very Low	No Impact
7	A34 Off-Slip (NB)	4,809	5,192	383	8%	No Impact	Low	No Impact
8	A4130 (W)	21,723	21,723	0	0%	No Impact	Medium	No Impact
9	Park Drive	17,666	17,972	306	2%	No Impact	Very Low	No Impact
10	A4130 (E)	30,989	32,067	1,078	3%	No Impact	Medium	No Impact
11	A4130	26,559	27,673	1,114	4%	No Impact	Medium	No Impact
12	A4130	26,567	27,537	970	4%	No Impact	Medium	No Impact
13	A4130	26,390	27,194	803	3%	No Impact	Medium	No Impact
14	A4130	25,256	25,754	498	2%	No Impact	Medium	No Impact
15	B4493	23,788	23,944	156	1%	No Impact	Medium	No Impact
16	Mendip Heights	1,444	1,444	0	0%	No Impact	Very Low	No Impact
17	A4130	20,890	21,439	550	3%	No Impact	Medium	No Impact
18	A4130	18,187	18,697	510	3%	No Impact	Medium	No Impact
19	A4130	16,055	16,564	509	3%	No Impact	Medium	No Impact
20	A4130	15,240	15,307	67	0%	No Impact	Medium	No Impact

Link		2024 DN (2-Way)	2024 DN + Construction (2-Way)	Absolute Difference	Percentage Difference	Magnitude	Sensitivity	Significance
21	A4130	12,174	12,174	0	0%	No Impact	Medium	No Impact
22	Milton Road	14,496	14,536	40	0%	No Impact	Very Low	No Impact
23	Basil Hill Road	2,732	2,732	0	0%	No Impact	Very Low	No Impact
24	Lady Grove	10,019	10,019	0	0%	No Impact	Very Low	No Impact
25	B4016	5,573	5,601	28	1%	No Impact	Low	No Impact
26	B4016	5,585	5,613	28	1%	No Impact	Low	No Impact
27	Sires Hill	11,545	11,573	28	0%	No Impact	Very Low	No Impact
28	Saxons Heath	11,059	11,059	0	0%	No Impact	Very Low	No Impact
29	B4016 High Street	10,914	10,914	0	0%	No Impact	Low	No Impact
30	Harwell Road	8,182	8,196	0	0%	No Impact	Very Low	No Impact
31	High Street	7,602	7,616	0	0%	No Impact	Very Low	No Impact
32	B4016 Church Street	9,957	10,215	258	3%	No Impact	Low	No Impact
33	B4016 Appleford Road	5,565	5,789	224	4%	No Impact	Low	No Impact
34	Tollgate Road	7,650	7,796	146	2%	No Impact	Very Low	No Impact
35	A415 Abingdon Road	11,133	11,433	300	3%	No Impact	Medium	No Impact
36	A415 Abingdon Road	11,017	11,411	394	4%	No Impact	Medium	No Impact
37	A415 Abingdon Road	10,910	11,315	406	4%	No Impact	Medium	No Impact
38	A415 Abingdon Road	11,423	11,603	180	2%	No Impact	Medium	No Impact
39	A415 Abingdon Road	7,349	7,379	30	0%	No Impact	Medium	No Impact
40	B4015 Oxford Road	9,344	9,439	95	1%	No Impact	Low	No Impact
41	B4015 Oxford Road	9,337	9,477	140	1%	No Impact	Low	No Impact

16.10.25 Table 16.13 indicates that the Annual Average Daily Traffic (AADT) flows are not forecast to increase more than 10% on all links within the extent of the assessment.

16.10.26 As noted previously, the PIC data does not indicate any significant safety design issues, while the change in traffic flow is considered negligible and not resulting in a significant increase in turning movements within the scheme extents.

16.10.27 It is therefore considered that the overall impact of accidents and safety on vehicle travellers in negligible during the construction period.

Public Transport Users

16.10.28 It is anticipated that the number of construction personnel travelling to the site by public transport (i.e. bus and rail) will be low, as access to the site compounds by public transport is not convenient due to lack of stops/ no bus services in the vicinity of some of the compounds. Therefore, the magnitude of the impact of increased bus patronage by construction personnel will be negligible.

16.10.29 The significance of effects on the capacity of existing bus and rail services will therefore be negligible. It is also expected that the level of traffic generated during the Scheme construction phase will have a negligible impact on bus journey times; temporary re-routing of bus routes and/or closure/relocation of bus stops is not anticipated.

16.10.30 It is considered that the overall effect during construction of the Scheme on public transport users is negligible which is not significant.

Operation

Operational Traffic Flows

16.10.31 The daily 2034 with and without scheme traffic flows are presented in Table 16.14.

Table 16.14: 2034 Daily Two-Way Traffic Flows

Link		All Vehicles				HGVs			
		2034 DN	2034 DS	Absolute Difference	Percentage Difference	2034 DN	2034 DS	Absolute Difference	Percentage Difference
1	A34 (North)	86,063	76,931	-9,132	-11%	3,414	2,894	-520	-15%
2	A34 (mid-junction)	46,921	40,454	-6,467	-14%	1,547	1,290	-257	-17%
3	A34 (South)	57,133	49,622	-7,511	-13%	2,490	2,026	-463	-19%
4	A34 On-Slip (NB)	21,041	19,093	-1,948	-9%	0	718	718	0%
5	A34 Off-Slip (SB)	18,025	17,386	-639	-4%	1,081	885	-195	-18%
6	A34 On-Slip (SB)	4,940	4,530	-411	-8%	402	354	-48	-12%
7	A34 Off-Slip (NB)	5,071	4,638	-433	-9%	530	381	-149	-28%
8	A4130 (W)	28,490	25,507	-2,983	-10%	1,377	1,181	-196	-14%
9	Park Drive	22,092	19,722	-2,370	-11%	1,036	893	-143	-14%
10	A4130 (E)	39,258	39,598	340	1%	3,022	2,704	-318	-11%
11	A4130	35,883	36,546	663	2%	2,756	2,428	-328	-12%
12	A4130	36,073	36,187	114	0%	2,742	2,501	-241	-9%
13	A4130	32,840	35,625	2,784	8%	2,728	2,522	-206	-8%
14	A4130	29,069	16,187	-12,883	-44%	2,653	848	-1,805	-68%
15	B4493	27,287	20,994	-6,293	-23%	956	555	-400	-42%
16	Mendip Heights	1,992	1,887	-104	-5%	50	48	-2	-5%
17	A4130	27,703	11,242	-16,462	-59%	2,765	670	-2,094	-76%
18	A4130	20,531	7,018	-13,513	-66%	1,982	131	-1,850	-93%
19	A4130	17,962	25,523	7,561	42%	1,585	1,967	382	24%
20	A4130	17,124	25,711	8,587	50%	817	730	-87	-11%

Link		All Vehicles				HGVs			
		2034 DN	2034 DS	Absolute Difference	Percentage Difference	2034 DN	2034 DS	Absolute Difference	Percentage Difference
21	A4130	13,855	15,927	2,072	15%	730	624	-106	-14%
22	Milton Road	19,184	14,521	-4,663	-24%	1,257	605	-651	-52%
23	Basil Hill Road	3,333	6,142	2,809	84%	528	492	-36	-7%
24	Lady Grove	14,171	5,439	-8,732	-62%	342	61	-281	-82%
25	B4016	9,077	3,083	-5,993	-66%	193	2	-191	-99%
26	B4016	9,594	3,087	-6,506	-68%	195	2	-194	-99%
27	Sires Hill	18,625	6,853	-11,773	-63%	251	63	-189	-75%
28	Saxons Heath	18,071	3,712	-14,359	-79%	186	1	-184	-99%
29	B4016 High Street	18,202	3,671	-14,531	-80%	307	99	-208	-68%
30	Harwell Road	14,293	7,134	-7,159	-50%	614	134	-479	-78%
31	High Street	13,340	6,429	-6,911	-52%	687	166	-521	-76%
32	B4016 Church Street	16,388	10,823	-5,564	-34%	787	333	-454	-58%
33	B4016 Appleford Road	9,771	10,364	593	6%	155	490	335	217%
34	Tollgate Road	11,569	3,061	-8,508	-74%	729	210	-518	-71%
35	A415 Abingdon Road	10,484	14,893	4,408	42%	450	575	125	28%
36	A415 Abingdon Road	14,510	16,369	1,859	13%	672	675	2	0%
37	A415 Abingdon Road	15,886	29,919	14,032	88%	641	808	167	26%
38	A415 Abingdon Road	17,436	2,384	-15,051	-86%	665	48	-617	-93%
39	A415 Abingdon Road	13,259	2,139	-11,120	-84%	409	41	-369	-90%
40	B4015 Oxford Road	14,626	2,481	-12,145	-83%	449	71	-377	-84%
41	B4015 Oxford Road	14,741	27,640	12,898	87%	451	784	333	74%

16.10.32 Table 16.14 indicates that six of the 41 links are forecast to experience an increase in total daily traffic flows of greater than 30% in 2034 with the implementation of the Scheme, and 15 links are forecast to experience a decrease of 30% or more.

16.10.33 In the DN scenario congestion occurs across the network and this results in some link flows being low, as traffic is unable complete their journey as it is held up in queues elsewhere.

16.10.34 Link 37 (A415 Abingdon Road between the New Thames River Crossing / A415 roundabout and the A415 / Clifton Hampden Bypass / CSC roundabout) is forecast to experience an 88% increase in daily traffic flows in 2034 with the implementation of the Scheme. This is due to the Scheme providing a more direct and desirable route to access CSC and providing another crossing point across The River Thames. Without the Scheme there is severe congestion in this area, resulting in a lower modelled flow on the link as vehicles are queuing and therefore fewer can travel on the link across a time period.

16.10.35 Link 23 (Basil Hill Road) is shown to experience an 84% increase in daily traffic flows in 2034 with the implementation of the Scheme. This apparent increase is considered to be caused by the new route north/south over the River Thames that the scheme provides, which enables residents from existing housing in central Didcot to travel here instead of through the villages north of Didcot, as shown by reductions on links 24 and 30. The 84% increase is due to the flows being low in the DN, the absolute difference is 2,809 daily two-way flows, which is considered low. The A4130 / Basil Hill Road / Milton Road (Power Station) roundabout has been assessed in this section to determine if the Scheme has an effect on driver delay and accidents and safety.

16.10.36 Link 41 (B4015 Oxford Road) is forecast to experience an 87% increase in total daily traffic flows in 2034 with the implementation of the Scheme. The Scheme enables a route choice change, as can be seen by the 84% decrease in trips on the alternative route through Burcot (link 39). Other links within Clifton Hampden and Long Wittenham (29, 38, 40) also experience decreases of over 80%. Traffic flows through Sutton Courtenay (links 30, 31 and 32) experience reductions of between 34% to 52% and flows over the existing river crossing at Culham (link 34) reduce by 74%.

16.10.37 Table 16.14 also indicates that two of the 41 links are forecast to experience an increase in daily HGV traffic of greater than 30% in 2034 with the implementation of the Scheme. The B4016 Appleford Road to the west of the New Thames River Crossing / B4016 roundabout (link 33) is forecast to experience a 217% increase in HGV traffic in 2034 with the implementation of the Scheme. This increase only relates to the section up to the roundabout connecting to the new Scheme and flows through Appleford (link 26) reduce significantly.

16.10.38 The B4015 Oxford Road (link 41) is forecast to experience an 74% increase in daily HGV traffic flows in 2034 with the implementation of the Scheme. This is due to the Scheme providing an alternative route to the A4074, as shown by the 90% decrease on link 39 (Burcot). The Scheme provides a more desirable route for HGVs, rerouting them away from the villages of Clifton Hampden and Burcot.

Driver Delay

16.10.39 The effect on driver delay is measured at the junctions on the highway network in the vicinity of the Scheme. The total junction delay has been calculated using the junction capacity assessments undertaken as part of the Transport Assessment. The additional driver delay forecast for each junction 10 years after the Scheme is complete is presented in Table 16.15.

16.10.40 The sensitivity of the receptors ranges from very low to high (refer to paragraph 16.4.10), and the magnitude of change ranges from negligible to high (refer to paragraph 16.4.15). In accordance with Table 16.2, the significance of the effect on driver delay is presented in Table 16.15 and ranges from negligible to major beneficial.

16.10.41 In accordance with IEMA Guidance (Ref 16.9), delays are only likely to be significant when the traffic on the network surrounding the Scheme is already at or close to the capacity of the system.

Table 16.15: Driver Delay (2034)

Junction		Driver Delay (seconds)					Magnitude	Sensitivity	Significance
		2034 DM AM Peak	2034 DS AM Peak	2034 DM PM Peak	2034 DS PM Peak	Ave.			
OFF 2	A4130/ Service Area	16	3	3	1	-8	Negligible	Very Low	Negligible
OFF 3	A4130/Milton Gate	356	9	735	6	-227	High	Low	Moderate Beneficial
OFF 4	A4130/ B4493/ Mendip Heights	935	10	712	74	-828	High	Very Low	Minor Beneficial
OFF 5	A4130/ Basil Hill Road/ Milton Road (Power Station)	844	59	1,159	72	-736	High	High	Major Beneficial
OFF 6 & OFF 7	A415/ High Street (Clifton Hampden)	1,196	6	58	6	-1112	High	High	Major Beneficial
OFF 8	Harwell Road/ Milton Road/ High Street	40	11	1,917	15	-43	High	Very Low	Minor Beneficial
OFF 9	B4493/ Foxhall Road	2,821	13	2,553	51	-2,655	High	High	Major Beneficial
OFF 10 & OFF 11	B4016 Appleford Road/ Abingdon Rd	239	35	84	23	-133	High	High	Major Beneficial
	A415/ Tollgate Road								
OFF 12	A4130/ Lady Grove	5	22	25	15	2	Negligible	High	Negligible
OFF 13	Lady Grove/ Sires Hill	99	8	5	6	-53	High	Medium	Major Beneficial
OFF 14	Sires Hill/ Didcot Road	40	17	32	8	-43	High	Very Low	Minor Beneficial

16.10.42 Table 16.15 indicates the following:

- The Scheme is forecast to result in moderate and major beneficial effects on driver delay at several junctions, due to traffic re-routing onto the Scheme and away from other congested parts of the network.
- Major beneficial effects are predicted in Didcot at the A4130/B4493/Mendip Heights (OFF 4) and A4130/Basil Hill Road/Milton Road (OFF 5) junctions; at the B4493/Foxhall Road (OFF 9) junction in Sutton Courtenay; at the B4016 Appleford Road/Abingdon Road (OFF 10) and A415 Tollgate Road (OFF 11) junctions at either end of the river crossing at Culham; at the staggered signalised junction on the A415 in Clifton Hampden (OFF 6 & OFF 7); and at the Lady Grove/Sires Hill junction (OFF 13) between Didcot and Long Wittenham.

16.10.43 In total Eleven of the junctions included in the assessment are forecast to have a reduction in driver delay due to the re-routing of traffic, and one junction is forecast to have an increase in driver delay of only an average of two seconds across the peak hours, which is negligible. It is therefore considered that the overall effect of the Scheme on driver delay is major beneficial and thus significant.

Accidents and Safety

16.10.44 The impact of the operation of the Scheme on accidents and safety for vehicle travellers has been assessed quantitatively. The sensitivity of the receptors ranges from very low to high (refer to paragraph 16.4.12), and the magnitude of change ranges from negligible to high (refer to paragraph 16.4.21). The significance of the impact on accidents and safety is also presented in Table 16.16 and ranges from major beneficial to major adverse.

Table 16.16: Accidents and Safety (2034 AADT)

Link		2034 DN (2-Way)	2034 DS (2-Way)	Absolute Difference	Percentage Difference	Magnitude	Sensitivity	Significance
1	A34 (North)	86,063	76,931	-9,132	-11%	Low	High	Moderate Beneficial
2	A34 (mid-junction)	46,921	40,454	-6,467	-14%	Low	High	Moderate Beneficial
3	A34 (South)	57,133	49,622	-7,511	-13%	Low	High	Moderate Beneficial
4	A34 On-Slip (NB)	21,041	19,093	-1,948	-9%	No Impact	Very Low	No Impact
5	A34 Off-Slip (SB)	18,025	17,386	-639	-4%	No Impact	Low	No Impact
6	A34 On-Slip (SB)	4,940	4,530	-411	-8%	No Impact	Very Low	No Impact
7	A34 Off-Slip (NB)	5,071	4,638	-433	-9%	No Impact	Low	No Impact
8	A4130 (W)	28,490	25,507	-2,983	-10%	Low	Medium	Minor Beneficial
9	Park Drive	22,092	19,722	-2,370	-11%	Low	Very Low	Negligible
10	A4130 (E)	39,258	39,598	340	1%	No Impact	Medium	No Impact
11	A4130	35,883	36,546	663	2%	No Impact	Medium	No Impact
12	A4130	36,073	36,187	114	0%	No Impact	Medium	No Impact
13	A4130	32,840	35,625	2,784	8%	No Impact	Medium	No Impact
14	A4130	29,069	16,187	-12,883	-44%	High	Medium	Major Beneficial
15	B4493	27,287	20,994	-6,293	-23%	Medium	Medium	Moderate Beneficial
16	Mendip Heights	1,992	1,887	-104	-5%	No Impact	Very Low	No Impact
17	A4130	27,703	11,242	-16,462	-59%	High	Medium	Major Beneficial
18	A4130	20,531	7,018	-13,513	-66%	High	Medium	Major Beneficial
19	A4130	17,962	25,523	7,561	42%	High	Medium	Major Adverse
20	A4130	17,124	25,711	8,587	50%	High	Medium	Major Adverse
21	A4130	13,855	15,927	2,072	15%	Low	Medium	Minor Adverse

Link		2034 DN (2-Way)	2034 DS (2-Way)	Absolute Difference	Percentage Difference	Magnitude	Sensitivity	Significance
22	Milton Road	19,184	14,521	-4,663	-24%	Medium	Very Low	Negligible
23	Basil Hill Road	3,333	6,142	2,809	84%	High	Very Low	Minor Adverse
24	Lady Grove	14,171	5,439	-8,732	-62%	High	Very Low	Minor Beneficial
25	B4016	9,077	3,083	-5,993	-66%	High	Low	Moderate Beneficial
26	B4016	9,594	3,087	-6,506	-68%	High	Low	Moderate Beneficial
27	Sires Hill	18,625	6,853	-11,773	-63%	High	Very Low	Minor Beneficial
28	Saxons Heath	18,071	3,712	-14,359	-79%	High	Very Low	Minor Beneficial
29	B4016 High Street	18,202	3,671	-14,531	-80%	High	Low	Moderate Beneficial
30	Harwell Road	14,293	7,134	-7,159	-50%	High	Very Low	Minor Beneficial
31	High Street	13,340	6,429	-6,911	-52%	High	Very Low	Minor Beneficial
32	B4016 Church Street	16,388	10,823	-5,564	-34%	High	Low	Moderate Beneficial
33	B4016 Appleford Road	9,771	10,364	593	6%	No Impact	Low	No Impact
34	Tollgate Road	11,569	3,061	-8,508	-74%	High	Very Low	Minor Beneficial
35	A415 Abingdon Road	10,484	14,893	4,408	42%	High	Medium	Major Adverse
36	A415 Abingdon Road	14,510	16,369	1,859	13%	Low	Medium	Minor Adverse
37	A415 Abingdon Road	15,886	29,919	14,032	88%	High	Medium	Major Adverse
38	A415 Abingdon Road	17,436	2,384	-15,051	-86%	High	Medium	Major Beneficial
39	A415 Abingdon Road	13,259	2,139	-11,120	-84%	High	Medium	Major Beneficial
40	B4015 Oxford Road	14,626	2,481	-12,145	-83%	High	Low	Moderate Beneficial
41	B4015 Oxford Road	14,741	27,640	12898	87%	High	Low	Moderate Adverse

16.10.45 Table 16.16 indicates that 21 of the 41 links are forecast to experience a decrease in traffic flows with the implementation of the Scheme in 2034 resulting in minor to major beneficial effect on accidents and safety. Eight links are forecast to have an increase in traffic flows resulting in a minor to major adverse impact. In addition, 12 links are forecast to either have no impact or a negligible effect on accidents and safety.

16.10.46 Major adverse effects are forecast on the A4130 (links 19 and 20), and A415 Abingdon Road (link 37), and a moderate adverse impact is forecast on the A415 east of Clifton Hampden (link 41), as traffic diverts from local routes to use the new scheme, or traffic that is queueing in congestion without the scheme is enabled to travel along the link due to the improved highway operation. The scheme, including junctions along the route, has been designed to DMRB standards and subject to Road Safety Audits, and therefore is better able to accommodate the increase in traffic safely. These effects are also consistent with the aim of the scheme to remove traffic from local villages.

16.10.47 The A415 Abingdon Road to the west of Culham (link 35) is shown to have an increase in traffic of 88%, triggering a major adverse effect on accidents and safety. In the 2031 DN scenario the A415/Tollgate Road is very congested, and this restricts traffic flows through this part of the network. The scheme relieves congestion at this junction and allows traffic to flow more freely along the A415. Traffic flows on Tollgate Road (link 34) are reduced significantly and this reduces conflicts at this junction, reducing the potential for accidents. Therefore, whilst the apparent increase in traffic flows triggers an adverse impact, safety overall is expected to improve in this area.

16.10.48 As noted previously, the PIC data does not indicate any significant safety design issues, while the change in traffic flow is considered negligible and not resulting in a significant increase in turning movements within the scheme extents.

16.10.49 Therefore, operational traffic flows are predicted to have an overall moderate beneficial effect on accidents and safety on the local road network, which is significant.

Public Transport Users

16.10.50 As part of the HIF1 scheme, the following new bus stops are proposed:

- Six bus stops (three eastbound and three westbound) along the A4130;
- Four bus stops (two eastbound and two westbound) as part of the Didcot Science Bridge section;
- Four bus stops (a pair at the southern end inside the future employment site, and a pair near Appleford) as part of the River Crossing section; and
- Four bus stops (a pair at CSC and a pair north of Clifton Hampden Village) as part of the Clifton Hampden Bypass Scheme.

16.10.51 These additional bus stops will increase the accessibility and catchment of the existing bus services in this area, whilst also helping to cater for new or improved services in the future.

16.10.52 New bus services or a change in the existing frequency will not be introduced as part of the Scheme, however, the removal of traffic from local roads will improve journey times and reliability for bus services.

16.10.53 As part of the TA, journey time data has been extracted from the Paramics model for a number of routes, as shown in Figure 16.10.

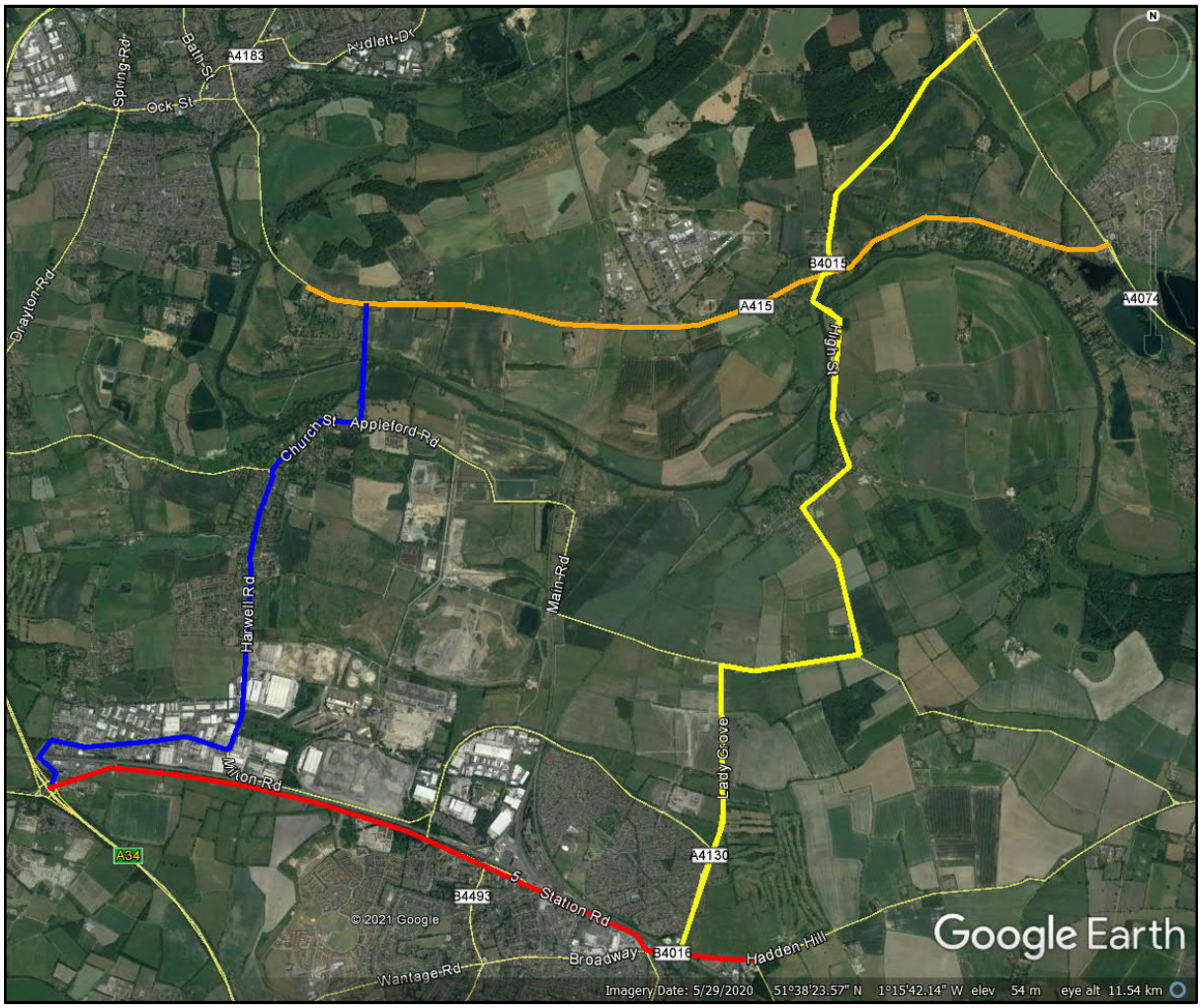

Figure 16.10: Journey Time Routes

16.10.54 The results indicate significant journey time reductions with the HIF1 scheme on the Didcot to A4074 route via Long Wittenham and Clifton Hampden (yellow route), Milton Interchange to Culham route via Sutton Courtenay (blue route) and Culham to Burcot route along A415 Abingdon Road (orange route), as traffic diverts off the local roads and uses the HIF1 scheme. The yellow and blue routes are used by bus services to cross the River Thames therefore the scheme enables lower journey times / improved journey time reliability for bus services using these routes.

16.10.55 A comparison of the sum of journey times for all routes is shown below.

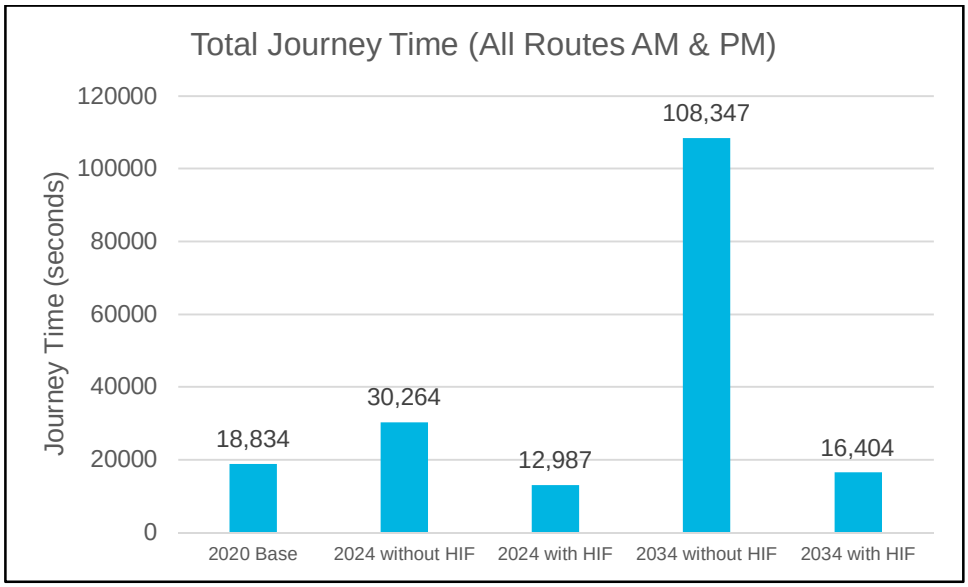

Figure 16.11: Journey Time Routes

16.10.56 The Figure above demonstrates that the total journey time for all routes is significantly reduced with the HIF1 scheme in both 2024 and 2034. The significant increase in journey times seen in 2034 without HIF is caused by increases across all routes, but predominantly the orange PM eastbound route. This is created by significant delays at the Clifton Hampden staggered signalised junction and CSC entrance.

16.10.57 Total journey times in 2034 with the HIF1 scheme are also slightly lower than those in 2020, showing that the HIF1 scheme helps to enable the planned growth whilst allowing the road network to operate similarly to the base scenario. Speeds across the entire modelled network help to illustrate this further, as presented in the following section. It is considered the overall effect during operation of the Scheme on public transport users is moderate beneficial and thus significant.

16.11 Monitoring

16.11.1 As no significant adverse effects have been identified in both the construction and operation assessments, no monitoring is proposed.

16.12 Summary

Construction

16.12.1 During the Scheme construction phase a total of 14 site access points will be used along the Scheme. This will help to disperse construction traffic around the local highway network. There is good access to the A34 and the wider strategic road network which will provide access for HGV traffic and help to minimise impacts on local roads.

16.12.2 Through the implementation of the CTMP construction traffic will be managed to minimise impacts on the local network, and overall, the construction phase is considered to have a negligible effect on driver delay, accidents and safety and public transport users, which is not significant.

Operation

16.12.3 The Scheme is forecast to reduce driver delay at several key existing junctions in the local area due to the re-routing of traffic to use the Scheme. It is therefore considered that the overall effect of the Scheme on driver delay is moderate beneficial, which is significant.

16.12.4 The Scheme is forecast to have an overall moderate beneficial effect on accidents and safety in 2034 with the operation of the Scheme.

16.12.5 Although the Scheme does not directly include changes to existing bus services, the reduction in delays on the network will improve journey times and reliability for bus services. The Scheme also creates opportunities for new bus routes in the future. Therefore, it is considered the overall effect of the Scheme on public transport users is moderate beneficial which is significant.

16.13 References

Ref 16.1 Didcot Garden Town HIF 1 Scheme - Transport Assessment' Transport Assessment, AECOM, (2021)

Ref 16.2 Ministry of Housing, Communities and Local Government (2021). 'National Planning Policy Framework', London.

Ref 16.3 Communities and Local Government, (2014). 'Planning Practice Guidance'. Available at: https://www.gov.uk/government/collections/planning-practice-guidance

Ref 16.4 South Oxfordshire District Council (2020). 'South Oxfordshire Local Plan 2011-2035'. Available at: https://www.southoxon.gov.uk/south-oxfordshire-district-council/planning-and-development/local-plan-and-planning-policies/local-plan-2035/adopted-local-plan-2035/

Ref 16.5 South Oxfordshire District Council (2019). 'South Oxfordshire Infrastructure Delivery Plan'. Available at: https://www.southoxon.gov.uk/wp-content/uploads/sites/2/2019/07/CSD06-Infrastructure-Delivery-Plan-January-2019-Update-LP.pdf

Ref 16.6 Vale of White Horse District Council (2016). 'Vale of White Horse Local Plan 2031 Part One: Strategic Sites and Policies'. Available at: https://www.whitehorsedc.gov.uk/vale-of-white-horse-district-council/planning-and-development/local-plan-and-planning-policies/local-plan-2031/

Ref 16.7 Vale of White Horse District Council (2019). 'Vale of White Horse Local Plan 2031 Part Two: Detailed Policies and Additional Sites'. Available at: https://www.whitehorsedc.gov.uk/vale-of-white-horse-district-council/planning-and-development/local-plan-and-planning-policies/local-plan-2031/

Ref 16.8 Vale of White Horse Local Plan 2031: Part 1 & 2, Infrastructure Delivery Plan (IDP)

Ref 16.9 Institute of Environmental Assessment, (1994). 'Guidelines for the Environmental Assessment of Road Traffic'. IEA, Horncastle

Ref 16.10 TAG Unit A4.1 Social Impact Appraisal (DfT, May 2020)

Ref 16.11 Highways England (August 2020), 'LA104 Environmental Assessment and Monitoring Revision 1'

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