Cambridge Science Park Station Interchange
Transport Assessment
Network Rail

May 2015
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Executive Summary

Atkins has been appointed by Network Rail to undertake a Transport Assessment (TA) to support the planning application for the proposed new Cambridge Science Park Station Interchange (CSI).

CSI is a new station interchange facility proposed within north-eastern Cambridge and accessed from Cowley Road. CSI will comprise the following:

- **Rail Station**
  - Approximately 450sqm building (passenger waiting facilities; toilets; ticket office; retail; amenity space; rail staff accommodation and facilities)
  - Two main line platforms
  - One terminating bay platform
  - Pedestrian / cycle bridge linking station building and platforms over the main line
  - Operational times 05:30-01:00 daily

- **Interchange Facility**
  - New pedestrian and cycle links to surrounding area including; through Bramblefields Local Nature Reserve and Nuffield Road Industrial Estate
  - Approximately 1000 space cycle parking
  - Extension of the Cambridgeshire Guided Busway into the site
  - Multi-modal interchange for cars, buses, trains, cyclists, pedestrians and heavy rail
  - Highway access from Cowley Road
  - Approximately 450 space car park

The site is located approximately 2 miles northeast of Cambridge City Centre on the edge of Chesterton and is approximately 9.95 hectares of railway operational freight sidings. The new station interchange will be located on the Ely to Cambridge line.

The site is easily accessible from the highway network with almost direct access to the trunk road network and local residential areas.

Links via sustainable modes of travel to the site are currently either limited in certain directions or not possible to access from within the site. However, as part of the proposed development there is significant potential to provide very good links to the site without having to improve the wider sustainable infrastructure.

The site will promote sustainable modes of travel by its very nature of being a rail station. The location of CSI will also encourage existing Cambridge Station passengers, currently travelling by private car or other travel modes, to avoid the City Centre by offering an attractive alternative option to Cambridge Station. Its location will also promote sustainable land use development around the northern fringes of Cambridge in accordance with local planning policies. A considerable number (60% of total passengers) of non-vehicular access trips (i.e. walking and cycling) are anticipated to be generated by CSI. If public buses are included then 75% of passengers generated by CSI are anticipated to travel to/from the site by sustainable travel modes (i.e. walking, cycling and bus).

The proposed development is in accordance with national, regional and local transport policies and it is considered that CSI will meet the principal objectives of the key policy documents.

In addition, CSI will provide for; sufficient cycle parking storage for passengers to encourage sustainable travel, a sufficient number of car parking spaces that meets necessary demand without over provision, appropriate access for disabled passengers, a direct link with the Busway, and safe and convenient cycle and pedestrian access.
Whilst existing deficiencies in junction capacity are predicted along Milton Road, additional infrastructure provision would be necessary with or without CSI. Any off-site works would not be fairly and reasonably related in scale and kind to the proposed development. However, the following mitigation measures are proposed to limit the impact generated by CSI and improve accessibility to the site.

- Revised lane designation at the northern Cowley Road junction
- Provision of high quality pedestrian / cycle links to the local surrounding area
- TROs introduced along the entire length of Cowley Road to prevent on-street parking
- High quality signage to the site will be provided for all travel modes
- Monitor parking within the local residential area before and after the opening of the new station. Necessary controls will be developed and introduced in consultation with local residents if issues are observed.

Following the implementation of the above measures and the committed extension of the Busway up to the station building, the residual impact of CSI is anticipated to be beneficial in transport terms.
1. Introduction

1.1. Background
Atkins has been appointed by Network Rail to undertake a Transport Assessment (TA) to support the planning application for the proposed new Cambridge Science Park Interchange (CSI).

CSI is a new station interchange facility proposed within north-eastern Cambridge and accessed from Cowley Road. CSI will comprise a rail station with: two main line platforms; bay platform; 450m² building and associated parking, cycle parking facilities. Access to CSI will be available by all modes of travel with new and improved pedestrian and cycle connections and extension of the Busway to the interchange from Milton Road.

The site is located approximately 2 miles northeast of Cambridge City Centre on the edge of Chesterton, just 200m north of Chesterton Junction Level Crossing. The new station interchange will be located on the Ely to Cambridge line approximately 2 miles north of Cambridge Station and approximately 14 miles south of Ely Station. The proposed site location is illustrated in Figure 1.

Figure 1. CSI Site Location
1.1.1. Scoping
A final Scoping Note was prepared following a number of scoping meetings with Local Planning Authority (LPA) Highways Officers on 2 August 2012 (scoping meeting) and 9 November 2012 (meeting to discuss comments on scoping note). The minutes of these meetings and the associated Scoping Notes are presented in Appendix A of this report. The purpose of the meetings were to provide an introduction of the scheme to CCC and to seek their advice on the scope of transport work required to support this planning application for the proposed development. The LPA confirmed that a TA would be required as part of submission material for the planning application. Following consultation as part of the scoping work, the Highways Agency (now Highways England) agreed to the proposed scope of the TA where it relates to the Trunk Road network, principally the A10 / A14 interchange.

1.2. Purpose of the Report
This TA will act as supporting information to the Planning Application. It will assist in evaluating the impact the proposals may have on the local and wider transport network.

This assessment considers the impact on the local transport infrastructure, specifically; accessibility, highway capacity along Milton Road, impact on the Busway, impact on footways and cycleways located in the immediate vicinity of the site, on site transport facilities and the requirement for mitigation measures on the local highway network.

This TA has been prepared in accordance with Department for Transport’s (DfT) Planning Practice Guidance ‘Travel plans, transport assessments and statements in decision making’ (March 2014).

The TA covers the following key aspects:

- Details of the existing site and transport situation for all modes of transport;
- Review of current national, regional and local policy information, that is relevant to the proposed development;
- Details of the proposed development including trip generation;
- Assessment of the highway impact of CSI for the future year of 2026;
- Qualitative assessment of the impact of the proposals on sustainable transport users; and
- Identification of measures to mitigate the impact of the development and allow access to the site by all modes of travel.

1.3. Structure of the Report
The report is structured as follows:

- Chapter 2 contains a review of relevant planning policy which guides the development of CSI and this TA;
- Chapter 3 contains a summary of the existing conditions of the transport network serving CSI;
- Chapter 4 describes the proposals for CSI;
- Chapter 5 provides an overview of the travel demand forecasts prepared for the railway station and the supporting analysis used to derive predictions of travel to and from the interchange;
- Chapter 6 explains the basis of the Highway Impact Assessments and, in particular, the determination of the car park size;
- Chapter 7 presents detailed highway junction capacity impacts analysis for a range of junctions serving CSI;
- Chapter 8 addresses the measures included in the development to support the use of sustainable travel modes and any impacts these might have;
- Chapter 9 describes the mitigation proposals arising from the implementation of CSI;
- Chapter 10 provides a summary of the residual impacts arising after mitigation measures have been implemented; and finally
- Chapter 11 gives a summary of the TA and some concluding comments.
2. Policy Review

2.1. Introduction

The purpose of this Chapter is to review all relevant planning policy to guide the development of the TA and confirm that the proposed development is in alignment with relevant policies. It covers guidance from National policy through to local planning requirements in both Cambridge City and South Cambridgeshire.

2.2. National Policy

2.2.1. National Planning Policy Framework (March 2012)

Planning Policy Guidance note 13 (PPG13) sets out the objectives to integrate planning and transport at the national, strategic and local level to promote more sustainable transport choices both for carrying people and for moving freight. The document was first issued in 1994, was updated in 2001 and further updated again in 2011 removing the requirement for local authorities to set maximum parking limits for residential developments, before finally being replaced by the National Planning Policy Framework in March 2012.

The National Planning Policy Framework (NPPF) came into force on 27th March 2012. It aims to make the planning system less complex and more accessible, and to promote sustainable growth. The NPPF replaces all the previous Planning Policy Statements (PPSs) and Planning Policy Guidance (PPGs) including PPG13.

The NPPF sets out the Government's economic, environmental and social planning policies for England. Taken together, these policies articulate the Government’s vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

The NPPF introduces 12 core planning principles, in summary these are that planning should:

- Be genuinely plan-led. This should include providing a practical framework within which decisions on planning applications can be made with a high degree of predictability and efficiency.
- Be a creative exercise in finding ways to improve the places where people live.
- Drive and support sustainable economic development.
- Seek to secure high quality design and a good standard of amenity.
- Take account of the different roles and character of different areas.
- Support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change.
- Contribute to conserving and enhancing the natural environment and reducing pollution.
- Encourage the effective use of land by reusing land that has been previously developed.
- Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas.
- Conserve heritage assets in a manner appropriate to their significance.
- Actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable.
- Take account of and support local strategies to improve health, social and cultural wellbeing.

The NPPF clearly promotes sustainable transport, the document states that:

- Transport policies have an important role to play in facilitating sustainable development but also in contributing to wider sustainability and health objectives.
- The transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel.
- The Government recognises that different policies and measures will be required in different communities and opportunities to maximise sustainable transport solutions will vary from urban to rural areas.
- Encouragement should be given to solutions which support reductions in greenhouse gas emissions and reduce congestion.
The NPPF has retained the use of Transport Statements and TAs and states that all developments that generate significant amounts of movement should be supported by a Transport Statement or TA. Plans and decisions should take account of whether:

- The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure.
- Safe and suitable access to the site can be achieved for all people.
- Improvements can be undertaken within the transport network that, cost effectively, limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.

This guidance indicates that a refusal of planning permission on transport grounds will only be defendable if there are severe impacts arising from the development. The NPPF states that plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods or people.

In summary, CSI is in accordance with NPPF in that by its very nature the development will; drive and support sustainable travel, offer high quality design and a very good standard of amenity and supports a low carbon future. In addition the site is located on railway operational land.

This TA shows that the cumulative transport impacts of the development are not severe. Mitigation is proposed to improve the onsite pedestrian/cycle infrastructure to link with the existing local infrastructure, in addition to committed improvements to public transport accessibility up to the station building. All of these improvements will limit the impact of the development.

CSI will provide safe and suitable access for all by proposing cost effective opportunities for sustainable transport modes. These opportunities will prevent the need for major transport infrastructure works. The cost effective opportunities are discussed in more detail within Chapter 4.

### 2.3. Regional Policy

This section considers regional planning policy relevant to the development of CSI.

#### 2.3.1. East of England Plan (May 2008)

The East of England Plan formally sets out the local Regional Assembly's (disbanded in March 2011) approach to create joined up policies relating to growth across the East of England. Although the Regional Assembly has been disbanded the policies within the plan are relevant to the proposed CSI development.

Policies within the East of England Plan which relate to the development of CSI are as follows:

- **Policy T1 - Regional Transport Strategy Objectives and Outcomes**: To give priority to increased passenger and freight movement by more sustainable modes, while reflecting the functionality required of the region's transport network.
- **Policy T2 – Changing Travel Behaviour**: To bring about a significant change in travel behaviour, a reduction in distances travelled and a shift towards greater use of sustainable modes.
- **Policy T9 – Walking, Cycling and Other Non-Motorised Transport**: Provision for walking, cycling and other non-motorised transport should be improved and developed as part of an integrated strategy for achieving the RTS objectives. Pedestrian, cycle and other non-motorised transport networks should be managed and improved to enhance access to work, schools and town centres, and provide access to the countryside, urban greenspace, and recreational opportunities.
- **Policy T13 – Public Transport Accessibility**: Public transport provision, including demand responsive services, should be improved as part of a package of measures to improve accessibility. Public transport use should be encouraged throughout the region by increasing accessibility to appropriate levels of service of as high a proportion of households as possible, enabling them to access core services such as schools.
- **Policy T14 – Parking**: Parking controls, such as the level of supply or charges, should be used as part of packages for managing transport demand and influencing travel change, alongside measures to improve public transport, walking and cycling accessibility.
In summary, CSI is in accordance with the East of England Plan in that the development will; give priority to increased passenger movement by sustainable travel, bring about a significant change in travel behaviour to more sustainable modes and limit the level of parking provision so as not to over provide. The site will also link very well with local sustainable travel infrastructure such as pedestrian/cycle routes, the Busway and other rail stations.


The Cambridgeshire and Peterborough Structure Plan aims to support the growth of the local economy and housing needs of Cambridgeshire. The document recognises that while development does put pressure on the environment and on local infrastructure, it also brings opportunities for better jobs, homes, transport and landscapes.

The Structure Plan is intended to improve the quality of life of everyone who lives, works and spends time in Cambridgeshire. Many of the policies within the document are covered by the policies listed above from the East of England Plan however there are some additional policies from the plan which are relevant to the development of CSI, namely:

- **Policy P6/1 – Development Related Provision**: Development will only be permitted where the additional infrastructure and community requirements generated by the proposals can be secured, which may be by condition or legal agreement or undertaking. Local Plans should include appropriate policies and identify the key infrastructure requirements in their site specific policies.

- **Policy 8/2 – Implementing Sustainable Transport for New Developments**: New development will be required to make provision for integrated and improved transport infrastructure to increase the ability to move by cycle, public transport and on foot.

- **Policy 8/8 – Encouraging Walking and Cycling**: The capacity, quality and safety of walking and cycling networks will be increased to promote their use, minimise motorised travel and to realise health improvements. All new development must provide safe and convenient pedestrian and cycle environments including adequate cycle parking, and contribute towards the wider encouragement of cycling and walking.

- **Policy P9/8 – Infrastructure Provision**: All development likely to have a definable impact on infrastructure requirements will be expected to make provision for infrastructure accommodating local impacts and also contributing to the needs of the wider area.

CSI is explicitly included for under policies “P8/10 – Transport Investment Priorities” and “P9/9 – Cambridge Sub-Region Transport Strategy” of the Structure Plan where it is stated that the implementation of the station will be sought over the Structure Plan period to meet strategic requirements and the needs of major developments.

In summary, CSI is in accordance the Cambridgeshire and Peterborough Structure Plan in that the development provides for the local rail infrastructure requirements generated by other existing and proposed developments. The site will also offer increased capacity, quality and safety of walking and cycling in the local area.

2.3.3. Cambridgeshire Local Transport Plan 2011-2026 (March 2011)

The Cambridgeshire Local Transport Plan sets out the policies and plans for transport to contribute towards CCC’s vision of creating communities where people want to live and work: now and in the future. The Local Transport Plan sets out eight key challenges that will be addressed as part of the Local Transport Plan:

- Improving the reliability of journey times by managing demand for road space, where appropriate and maximising capacity and efficiency of the existing network.

- Reducing the length of the commute and the need to travel by private car.

- Making sustainable modes of transport a viable and attractive alternative to the private car.

- Future-proofing the maintenance strategy and new transport infrastructure to cope with the effects of climate change.

- Ensuring people – especially those at risk of social exclusion – can access the services they need within reasonable time, cost and effort.
- Addressing the main causes of road accidents in Cambridgeshire.
- Protecting and enhancing the natural environment by minimising the environmental impact of transport.
- Influencing national and local decisions on land-use and transport planning that impact on routes through Cambridgeshire.

CSI is listed as a major scheme within the LTP and is included as a requirement of the LTP to help meet the vision of “Making sustainable modes of transport a viable and attractive alternative to the private car”. The following table (Table 1) is included within the LTP to identify the impacts CSI in relation to LTP3.

<table>
<thead>
<tr>
<th>LTP3 Objective</th>
<th>Impact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing and delivering growth</td>
<td>Positive</td>
<td>- Will provide significantly improved accessibility to rail network for major growth developments in north and west of Cambridge and for proposed new town of Northstowe.</td>
</tr>
</tbody>
</table>
| Promoting improved skill levels and economic prosperity across the county, helping people into jobs and encouraging enterprise | Positive   | - Interchange will improve accessibility to nearby Science Park and business parks, one of Cambridgeshire’s most important economic hubs  
- Reduced traffic in city will lead to reduced congestion, benefiting the local economy |
| Meeting the challenges of climate change and enhancing the natural environment | Positive   | - Reduced traffic in city leads to less congestion and reduced carbon dioxide emissions.  
- Significantly improved sustainable transport access to Science Park and business parks.  
- Improved air quality in city as a result of reduced traffic levels.  
- Any contaminated land will require removal  
- Appropriate measures to protect the site’s proximity to the River Cam will be taken. |
| Enabling people to thrive, achieve their potential and improve their quality of life | Positive   | - Interchange would improve accessibility to rail network for those living in/to the north of Cambridge  
- Bus and cycling links will ensure sustainable transport access to rail network will be significantly improved for those living in/to the north of Cambridge.  
- Station will fully conform to the Disability Discrimination Act standards |
| Supporting and protecting vulnerable people                                   | Positive   | - Secure station accreditation will be sought  
- Reduced traffic in city should reduce number of accidents |

In summary, CSI is in accordance with the Cambridgeshire Local Transport Plan in that the development will; improve the reliability of journey times by offering a second rail station in Cambridge, remove the need to travel by private car and make sustainable travel a more viable alternative to the private car.
2.4. Local Policy
This section considers local planning policy relevant to the development of CSI.

2.4.1. Cambridge City Council Local Plan 2014: Proposed Submission (July 2013)

The Cambridge Local Plan sets out policies and proposals for future development and land use to 2031. It sets out a vision for Cambridge and objectives for achievement. It provides a means of guiding change over long periods of time.

The Cambridge Local Plan and the planning system have a fundamental role to play in achieving the land use planning aspects of sustainable development.

Policy 14 is focused on the development of Cambridge Northern Fringe East which includes CSI. The policy states that all applications in the area should:

- Take into account existing site conditions and environmental safety constraints;
- Ensure that appropriate access and linkages, including for pedestrians and cyclists, are planned for in a high quality and comprehensive manner;
- Recognise the existing local nature reserve at Bramblefields, and where development is proposed provide for appropriate ecological mitigation measures either on or off site; and
- Ensure that due consideration has been given to safeguarding the appropriate future development of the wider site.

The plan states that it is important that the location of new development should minimise the need for private car use, and maximise the scope for access by sustainable modes of transport.

Policy 81, relates to mitigation measures, stating that where development is likely to place demand on the transport system, applications will require suitable mitigating measures to be identified.

Policy 80 states that to support walking and cycling, all developments will be designed to:

- Give priority for these modes over cars
- Ensure maximum convenience for these modes
- Be accessible to those with impaired mobility
- Link with the surrounding walking and cycling network
- Safeguard existing and proposed routes for walking, cycling and public transport.

Policy 80 also states that ‘public transport links should be within walking and cycling distance of a development’.

In summary, CSI is in accordance with Cambridge City Council Local Plan in that the development will create a new public transport node, whilst making best and most efficient use of existing railway operational land. Where the development places demand on the local transport system, measures to mitigate this impact are included within the proposals.

2.4.2. South Cambridgeshire District Council Local Development Framework

In March 2014 the Local Plan and its supporting documents were submitted for independent examination to the Secretary of State for Communities and Local Government via the Planning Inspectorate. The existing South Cambridgeshire Local Development Framework was adopted in July 2007.

The South Cambridgeshire District Council (SCDC) Local Development Framework (LDF) is a suite of documents developed by the council to guide the future of South Cambridgeshire. A number of the LDF documents set out policies which are relevant to the development. The relevant policies are listed below.
Transport Assessment

- **Policy DP/2 – Design of New Development**: This policy states that developments should be permeable for all sectors of the community and all modes of transport, including links to existing footways, cycleways, bridleways, rights of way, green spaces and roads.
- **Policy DP/3 Development Criteria**: All development proposals should provide, as appropriate to the nature, scale and economic viability of the area, including the car and cycle parking provision.
- **Policy DP/4 Infrastructure and New Developments**: Planning permission will only be granted for proposals that have made suitable arrangements for the improvement or provision of infrastructure necessary to make the scheme acceptable in planning terms and contributions may also be required towards the future maintenance and upkeep of facilities.
- **Policy DP/6 Construction Methods**: Any haul roads must be agreed and developers must employ an agreed methodology for haul roads where they cross public rights of way. They must be located, designed and landscaped (where appropriate) in such a way as to avoid any noise, smell, dust, visual or other adverse impact on residents and businesses. At any point where on-site temporary haul routes for construction traffic enter the public highway, provision should be made for the cleaning of vehicle tyres to avoid deposition of mud / debris on the public highway and the generation of dust.
- **Policy TR/1 Planning for More Sustainable Travel**: Planning permission will not be granted for developments likely to give rise to a material increase in travel demands unless the site has a sufficient standard of accessibility to offer an appropriate choice of travel by public transport or other non-car travel mode.
- **Policy TR/2 Car and Cycle Parking Standards**: Car parking should be provided in accordance with the maximum standards to reduce over-reliance on the car and to promote more sustainable forms of transport. Cycle parking should be provided in accordance with the minimum standards to ensure the provision of adequate secure parking.
- **Policy TR/3 Mitigating Travel Impact**: New development will be required to mitigate their travel impact and proposals for major development will require developers to submit TAs and Travel Plans alongside planning applications.
- **Policy TR/4 Non-motorised Modes**: SCDC will seek to use new developments as a means of promoting sustainable transport.

CSI is included for within the South Cambridgeshire District Council Local Development Framework as part of the Area Action Plan and Site Specific Policy 17 – Rail Infrastructure, which states that “Land at Chesterton Sidings is safeguarded for the development of a railway station and interchange facility”.

In summary, CSI is in accordance with South Cambridgeshire District Council Local Development Framework in that the development will: make limit parking provision to avoid over demand and discourage car trips, provide plenty of cycle storage, provide permeability for walkers and cyclists through the site and site construction will follow a construction code of practice.

### 2.5. Summary

CSI is included for within or as part of all regional and local policy documents discussed above and forms an integral part of Cambridgeshire’s Spatial Strategy to help meet the needs of future growth.

The proposed development is in accordance with the aforementioned national, regional and local transport policies and it is considered that the CSI development will meet the principal objectives of the key policy documents. The location of CSI will also encourage existing Cambridge Station passengers, currently travelling by private car or other travel modes, to avoid the City Centre by offering an attractive alternative option to Cambridge City Centre Rail Station. Its location will also promote sustainable land use development around the northern fringes of Cambridge in accordance with local planning policies.

In addition CSI will provide for sufficient cycle parking storage for passengers to encourage sustainable travel, a sufficient number of car parking spaces that meets necessary demand without over provision, appropriate access for disabled passengers, a direct link with the Busway and safe and convenient cycle and pedestrian access.
3. Baseline Conditions

3.1. Introduction
This Chapter provides a summary of the current existing conditions relevant to the proposed site including the highway network surrounding the site from which access will be gained. It has been informed by a number of site visits undertaken during October, November and December 2012 and is supported by research including accident history for a range of junctions in addition to traffic count surveys.

3.2. Site Location and Local Highway Network
The CSI site is approximately 9.95 hectares of railway operational land located within northeast Cambridge. The site is bounded by the Cowley Road industrial area to the west and north, the West Anglia Main Line Railway to the east, Nuffield Road allotments to the south and Cambridge Business Park to the west. Highway access to the site is from Cowley Road.

The local highway network is shown in Figure 2 and the main link roads surrounding the site are labelled.
Cowley Road is a single carriageway road providing access to Cambridge Waste Water Treatment Works and industrial land located to the east of Milton Road (A1309). Cowley Road is accessed from Milton Road via two signalised junctions. Cowley Road/Milton Road provides access onto and exit from Cowley Road for
traffic entering from the north and exit from Cowley Road to traffic travelling north and south. The Cowley Road/ Milton Road/Science Park junction provides access to Cowley Road for traffic arriving from the south or the Science Park and exit from Cowley Road for traffic travelling south. No access to the Science Park from Cowley Road is available at this junction.

Milton Road provides access to the A14 via Milton Interchange to the north. The A14 is a Trunk Road providing access to the strategic road network servicing East Anglia and the wider UK including links to the M11 towards London. To the south of the site Milton Road provides access to central Cambridge including the outer ring road and provides local access to residential areas of Chesterton, Kings Hedges and Arbury. Via the outer ring road alternative access is available to A14, M11 and villages surrounding Cambridge. Milton Road is a single carriageway to the south of the site and dual carriageway to the north of the site.

3.2.1. Local Links and Junctions

Cowley Road
Cowley Road is approximately seven metres wide at its narrowest point closer to the site but widens to 10 metres closer to Milton Road. On-street fly parking exists along both sides of Cowley Road along the length where it is 10 metres wide therefore narrowing the useable carriageway to approximately six metres.

Milton Road
Milton Road provides one of three main links into Cambridge City Centre from the north. It provides a link of A14 and A10 and links through the residential areas of Chesterton, Kings Hedges and Arbury. The carriageway varies in width between 22m (six lanes) at its northern end to just 9m (two lanes plus cycle lane) though the residential area of Chesterton.

There are various bottlenecks that exist along Milton Road where capacity becomes an issue at specific junctions where further widening is not possible due to land constraints. Bottlenecks with particular capacity constraints include:

- Milton Road / Cowley Road southern signalised junction;
- Milton Road / Cowley Road Park signalised junction;
- Milton Road / Kings Hedges Road signalised junction; and
- Arbury Road / Milton Road signalised junction.

Milton Road / Cowley Road (northern junction) – see Figure 3
This junction is a three-arm signal controlled junction located to the northwest of the site which provides access into and out of the site to / from the north and south along Milton Road. Two approach lanes with a right turn flare are provided on Cowley Road providing for dedicated left and right turn movements. Two ahead lanes are provided on Milton Road northbound approach and three on the southbound approach in addition to a dedicated northbound right turn flared lane and dedicated southbound left turn flared lane.
Figure 3. Milton Road / Cowley Road Northern Junction

Looking southbound    Looking northbound

Milton Road / Cowley Road (southern junction) – see Figure 4
This junction is a four-arm signal controlled junction. The junction offers access to the Science Park and Cowley Road. Milton Road northbound approach is three lanes providing a dedicated right turn lane, two ahead lanes with a shared left turn lane. Milton Road southbound approach has one lane for ahead movements on Milton Road and two dedicated lanes for the right turn into the Science Park.

The southbound left turn to Cowley Road cannot be made at this junction and this movement is undertaken at the Milton Road / Cowley Road (northern junction). The Science Park has a three lane approach with 2 lanes dedicated for the left turn and one lane for ahead and right. Cowley Road is a one lane approach for the left turn and a flare for the right turn. Pedestrian facilities are available across Milton Road South arm and Cowley Road.

Figure 4. Milton Road / Cowley Road Southern Junction (looking northbound along Milton Road)

Milton Road / Cowley Park – see Figure 5
The junction is a three-arm signal controlled junction along Milton Road. On Milton Road northbound there are two lanes with a flared approach for the right turn into Cowley Road. Milton Road southbound is two lanes, with one lane travelling ahead on Milton Road and one lane for the left turn in Cowley Park. Cowley
Park is a one lane approach for both movements left and right onto Milton Road. Pedestrian facilities are available across Cowley Park.

Figure 5. Milton Road / Cowley Park Junction (looking southbound along Milton Road)

Milton Road / Green End Road / Kings Hedges Road – see Figure 6
Between Milton Road / Green End Road / Kings Hedges Road and the Busway junction there is a pedestrian crossing.

The Milton Road / Green End Road / Kings Hedges Road is a four-arm signalised junction. Milton Road northbound approach is one lane for ahead and right movements with a flare for the right turn. Milton Road southbound is a two lane approach with a flare. Each lane provides a lane for each movement right, ahead and left (flare). Green End Road is a one lane approach for the right turn, a flare is provided for the ahead and left turn. Kings Hedges Road is a one lane approach for the ahead and right turn and a flare for the left turn. Staggered pedestrian crossing facilities are provided across all arms.

Figure 6. Milton Road / Green End Road / Kings Hedges Road Junction (looking southbound along Milton Road)
Arbury Road / Unicorn Lane – see Figure 7
Arbury Road is a four arm signalised junction. Milton Road northbound is one lane ahead with a flare for the left turn, the right turn in banned. Milton Road southbound, Arbury Road and Unicorn Lane are all one lane for all turning movements. There are pedestrian crossings all around the junction on each arm.

Figure 7. Arbury Road / Unicorn Lane Junction (looking southbound along Milton Road)

Highworth Avenue / Elizabeth Way / Milton Road – see Figure 8
Highworth Avenue / Elizabeth Way / Milton Road is a four arm roundabout operating on give way. All approaches are single lane for all movements with flared approaches at the entry point.

Figure 8. Highworth Avenue / Elizabeth Way / Milton Road Junction (looking southbound along Milton Road)
3.3. Sustainable Travel Accessibility

Figure 9 below shows all sustainable travel options for cyclists located near to the proposed site. Many of these routes are also available to pedestrians, including the maintenance track along the busway and links to local residential areas. Figure 10 shows wider pedestrian links in the vicinity of the site.

Figure 9. Local Cycle Network
3.3.1. Access for Pedestrians and Cyclists

Cowley Road has footpaths along much of its length although these are restricted to one side of the road. From Cowley Road pedestrians can access Milton Road which provides connections towards Cambridge, Milton and the Science Park. A pedestrian/cycle crossing phase is available at the signals on Milton Road to allow access to the Science Park. Further pedestrian/cycle crossing points, controlled and uncontrolled, are also available on Milton Road as it continues towards the City Centre. From Milton Road a wider network of footpaths serving; residential, commercial, leisure and employment areas within the City Centre and surrounding area.

Whilst the pedestrian/cycle crossing over Milton Road that links to the Science Park provides a direct link from the existing site observations showed that pedestrians and cyclists were delayed due to the complicated layout and signal staging sequence required at this junction. However, whilst the delay observed was noticeable it was far from significant and existing pedestrian/cycle infrastructure was observed to be more than sufficient to accommodate existing demand.

National Cycle Route 11 passes through Chesterton on Green End Road and the High Street as an on-road strategic route. Route 11 continues as an on-road local route along Water Street, Fen Road and Cam Causeway, continuing off-road crossing the railway line and continuing alongside the river Cam towards Waterbeach. To the west Route 11 continues off-road alongside Milton Road towards Milton.
Chesterton High Street Route 11 continues into Cambridge City Centre and beyond with links to Trumpington and Shelford. From Route 11 a large number of local and strategic cycle routes can be accessed within Cambridge City Centre. These routes provide connections to most areas of the City and out into the wider village network surrounding the City.

In addition, National Cycle Route 51 runs along the Busway and links with Route 11 where the Guided Busway connects with Milton Road at its eastern end. It is anticipated Route 51 will continue into the site as part of the Busway extension.

In addition, informal pedestrian/cycle routes are provided for through the Bramblefields located to the south of the proposed site.

Cycle and walk mode shares for Cambridge are generally much higher than the national averages for these modes of travel and it is important to consider this when assessing the potential effects of the proposed Development. People are not only more likely to walk and cycle but are also likely to walk and cycle greater distances and this must be considered when determining walking and cycling catchments relevant to the Site. Table 2 below shows the split in mode of access for people accessing Cambridge Station which provides a useful proxy for trips to the proposed CSI. This information is derived from National Rail Travel Survey Data (NRTS)\(^1\) (Tab 1 Table 1), of which a more detailed analysis has been conducted in order to determine proportion by mode.

<table>
<thead>
<tr>
<th>Access Mode</th>
<th>Proportion by Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>22</td>
</tr>
<tr>
<td>Cycle</td>
<td>21</td>
</tr>
<tr>
<td>Walk/Bus</td>
<td>57</td>
</tr>
<tr>
<td>All modes</td>
<td>100</td>
</tr>
</tbody>
</table>

\(^1\) The NRTS is a survey of passenger trips on the national rail system in Great Britain on weekdays outside school holidays. NRTS data has detailed travel information for users of Cambridge Station which has been available by the Department for Transport solely for use in connection with this project.
3.3.2. Access for Public Transport Users

Guided Busway
The site is located 600 metres from the eastern end of the guided section of the Busway where it links onto Milton Road just south of the junction with the Cambridge Science Park. Bus services operate between Huntingdon and Trumpington Park and Ride (via the Science Park, Cambridge Rail Station and Addenbrookes Hospital) with some onward services to Peterborough. The route accesses Milton Road to the south of the Science Park and continues on-road towards the City Centre. The closest stop to the proposed new station is on the Busway itself at the Science Park. As part of the Transport and Works Act Order for the Busway, rights to extend the Busway across Milton Road and along the former St. Ives Branch Line were given in anticipation of the new station proposals for what was then Chesterton sidings. These rights will be exercised as part of this CSI proposal enabling Busway services to access the station forecourt directly from Milton Road on a section of new route.

Existing Bus Services
Buses are an important mode of transport within Cambridge and the surrounding area. The majority of bus services currently travel into and through Cambridge City centre.

Bus Routes Citi2, 9 and 99 currently run along Milton Road close to its junction with Cowley Road. Service 99 serves Milton Park and Ride site but includes a stop within the Science Park. Route 9 runs from Chatteris to Cambridge at a frequency of 6 buses per day. Route C2 is a City bus route running from the Science Park to Addenbrookes Hospital and including numerous stops in and around the City Centre, Chesterton, Romsey and Cherry Hinton areas. This service runs at a frequency of one bus every 10 minutes.

Table 3 summarises the cluster of bus stops located nearest to the proposed station and the bus routes which serve them. Figure 11 identifies the local Cambridge Bus Routes.

It is evident that these bus services would provide a link between the proposed station and destinations/origins to the north of the site as well as Cambridge City Centre to the south.

It is also worth noting that the nearest bus stop for any local service is located approximately 1km from the site and passengers will have to cross Milton Road, however the committed extension of the Busway into the site will allow for much improved accessibility across Milton Road.

<table>
<thead>
<tr>
<th>Street Name / Stops</th>
<th>Services</th>
<th>Destinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Park Bay</td>
<td>Citi2</td>
<td>Addenbrookes - City Centre – Science Park ( - Milton)</td>
</tr>
<tr>
<td>Scarsdale Close Bay</td>
<td>9</td>
<td>Cambridge - Waterbeach - Ely - Littleport - Chatteris</td>
</tr>
<tr>
<td>Science Park Bay</td>
<td>99</td>
<td>Babraham Road P&amp;R - City Centre - Milton P&amp;R</td>
</tr>
<tr>
<td>Kendall Way Bay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science Park Bay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kendall Way Bay</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 11. Local Frequent Bus Routes
3.3.3. Summary of Sustainable Transport

The proposed site is located in an area with very good existing pedestrian / cycling infrastructure providing links along the Busway to the west and into Cambridge City Centre to the south. Within the immediate area of the site pedestrian / cycling infrastructure is limited due to the very nature of the existing site but this will be significantly enhanced as part of the proposed development.

The railway line and river located adjacent to the site severs the site from the east, which therefore limits sustainable access to/from the east. The site is however linked to the north, south (City Centre) and northwest by public transport with excellent opportunity to link the site to the wider area through the extension of the Busway into the site.

In summary, sustainable infrastructure linking the site to the wider area are currently either limited in certain directions or not possible to access from within the site. However, there is potential, as part of the proposed CSI development, to provide for very good sustainable infrastructure on site, whilst also improving links to the immediate and therefore wider area, without having to improve the wider network.

3.4. Car Parking

3.4.1. On-Street

On-street fly parking exists along both sides of Cowley Road along the length where it is 10 metres wide and runs parallel with Milton Road. On-street parking in this location narrows the carriageway down to approximately six metres. This section of carriageway is shown in Figure 12 below.

No on-street parking occurs within 500 metres of the development land as there is no local demand in this immediate area whereas there is closer to Milton Road where the business parks are located.
3.4.2. On-Site

As the site is currently railway operational land there is currently no on-site parking provision.

The former Cowley Road Park and Ride site is located 500 metres to the west of the site and used to provide approximately 600 parking spaces. This site is currently closed off to the public but Stagecoach currently use the car park to store their buses as well as allowing drivers to park their cars. The car park is also used as a base for Stagecoach’s driver training scheme. At present approximately 30 – 50 cars were observed to be parked within the car park (based on a site visit carried out on Monday 28th January 2013). There are currently no committed plans to change the use of or reopen this car park to the public.

3.5. Current Land Use

Chesterton sidings contains operational freight sidings. The sidings are currently utilised by two operators; Lafarge Aggregates who operate a road coating plant in the northern area and Frimstone who utilise land in the site for the transfer of aggregates between rail and road. Both operators generate HGV traffic along Cowley Road as well as a small amount of ancillary servicing traffic.

A traffic survey was carried out at the entrance to these two sites in July 2012. This survey shows that on an average weekday these two sites generate approximately 187 two way trips (nearly 400 passenger car units) over a 24 hour period of which 27% of vehicles were HGVs.

It is anticipated that these freight operations will remain within the sidings with the operations being relocated to a more northerly location.
3.6. Accident Data

Personal Injury Accident (PIA) data was obtained from Cambridgeshire County Council for the most recent five year period (2007 to 2012) for the local area surrounding the proposed site. A summary of the results for the overall area is given below. The full accident descriptions can be found in Appendix B.

As agreed with the LPA the search area included the section of highway from Milton Road / Cowley Road to Highworth Avenue / Elizabeth Way / Milton Road.

Figure 13 below shows the PIA search area.

![Figure 13. PIA Search Area](image)
Table 4 below shows a summary of the number of PIAs at each junction along Milton Road:

### Table 4. Frequency of accidents at junctions

<table>
<thead>
<tr>
<th>Junction</th>
<th>Accident Severity</th>
<th>Total</th>
<th>Pedestrians</th>
<th>Cyclists</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slight</td>
<td>Serious</td>
<td>Fatal</td>
<td></td>
</tr>
<tr>
<td>Milton Road / Cowley Road</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Milton Road / Science Park / Cowley Road</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Milton Road / Cowley Park</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Milton Road / Green End Road / Kings Hedges Road</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Arbury Road / Unicorn Lane</td>
<td>10</td>
<td>1</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Highworth Avenue / Elizabeth Way / Milton Road</td>
<td>14</td>
<td>1</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Milton Road / Various Minor Roads</td>
<td>15</td>
<td>1</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>58</td>
<td>3</td>
<td>1</td>
<td>62</td>
</tr>
</tbody>
</table>

Table 4 indicates that there have been 62 accidents at the seven junctions within the area surrounding the proposed site in the latest five year period. These consisted of 58 slight accidents, 3 serious accidents and 1 fatal accident.

Of these recorded accidents the following can be concluded:

- Of these 62 accidents three involved a pedestrian and 27 involved a cyclist;
- 12 of the pedestrian or cyclist accidents occurred in a similar location to another; and,
- 32% of the accidents involved the same manoeuvre and causation factor (most being rear end shunts).

A more detailed summary of the PIAs by junction is provided below.

#### 3.6.1. Milton Road / Cowley Road Junction
There have been two recorded PIAs at this junction (one of two site accesses) in the latest five year period. These two accidents were both slight in nature. One of the accidents involved a cyclist. Of the two accidents recorded at this junction; one causation factor was a rear end shunt and the other was a vehicle overtaking another vehicle on the nearside.

#### 3.6.2. Milton Road / Science Park / Cowley Road Junction
There have been eight recorded PIAs at this junction in the latest five year period. Of these eight accidents all were slight and three involved a cyclist. Of the eight accidents recorded at this junction 50% involved a rear end shunt.

#### 3.6.3. Milton Road / Cowley Park Junction
There have been no recorded PIAs at this junction in the latest five year period.

#### 3.6.4. Milton Road / Green End Road / Kings Hedges Road Junction
There have been nine recorded PIAs at this junction in the latest five year period. Of these nine accidents all were slight in nature. One of the accidents involved a pedestrian and three involved a cyclist. Of the nine accidents recorded at this junction 33% involved a rear end shunt.

#### 3.6.5. Arbury Road / Unicorn Lane Junction
There have been 11 recorded PIAs at this junction in the latest five year period. Of these 11 accidents 10 were slight and 1 was serious in nature. None of the accidents involved a pedestrian and 1 involved a cyclist. Of the 11 accidents recorded at this junction 27% involved a rear end shunt.
3.6.6. Highworth Avenue / Elizabeth Way / Milton Road Junction
There have been 15 recorded PIAs at this junction in the latest five year period. Of these 15 accidents 14 were slight and one was serious in nature. 12 of the accidents involved a cyclist. Of the 15 accidents recorded at this junction 27% involved a rear end shunt and 20% involved vehicles crossing the path of another vehicle whilst negotiating the junction.

3.6.7. Milton Road / Various Minor Roads Junction
There have been 17 recorded PIAs along Milton Road at the various minor road junctions in the latest five year period. Of these 17 accidents 15 were slight, one was serious and one was fatal in nature. Two of the accidents involved a pedestrian and seven involved a cyclist. Of the 17 accidents recorded at this junction three involved a rear end shunt and eight involved vehicles turning into the path of another vehicle. Of the accidents there was no obvious combined location/ causation factor.

3.6.8. Accidents on Milton Road
There have been 18 recorded PIA on Milton Road between the junctions. Of these 18 accidents 17 were slight and one was serious in nature. Two of the accidents involved a pedestrian and 10 involved a cyclist. Of these 18 PIAs there was no obvious combined location/ causation factor.

Very few of the accidents that occurred close to the site involved vulnerable road users. Most accidents that involved vulnerable road users occurred at the junction between Milton Road and Elizabeth Way. Almost all of these accidents involved cars turning left into Elizabeth Way or right out of Elizabeth Way colliding with cyclists. The distribution of passengers using the station is not anticipated to replicate these car movements as passengers who live or work to the southeast of the roundabout will more than likely use Cambridge Station. It is predicted that fewer cars will make these movements after the opening of the station.

The opening of CSI could increase the number of cyclists that travel between the northeast and southwest, however there are alternative routes that cyclists could use to gain access to the southwest area of Cambridge (i.e. via the busway, Kings Hedges Road and Arbury Road) that would be more direct from the station.

3.6.9. PIA from 2012 onwards
The data presented above is now out of date. Updated PIA data from Cambridgeshire County Council shows that within the study area, since 2012, there has been 1 fatal, 2 serious and 5 slight PIAs. The fatal PIA occurred on Milton Road in 2013 near its junction with Birch Close. The accident involved a pedal cycle and two cars. A serious PIA occurred in 2013 on Milton Road Southbound just south of the A14 roundabout and involved a single pedal cyclist. The third PIA, which was serious in nature, occurred in 2013 on Milton Road Northbound and involved a pedal cycle and a LGV at the junction with a private drive.

3.6.10. PIA Summary
Analysis of the information related to accidents gives no rise for undue concern that the travel modes related to the proposed CSI will increase the accident volumes in comparison to those experienced to date.

3.7. Summary
The site is located in the northern fringes of Cambridge and is easily accessible from the highway network with almost direct access to the trunk road network. Analysis of the accident history at a range of junctions local to the site access shows there to be no specific highway safety concern within the local area that could be amplified following the opening of the new development.

Potential exists for access by sustainable modes from a number of routes to the site. Access for guided bus services will be afforded through the extension of the Busway obtained under the original Transport and Works Act Orders (TWAO) for the Busway.

The site is currently being used by operational rail sidings which generates HGV traffic along Cowley Road. These will remain necessitating the need to ensure adequate access off Cowley Road for freight users.
4. Development Proposals

4.1. Introduction

This Chapter provides details of the development proposals relevant to transport including: on-site infrastructure, links to existing off site infrastructure and committed/potential transport improvements that will benefit and be benefitted by the site.

Figure 14 below shows the proposed layout of the site.

Figure 14. Indicative Proposed Site Layout
4.2. Development Details

The development will comprise of the following elements:

- **Rail Station**
  - Approximately 450sqm building (passenger waiting facilities; toilets; ticket office; retail; amenity space; rail staff accommodation and facilities);
  - Two main line platforms;
  - One terminating bay platform;
  - Pedestrian/cycle bridge linking station building and platforms over the main line (lift and stair access); and
  - Operational times expected to be between 05:30-01:00 hours daily.

- **Interchange Facility**
  - New pedestrian and cycle links to surrounding area including; through Bramblefields Local Nature Reserve and Nuffield Road Industrial Estate;
  - Approximately 1000 space cycle parking;
  - Extension of the Busway into the site;
  - Multi-modal interchange for cars, buses, trains, cyclists, pedestrians and heavy rail;
  - Highway access from Cowley Road; and
  - Approximately 450 space car park.
4.3. Site Access
The main site access for vehicular traffic and on-road buses is via Cowley Road. Figure 15 shows this vehicle access route into the site.

![Figure 15. Vehicle Access Route](image)

4.3.1. Public Transport
Access for Busway services will be available via a proposed extension to the Busway along the former St. Ives branch line to the east of Milton Road through to the Station forecourt. Rights to undertake this extension have been secured via the original Transport and Works Act Order (TWAO), which envisaged a new station on the Chesterton site. Arrangements for the Busway crossing of Milton Road and onto the former St Ives branchline were also included within the Busway TWAO and do not form a part of this planning application; however the impact of additional buses crossing Milton Road is assessed within this TA and a summary of the results are provided in Chapter 7.

As part of the development proposals it is anticipated the Citi2 bus service, which runs along Milton Road, will be diverted into the station via Cowley Road. As part of this anticipated proposal the Citi2 service will then be routed up to the station building via an internal road linking onto the Busway. At the end of the Busway a turning circle suitable for all buses will be provided to allow the Citi2 and Busway services to operate every 10 minutes.
Rail replacement bus services will also access the station via Cowley Road. Like the anticipated extension of the Cit2 service these bus replacement services will then travel up to the main station building via an internal road linking onto the Busway.

Figure 16 below shows these two new public transport links in relation to the site layout and Milton Road.

### 4.3.2. Pedestrians / Cyclists

Cycle and pedestrian access to the site will be provided by the following:

- **Cowley Road**: A shared use footway / cycleway with a minimum width of 2.5m (in accordance with Cambridgeshire County Council Highway and Policy Standards) to be provided from adjacent to the taxi drop off facility, along the north side of Cowley Road, and linking into the existing network;
- **Nuffield Road South**: A shared use footway / cycleway with a minimum width of 2.5m (in accordance with Cambridgeshire County Council Highway and Policy Standards) is to be provided from Nuffield Road to the Busway Maintenance Track / Cycleway to the existing public highway of Nuffield Road. This access is to be separate and parallel to the existing allotment access;
- **Nuffield Road North**: A short shared use footway / cycleway with a minimum width of 2.5m (in accordance with Cambridge County Council Highway and Policy Standards) is to be provided from
Nuffield Road Business Park to the Busway Maintenance Track / Cycleway to the existing public highway on Nuffield Road;

- Moss Bank: a shared use footway / cycleway with a minimum width of 2.5m (in accordance with Cambridgeshire County Council Highway and Policy Standards) will be provided from the existing Public Highway on Moss Bank to the new Busway Maintenance Track / Cycleway;
- Busway: A shared use footway / cycleway with an appropriate width of 4m to the same standard as the existing high quality route parallel to the Busway;
- Bramblefields: An unlit shared use footway / cycleway linking the Busway Maintenance Track / Cycleway with existing paths in the Bramblefields;
- Lighting to the busway service path / cycleway to provide increased passenger security; and
- Clearly designated, well lit, direct pedestrian routes through the car park to the public square.

The aim is to provide maximum accessibility to the CSI site for all sustainable modes of travel in keeping with local and national planning policy, and recognising that these modes are widely used in Cambridge.
Figure 17 shows the proposed on-site cycle/pedestrian infrastructure and likely desire lines.

Figure 17. On Site Cycle/Pedestrian Network

Internally to the site the following pedestrian facilities will allow easy navigation of the station for all:

- All concourse and external levels have been considered and designed so that no ramps are required;
- Seating areas provided in a range of locations throughout the concourse allowing people to stop and rest if required;
- All entrances have wide automated doors;
- Lifts provide step free access via the footbridge from the station building to the platforms. These have been sized to accommodate two cycles and passengers; and
- Steel bicycle wheeling channels are to be installed on the stairs to the bridges for access to and from the platforms. The channel will be 100mm wide and 50mm deep.
4.4. **Parking**

A car park providing approximately 450 spaces will be provided on the site. This will include free short-stay waiting for cars. The free short stay period and charging regime will be determined by the rail industry but is expected to be similar to Cambridge Rail Station where passengers pay per hour or half hour with 10 minutes free at the start of their stay.

Figure 18 shows the layout and location of the proposed car park in relation to the rest of the site area.

![Figure 18. Car Park Location](image)

Parking standards appropriate to the development would usually be included within the TA. However no existing guidance is available from local planning guidance relating to car/cycle parking at rail stations. The number of parking spaces has therefore been determined following detailed analysis of the provision at a range of other stations in the Cambridge sub-region, as well as reviewing the forecast trips and geographic location in relation to accessing the new station.

A more detailed explanation of the demand forecasting and mode share distributions is provided in Chapter 5.
4.4.1. Taxi and Passenger Drop-Off / Pickup
It is proposed to provide a taxi and car drop-off / pickup area to the north of the site extending close to the station building. The area will comprise of a 100m long section of dedicated access road, leading off from the car park access, with a turning head at its very end.

A 38m long waiting bay will be provided close to the station building to allow space for eight cars to wait without impacting on other users (pedestrians, cyclists or other vehicles).

During excessively busy periods the 100m long drop off / pickup area will provide space for vehicles to queue before a space is made available in the 38m long bay. The proposed bay exceeds the existing provision at Cambridge Station.

4.4.2. Cycle Parking
It is proposed to provide parking for approximately 900 cycles to the eastern side of the site close to the station building, with a further 100 spaces just to the north of the station building for those arriving via Cowley Road. The cycle parking will be provided in the form of Sheffield Stand hoops and will be covered.

Compared with the 2,000 cycle stands provided at Cambridge Station CSI will provide a higher ratio of stands per passenger.

Figure 19 shows the layout and location of the proposed cycle parking in relation to the rest of the site area.
4.5. **Servicing**

Servicing will be required for the following:

- Retail concession – service vehicles will access the rear of the station building via the Busway (the section closest to the station) with suitable parking provided adjacent to the bus turning circle; and
- Network Rail – access is required to the Mainline Railway utilising the same approach as detailed above for the retail concession, NR will also require access to the generator room on the Busway.
Anticipated servicing arrangements are indicated in Figure 20 based on the following colour coding:

- Local business access is shown in yellow;
- Access to rail in red; and
- Retail / servicing in blue.

Figure 20. Servicing Arrangements

It is anticipated that, given the size of the retail building, the number of deliveries are likely to be minimal and infrequent (most likely to be weekly deliveries for most produce with up to one-two daily deliveries for fresh produce).

Staff working at the station and retail elements will also need access to the station. Whilst it is currently unconfirmed it is likely that staff will be given a permit to park within the station car park to allow for opening up and closing down during antisocial hours. Again given the size of the station and retail element the number of staff required on site at any one time are anticipated to be minimal.

A servicing and delivery plan will be created as part of the Station Travel Plan proposed under the mitigation measures for the scheme in Section 9.
4.6. Construction Traffic

Construction traffic generation is considered as part of the Environmental Statement for the site (Chapter 13 Transport and Access). In summary, it is predicted that the number of vehicles generated by the site during the construction phases will be considerably less than the number generated during the operation of the station post opening. The proportion of HGVs accessing the site will, however, be higher during construction than post opening. Based on an assumed scenario of average ground contamination it is anticipated that the site could generate up to 42 new two way trips (12 HGVs plus 30 cars) per day during the construction period. As ground investigations have not taken place, this is an estimate based on assumed levels of ground contamination.

4.7. Proposed Rail Service

The actual timetable which will operate at CSI will ultimately be determined by the rail industry. However, the basis of discussions with the rail industry has been around the following standard off-peak hour service provision:

- One fast train to and from London will be provided by the existing Kings Cross – Kings Lynn hourly services calling additionally at CSI;
- One semi-fast train per hour to and from London Kings Cross which will be provided by extending a current service which terminates at Cambridge Station through to CSI. The bay platform at CSI will specifically allow for the reversing of this train away from the main lines; and
- One train per hour to and from Norwich (and Cambridge) through additional stops by the Cambridge Norwich service.

During the peak hours, additional services will also call at CSI including Greater Anglia London Liverpool Street to Ely / Kings Lynn services.

Services are anticipated to operate from around 05:30 hours through to the last scheduled service. The station will operate daily inclusive of Sundays and Bank Holidays except for Christmas Day (and any other days that National Rail services do not operate).

4.8. Summary

CSI will be accessible by all modes of travel therefore limiting the number of car trips generated on the highway network.

The proposed train services available at the new station will widen travel choice for existing staff at the Science Park and staff and students of CRC. It is envisaged that some trips to these destinations may occur by rail in future rather than the private car.

As detailed later in Chapter 5, there is potential for nearly 900 members of staff, who live within the catchment area of a rail station, to use CSI to travel to the Science Park and CRC. In addition, over 200 car trips will be abstracted from Cambridge Station.

The development proposals will take full advantage of the existing sustainable infrastructure located within Chesterton by linking the site to existing infrastructure. The extension of the Busway up to the station’s main entrance, in addition to the provision of very good quality pedestrian / cycle routes linking the site the local area, the provision of approximately 1,000 cycle stands and a proposed car park that is not designed to over provide, will all encourage passengers to use sustainable travel modes.
5. Travel Demand Forecasting

5.1. Introduction
This Chapter outlines the approach adopted to forecasting travel demand to and from CSI. These forecasts are integral to the design of the scheme and form a key part of the Planning Application.

Specifically, this chapter covers:

- A brief overview of the station and rail demand forecasts and the need for more detailed forecasts to support the development of this TA;
- The sources of data which have been drawn upon to inform this TA; and
- The methodological approach adopted to derive the demand forecast using the above data sources.

The following chapters will quantify the impact of this travel demand on the transport network across all modes – the purpose of this Chapter is solely to provide an explanation of how the base inputs to the impact assessment has been derived.

Cautionary notice
It should be noted that forecasting demand for new railway stations is not a precise science and there is no textbook approach to calculating the level of demand that a new rail station will realise. Whilst there is a great deal of research available, most notably the rail industry’s Passenger Demand Forecasting Handbook, every rail station is different precisely because its location is unique within the wider context of the geography of the railways, the local transport network and the economy each services. Access to actual rail patronage is also restricted because of the commercially sensitive nature for train operators and contributes to the level of difficulty in forecasting demand.

In accordance with good practice, a range of data sources have been utilised which are local to Cambridge and take account of the unique characteristics of travel in the local area; namely that the use of sustainable modes is generally much greater than for the rest of the UK. Secondly, whilst the forecasts provided in this Chapter are very ‘precise’ these are only ever as good as the source data and assumptions adopted. In that context, professional judgement is exercised in both developing these forecasts and in applying them to the impact assessments documented in the following chapters.

For the purposes of this Chapter the following definitions apply:

- Two way trip – takes into account both the outbound and inbound trips generated by each person in one day. Where two way trips are referred to, the total one way trips have been doubled to allow for a second trip undertaken by that person;
- One way trip – refers to the first trip made by each person. This could be an inbound or outbound trip; and
- Outbound two way – the total number of outbound trips from the local area, including the return trip.

5.2. Station Demand Forecasts
CSI has a long planning history dating back to 2006/7 when Cambridgeshire County Council submitted a Major Scheme Business Case (MSBC) funding application for a new station at Chesterton. For a variety of reasons, the scheme did not come forward at that time, though the MSBC associated with it has been accepted by the Department for Transport and has been the basis for on-going dialogue through to the present day.

In summary, the MSBC forecasts for weekday demand at Chesterton are outlined below:

- Rail trips generated from Chesterton 3,053
- LESS rail trips abstracted from existing stations -1,581
- PLUS trips attracted into Chesterton 177
- LESS rail trips lost from extended journey times -27
- Net one-way trips per weekday 1,623
The forecasts are for a weekday in 2016, which at the time of the MSBC was assumed to be five years after opening. Overall the impact of the station would be to add around 1,600 additional ‘new to’ rail trips, but at Chesterton itself, it is forecast that there will be around 3,000 outbound trips and some 200 inbound trips. The train service associated with these forecasts remains the same as that currently envisaged and has been described in the earlier Chapter 4.

The issue with these forecasts is that they do not provide enough detail for the purposes of developing the supporting infrastructure and preparing the TA in terms of answering the following questions:

- Where geographically do the c3,000 outbound rail trips originate from in the Cambridge sub region?
- By what mode will they choose to travel to the new station?
- For trips abstracted from other stations, which stations are affected and what mode were those trips being made on?
- What is the profile of arrivals during the day and – critically – what number of trips are travelling to Chesterton during the peak hours?
- For those rail trips arriving at Chesterton, where are these trips destined for, and by what travel mode will they complete their journey?

As a result, it has been necessary to develop a much more detailed understanding of the travel demand arising at CSI in order to determine the associated infrastructure requirements and help prepare the TA to support the Planning Application.

5.3. Data Sources

Cambridge Sub Regional Model (CSRM)

The number of multi-modal trips predicted to be generated has been adjusted using the Cambridge Sub Regional Model (CSRM) which is a land use and transport model of the Cambridge Sub Region. The current version of the model was developed to support the Cambridge TIF submission and the A14 ECI scheme and it continues to be used by Cambridgeshire County Council and the local authorities to look at planning and transport issues. The model comprises the four districts of Cambridge City, South Cambridgeshire, East Cambridgeshire and Huntingdonshire. The model has a validated base year of 2006 and runs through time in five year steps to generate forecasts for 2011, 2016, 2021, 2026 and 2031. The model was developed in line with DfT’s modelling guidance set out in WebTAG and has been used in the most recent DfT led study of the A14.

There are four linked modules that make up CSRM: a land use model; a transport demand model; a highway assignment model; and a public transport assignment model. The highway assignment model operates for a single hour in the AM and PM peak hours and includes a simulation of the junction delays as a result of congestion. The public transport (bus) services occupying road space are included within the highway model to reflect the space required and delays they experience and cause. Freight is not modelled explicitly by CSRM. Goods vehicle movements are included in the highway assignment model with the numbers and growth in trips being derived externally to CSRM, using information from the East of England Regional Model and growth forecasts in line with DfT guidance. These growth forecasts take account of expected growth in population and employment across the sub-region including key strategic sites such as Northstowe and key sites within the Cambridge urban area and are provided in Appendix C of this report.

The CSRM model forecasts used within this TA are with CSI included (referred to as Do Something or DS) and without CSI included (referred to as Do Minimum or DM). The model forecasts are for a forecast year 2026, which is expected to be 10 years after opening, which has been agreed with the LPA during the TA scoping process.

National Rail Travel Survey (NRTS)

National Rail Travel Survey data was used to validate the travel mode data provided by CSRM. NRTS was also used to split up travel modes into more mode subdivisions, whereas, for example, the CSRM does not separate pedestrians from passengers using public transport.
The NRTS includes a wide choice of data ranging from travel times, travel modes, origin / destination rail stations and origin / destination post codes for passengers using all national rail stations. NRTS data for Cambridge Rail Station was specifically extracted and used as a proxy to determine the likely travel mode split at CSI (Passenger modal split). NRTS data was also used to determine the number (and travel mode) of passengers that currently use Cambridge Station but are likely to be attracted to use CSI (Abstracted outbound trips). Reference is made throughout this section to values originating from further analysis on NTRS data. Correspondence to NRTS_Data_REV 5 – summary.xlsx is shown in brackets in the table header (Tab:Table number).

**TRICS**

The TRICS data base was used to determine the number of new trips likely to be generated from future new development at key strategic sites (Number of new outbound development trips on the highway network).

**2001 Census Data**

2001 Census data was used to determine the proportion of new local development trips that will use train travel to get to and from a place or work (Proportion of new development trips by train). (The local characteristics of the Census 2011 Travel to Work survey were not available at the time of writing).

**Cambridge Science Park and Cambridge Regional College Staff Surveys**

Survey data (provided by the Travel to Work group) from the Science Park and the Cambridge regional College has been used to determine the number of new inbound trips at CSI (i.e. Inbound CSI trips).

### 5.4. Methodology and Forecasts

A new station and interchange at CSI will impact on a range of different trips:

- **Outbound** rail trips from CSI:
  - Those trips which have been abstracted from other rail stations in the sub-region – i.e. those that are already being made but will transfer to CSI when it has opened; and
  - Those trips which will be new to the railway either through mode shift from other modes to rail, or as a result of general growth in housing and employment generating new trips to the railway.

- **Inbound** rail trips to CSI:
  - Rail trips made to the immediate area surrounding CSI which in the context of Cambridge will be largely employment and educational trips.

**CSRM forecasts**

CSRM forecasts for 2026 indicated that CSI would generate approximately 4,950 two way passenger trips on a weekday. Note that these forecasts are for the 07:00 to 19:00 period and thus will exclude some travel before and after the modelled period. Also note that these are two-way trips i.e. they include the return portion of both inbound and outbound trips where they take place between the 07:00 to 19:00 period. As a result they are not directly comparable to the numbers presented in section 5.2 above.

In summary, however, CSRM predicts more inbound trips than was the case in the MSBC, which intuitively is correct given the proximity of the Cambridge Science Park and Cambridge Regional College. In terms of outbound trips, these are broadly in alignment, as is the proportion of trips abstracted from other stations. Overall, CSRM provides support for the MSBC forecasts which is encouraging because although strategic, it contains all travel models (including the guided bus) and has a much better view of land use projections than was the case for the MSBC.

**“First Principles” approach**

In order to ratify the CSRM forecasts, a “first principles” approach has been adopted to determine the number of passenger trips being made to and from CSI. Whilst CSRM also provides information on the mode use for travel to and from CSI, it is a strategic model and it would not be prudent to rely on it as the basis for developing the scheme’s access requirements. For example, walking and cycling to the Science Park and the Regional College is well within distances covered by the population of Cambridge – however transport models are usually set up to consider such distances ‘too far’. This first principles approach has therefore been adopted to better determine the likely travel mode of each passenger.
Section 5.4.1 describes the approaches used to estimate the demand at CSI using the data sources outlined in Section 5.3. Figure 21 provides a diagrammatic outline of the methodology applied to determine each of the trip types through CSI. The text following provides a more detailed explanation and the resulting forecasts.

Figure 21. Summary of approach to forecasting CSI trips
5.4.1. Outbound Trips

Abstracted Trips

Transfer from Cambridge Station

The numbers of potential outbound trips that currently use Cambridge Station but could use CSI in the future were determined using NRTS postcode data to gauge the number of potential trips that could be abstracted from Cambridge Station.

Post code data for outbound passengers currently using Cambridge Station were plotted against CSRM zones. These plots are shown in Appendix D.

From these plots the numbers of passengers that are more likely to use CSI when open were assessed. A common sense approach was used to determine which existing trips would use CSI based on location and existing travel mode. Plans showing the number of passengers and zones where passengers are likely to be abstracted from are included in Appendix E.

Table 5 shows a summary of the number of abstracted trips from Cambridge Station to CSI indicating for each mode of access, which current mode of access it has been derived from. This was based on the following assumptions:

- All existing walking or cycling trips to Cambridge Station that were located closer to CSI were assumed to walk or cycle to the station;
- All existing car trips to Cambridge Station that were located closer to CSI were assumed to become car trips to the station;
- All existing Cambridge Station trips (irrelevant of travel mode) within 2km of CSI were assumed to walk to the new station;
- All existing Cambridge Station trips (irrelevant of travel mode) within 3km of CSI were assumed to cycle to the station; and
- 50% of existing Cambridge Station car trips within close proximity to an easy bus journey to CSI were assumed to use public transport (either guided bus or other local bus services) to the new development. The remaining 50% were assumed to be car trips to the new station.

<table>
<thead>
<tr>
<th>Travel Mode (transfer from - to)</th>
<th>No. Trips</th>
<th>% Split</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle - Bicycle</td>
<td>131</td>
<td>12%</td>
</tr>
<tr>
<td>Bus/Coach - Bicycle</td>
<td>12</td>
<td>1%</td>
</tr>
<tr>
<td>Car Park - Bicycle</td>
<td>31</td>
<td>3%</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Bicycle</td>
<td>31</td>
<td>3%</td>
</tr>
<tr>
<td>Bus/coach - Bus/coach</td>
<td>71</td>
<td>6%</td>
</tr>
<tr>
<td>Car Park - Bus/coach</td>
<td>54</td>
<td>5%</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Bus/coach</td>
<td>49</td>
<td>4%</td>
</tr>
<tr>
<td>Car Park - Car Park</td>
<td>209</td>
<td>19%</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Car/Taxi Passenger</td>
<td>100</td>
<td>9%</td>
</tr>
<tr>
<td>Bicycle - Walk</td>
<td>163</td>
<td>15%</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Walk</td>
<td>29</td>
<td>3%</td>
</tr>
<tr>
<td>Car Park - Walk</td>
<td>72</td>
<td>6%</td>
</tr>
<tr>
<td>Walk - Walk</td>
<td>78</td>
<td>7%</td>
</tr>
<tr>
<td>Bus - Walk</td>
<td>91</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1120</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 5. Abstracted Outbound Trips – weekday (3:9)
As Table 5 shows, for cycling, 205 trips to CSI will be formed from trips currently being made by bicycle, walking, car divers and car passengers to Cambridge station. Tables 6 and 7 show the geographical origin of these trips.
Table 6.   Abstracted Outbound Trips (Origin) – weekday (3:11)

<table>
<thead>
<tr>
<th>Travel Mode (from - to)</th>
<th>Local Network</th>
<th>Trip No.</th>
<th>Guided Busway (wider)</th>
<th>NE</th>
<th>NW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle - Bicycle</td>
<td>109</td>
<td>14</td>
<td>5</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Bus/Coach - Bicycle</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Car Park - Bicycle</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Bicycle</td>
<td>31</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bus/coach - Bus/coach</td>
<td>18</td>
<td>36</td>
<td>5</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Car Park - Bus/coach</td>
<td>13</td>
<td>24</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Bus/coach</td>
<td>19</td>
<td>27</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Car Park - Car Park</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>118</td>
<td>118</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Car/Taxi Passenger</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Bicycle - Walk</td>
<td>114</td>
<td>49</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Walk</td>
<td>11</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Car Park - Walk</td>
<td>39</td>
<td>37</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Walk - Walk</td>
<td>68</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bus - Walk</td>
<td>52</td>
<td>39</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>517</strong></td>
<td><strong>253</strong></td>
<td><strong>170</strong></td>
<td><strong>174</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.   Abstracted Outbound Trips (Origin) - Local Network (weekday) (3:13)

<table>
<thead>
<tr>
<th>Travel Mode (from - to)</th>
<th>North</th>
<th>South</th>
<th>SW of Milton Rd</th>
<th>West of Histon Rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle - Bicycle</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>109</td>
</tr>
<tr>
<td>Bus/Coach - Bicycle</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Car Park - Bicycle</td>
<td>0</td>
<td>0</td>
<td>31</td>
<td>0</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Bicycle</td>
<td>0</td>
<td>0</td>
<td>31</td>
<td>0</td>
</tr>
<tr>
<td>Bus/coach - Bus/coach</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Car Park - Bus/coach</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Bus/coach</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Car Park - Car Park</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Car/Taxi Passenger</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bicycle - Walk</td>
<td>6</td>
<td>58</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Car/Taxi Passenger - Walk</td>
<td>3</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Car Park - Walk</td>
<td>11</td>
<td>22</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Walk - Walk</td>
<td>2</td>
<td>5</td>
<td>53</td>
<td>8</td>
</tr>
<tr>
<td>Bus - Walk</td>
<td>14</td>
<td>18</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
<td><strong>111</strong></td>
<td><strong>203</strong></td>
<td><strong>167</strong></td>
</tr>
</tbody>
</table>
The overall impact of CSI on Cambridge Rail Station is a reduction of traffic and therefore lower congestion levels in Cambridge City Centre due to the abstracted rail trips to CSI. These abstracted trips also make a mode shift towards more sustainable modes of travel.

Transfer from Ely Station
The number of outbound passengers that are anticipated to transfer from Ely Station (i.e. passengers that currently use Ely Station that would choose to use CSI in the future) has been taken directly from the CSRM forecasts. Although CSRM demand forecasting is considered to be an underestimate, the results do not have a significant impact on the overall analysis. The Major Business Case prepared for the DfT indicated that the level of abstraction from all neighbouring stations would be 480 trips. This compares to CSRM forecasts (see Table 10) which states that 481 trips will be abstracted to CSI.

Just under 40 one way trips are anticipated to transfer from Ely Station to CSI.

Transfer from ‘other’ Stations
The number of outbound passengers that are anticipated to transfer from ‘other’ local rail stations (i.e. passengers that currently use another rail station but would choose to use CSI in the future ) has been taken directly from the CSRM forecasts. In this case ‘other’ refers to Waterbeach, Huntingdon, St Neots and other local stations in the modelled area. However, CSRM is not able to determine proportions for each station. Given the overall forecast abstraction from other stations in The Major Business Case, this forecast is viewed to be sufficient.

Almost 500 one way trips are anticipated to transfer from ‘Other’ Stations to CSI, of which 65% are anticipated to travel by sustainable modes.

Outbound New Rail Trips
The numbers of new rail trips generated at CSI through mode shift (i.e. entirely new rail trips currently being made by other non-rail modes) have been estimated directly from CSRM.

The new rail trips estimated by CSRM include both inbound and outbound passengers. It is therefore not possible to directly extract new outbound trips only. In addition, it is evident that CSRM under predicts the number of inbound new trips, specifically for CSI, compared with the potential number of inbound trips to the Science Park and CRC (see inbound trips section later in this chapter – 5.4.2). The total number of new trips for CSI is therefore also under predicted, hence it is not possible to just extract the number of new inbound trips, predicted later in this chapter, from the total number of new trips predicted by CSRM.

A number of assumptions have therefore been applied to help differentiate the number of new outbound trips.

The number of new inbound trips forecast in CSRM is 70% lower than the number of inbound trips calculated later (section 5.4.2) from a first principles approach. All outstanding CSRM total new rail trips were then assumed to be new outbound rail trips.

Almost 500 outbound two way ‘new to’ rail trips are anticipated to be generated by CSI of which half are anticipated to travel by sustainable modes.

New Development Trips
The numbers of CSI passenger trips generated through future growth at the strategic sites in the Cambridgeshire area were estimated through the use of the TRICS database, 2001 census data and NRTS model split data for Cambridge Station (see Table 2).

The trip rate per person was determined using a selection of mixed private residential developments across England contained within the TRICS database. This trip rate was then applied to each of the following local committed developments to determine the total number of trips generated by each site:

- Northwest Cambridge - 4780 dwellings;
- Northstowe Development Site – 1500 residential dwellings;
- Arbury Camp – 1120 dwellings.
The number of dwellings were obtained for the strategic development sites in the Cambridge Sub Region (as they stood in the spring of 2012) and was agreed with CCC at the scoping stage. These growth assumptions were input into the CSRM modelling and are identical to the land use planning scenario adopted by the A14 DfT study undertaken in 2012. They relate to a land use scenario where there is no upgrade to the A14, which is required in order to evaluate the benefit attributable to an upgrade. Cambridge North Fringe East is not included in the forecast of new development trips as it is subject to its own proposals. Similarly, Milton Road City Deal Scheme is not taken into account as the project is not yet committed.

The TRICS database was then used to determine mode split for each development site based on the only multimodal survey available in the TRICs database within the Cambridgeshire area. The site extracted from TRICS is located in Chesterton and is a residential mixed use development. Although each development site has an associated Transport Assessment with Trip Rates, a standard robust trip rate was determined for all developments. The output from the TRICS process is shown in Appendix F.

The 2001 Census was then used (in combination with CSRM for the Inter peak) to determine that 4% of Cambridge journey to work trips in the AM peak are by train and 2% of daytime trips made from Cambridge are by train. Combined with NRTS data extracted for Cambridge Station and the multi-modal trip generation data for a site within Chesterton the number of potential new trips to CSI from the strategic development sites listed above was estimated and this is shown in Table 8. The methodology used to determine the trip rates to the development from new residential developments is based on the following assumptions:

- Total CSI person trips were determined from TRICS for each development;
- The modal split of rail passengers at Cambridge Station was determined from NRTS.
- The 2001 Census data was used to determine the proportion of journey to work trips by train in Cambridge in both the AM and interpeak period. A nominal increase was applied to the AM peak value to take account of there now being two stations within Cambridge;
- The modal split data for Cambridge Station was then multiplied by the proportion of trips to work by train to determine the travel mode of each new development trip that will use train as part of their journey; and
- Depending on the location of each development, either 50% or 100% of these new rail trips were assumed to use CSI.

Table 8 shows the number of potential new trips to the site from the strategic development sites for the AM peak and interpeak periods.
Almost 500 one way rail trips are anticipated to be generated through CSI from new residential developments, of which 60% are anticipated to travel by sustainable modes.

### 5.4.2. Inbound Trips

**Existing Trips to the immediate area surrounding CSI**

The number of inbound passenger trips generated from the immediate area surrounding CSI was determined from staff survey data obtained from the Science Park and the Cambridge Regional College. This data was used to determine the number of staff that currently live within the catchment of a railway station that will be linked to CSI by no more than one transfer rail trip. A robust assumption was used where 100% of staff that live within each catchment area would use rail as their preferred trip. This assumption allows for the worst case number of walking/cycling trips crossing Milton Road in the peak periods. The post code plots for the Science Park and the Cambridge Regional College are provided in Appendix G. Generally stations were assumed to have a catchment of 5 miles though larger stations adopted a catchment of 10 miles. Any Science Park or CRC employees within a stations catchment area are assumed to change mode and travel to work by train via CSI to gain access to the Science Park and CRC. The students from CRC were not taken into account in this analysis as the post code data was not available. The robust use of the staff data (i.e. 100% of staff within the catchment of a train station were assumed to use CSI) should take account of the pupil trips.

The travel mode of these inbound passenger trips, at the CSI end of their trip, was then determined based on NRTS modal split data, which has undergone further analysis, for Cambridge Station split between cycle and walk.

The total number of potential inbound passenger trips that would use CSI is shown in Table 9.
Table 9. Total Inbound CSI Trips (2026 - weekday) (6:6)

<table>
<thead>
<tr>
<th>Destination</th>
<th>Trips AM peak (07:00 - 10:00)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public Transport</td>
<td>Cycle</td>
<td>Walk</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Science Park</td>
<td>107</td>
<td>89</td>
<td>502</td>
<td>698</td>
<td></td>
</tr>
<tr>
<td>Regional College</td>
<td>26</td>
<td>22</td>
<td>123</td>
<td>171</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>111</td>
<td>625</td>
<td>869</td>
<td></td>
</tr>
</tbody>
</table>

Almost 500 one way rail trips are anticipated to be generated through CSI from the local area, of which all are anticipated to travel by sustainable modes.

5.5. Overall Trip Generation Forecasts

The total number of anticipated trips generated by CSI, derived from the above methodology and calculations is summarised in Table 10.

Table 10. Total CSI Demand Trips (2026 – weekday, both directions) (7)

<table>
<thead>
<tr>
<th>Component</th>
<th>One Way Trips</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Car</td>
<td>Taxi / drop off / pick up</td>
<td>PT</td>
<td>Cycle</td>
<td>Walk</td>
<td>One Way Total</td>
<td>Two Way Total</td>
</tr>
<tr>
<td>(1) Total Abstracted from Cambridge Station</td>
<td>209</td>
<td>100</td>
<td>174</td>
<td>205</td>
<td>433</td>
<td>1,120</td>
<td>2,240</td>
</tr>
<tr>
<td>(2) Transfer from Ely (CSRM)</td>
<td>26</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>38</td>
<td>75</td>
</tr>
<tr>
<td>(3) Transfer from other Stations (CSRM)</td>
<td>107</td>
<td>47</td>
<td>144</td>
<td>144</td>
<td>0</td>
<td>443</td>
<td>885</td>
</tr>
<tr>
<td>(4) Brand New Outbound Rail (CSRM)</td>
<td>101</td>
<td>44</td>
<td>23</td>
<td>94</td>
<td>95</td>
<td>357</td>
<td>715</td>
</tr>
<tr>
<td>(5) Total New (from local dev)</td>
<td>152</td>
<td>40</td>
<td>88</td>
<td>127</td>
<td>80</td>
<td>485</td>
<td>971</td>
</tr>
<tr>
<td>(6) Brand New Inbound Rail (CRC + SP)</td>
<td>0</td>
<td>0</td>
<td>133</td>
<td>111</td>
<td>625</td>
<td>869</td>
<td>1,738</td>
</tr>
<tr>
<td>Total New + Abstracted Trips</td>
<td>594</td>
<td>242</td>
<td>562</td>
<td>680</td>
<td>1,233</td>
<td>3312</td>
<td>6623</td>
</tr>
</tbody>
</table>

Overall, the demand identified in Table 10 above bears close similarity with the demand forecasts contained in the MSBC referred to in Section 5.2. The proximity of the Science Park and CRC to CSI explains the difference in the amount of inbound rail trips made through CSI with 850 trips forecast for this TA compared to 177 in 2006/7. In overall numbers, therefore, this analysis correlates to the MSBC station demand forecasts using independent data sources and thus provides a good degree of confidence in the amount of travel to and from CSI adopted for the TA.

Table 10 above also identifies that, over an entire weekday in 2026, there would be around 600 trips by car made to CSI, along with around 240 vehicular drop-offs. Car Park sizing is discussed in the next chapter though these forecasts have been taken into account in determining the size of car park to be provided. Table 10 also shows that some 1,900 trips will be made by walk and cycle. The exact split between the two is not as precise as shown in the table and indeed individual preferences will change on a daily basis given weather conditions amongst other reasons. However it does show that a considerable number (60%) of non-vehicular access trips will be made when considering both inbound and outbound travel.
5.6. Summary

Demand forecasts which were prepared to support the MSBC in 2006/7 for the new rail station do not provide enough detail on the numbers and origins of access and egress trips associated with CSI to be used within this TA. A further, more detailed assessment has been made using a variety of data sources in order to better understand the origins and mode of access for trips to and from CSI. This analysis matches closely the overall number and make up of demand in the business case, though it is considered there will be a greater amount of inbound travel by rail. The analysis also shows that there will be a significant amount of access made by non-vehicular modes (walking and cycling). The data shown in Table 10 is used in the following Section of this report.
6. Traffic Impact Assessment

6.1. Introduction and overview
This Chapter provides an assessment of the anticipated impact on the highway network as a result of traffic generated by CSI. It includes the work undertaken to determine the amount of car parking to be provided which in turn is the key driver of the traffic impacts CSI. It also notes that there will be beneficial impacts to some other parts of the highway network in and around Cambridge as a result of trips abstracted by the new station and interchange.

Figure 22 below provides a summary overview of the approach to undertaking the Traffic Impact Assessment reported in this TA:

![Figure 22. Overview of approach to CSI Highway Impact Assessment](image)

Figure 22 shows that the basis of the analysis is the forecasts of travel demand provided by the Cambridge Sub Regional Model (CSRM). CSRM forecasts provide a view of demand for travel by car which is unconstrained by the car park size; this has required a separate ‘off-line’ assessment of the size of car park. The proposed size of car park has then been used to ‘constrain’ the SATURN highway model (which is a component of the CSRM modelling framework) in order to ensure that volumes of traffic arriving and departing at CSI are in accordance with the capacity of the car park to be provided. All of this is explained within this Chapter.

The same SATURN forecasts of traffic assignment to the local highway network have been used to inform detailed junction capacity impact assessments; those impact assessments are documented in Chapter 7.

6.2. CSRM Forecasts
The CSRM model provides forecasts of car arrivals at CSI, by time period, for 2026 (ten years after opening – as agreed at the TA scoping stage). These forecasts include those arriving in cars which are parked at the station as well as those arriving by passenger in a car being driven by others (either car share or taxi either of which is subsequently driven away). It is therefore necessary to reduce these forecasts to take account of car sharers / taxi users from which a forecast of overall parking requirements can be derived. Further, account needs to be taken for employees and servicing needs. Analysis of the NRTS dataset for Cambridge station provides a suitable factor to take account of those arriving by car share / taxi. Table 11 below shows the calculated car park demand (along with predicted car arrivals) and the proportion of those actually parking cars as derived from NRTS.
Table 11. Forecast CSI Car Parking Demand based on CSRM 2026 forecasts and NRTS

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Car Arrivals at CSI (CSRM – 2026)</th>
<th>Proportion of car arrivals at Cambridge Station which are parking (NRTS Data)</th>
<th>Derived demand for car parking at CSI for 2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM</td>
<td>892</td>
<td>70%</td>
<td>625</td>
</tr>
<tr>
<td>IP</td>
<td>783</td>
<td>62%</td>
<td>488</td>
</tr>
<tr>
<td>PM</td>
<td>35</td>
<td>44%</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>1,710</td>
<td>-</td>
<td>1,128</td>
</tr>
</tbody>
</table>

If all of the demand forecast in Table 11 above were to be provided for, it would indicate that a car park size of over 1,100 spaces would be needed at CSI – assuming that there is no churn (i.e. individual spaces are not reused more than once over the course of a day), whereas an element of churn is expected.

6.3. Car Park Size

Car Park size has been calculated based upon both a top down (benchmarking) and bottom up (CSRM) process, both of which are detailed in the following sections. Technical Note 10 in Appendix H provides further details on the actual calculations used in this process.

6.3.1. CSRM adjusted forecast

Table 11 above implies a car mode share of c55% (1,710 car trips out of the total 3,053 passengers trips anticipated under the MSBC for the development) if CSRM forecasts are taken at face value. As outlined in Chapter 5, the initial impression of these forecasts is that the model is overestimating the level of car demand and under estimating that arriving by cycle, walking and public transport given known preferences for these modes in Cambridge. To confirm this assertion, the mode share at Cambridge station (as observed in the NRTS data set provided by the DfT – see Table 2) has been compared with the car mode share at Cambridge as forecast by CSRM. Table 12 below shows this comparison:

Table 12. CSRM vs. NRTS Mode Share comparison – Cambridge Station

<table>
<thead>
<tr>
<th>Access Mode</th>
<th>Proportion by mode</th>
<th>CSRM</th>
<th>NRTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>53%</td>
<td>53%</td>
<td>22%</td>
</tr>
<tr>
<td>Cycle</td>
<td>18%</td>
<td>18%</td>
<td>21%</td>
</tr>
<tr>
<td>Walk / Bus</td>
<td>29%</td>
<td>29%</td>
<td>57%</td>
</tr>
<tr>
<td>All mode</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

The comparison in Table 12 clearly shows that – for Cambridge Station – CSRM is over predicting car demand (53% compared to 22%).

Technical Note 10 in Appendix H outlines the methods used to adjust and justify the number of car park spaces being provided at CSI. Three methods were applied to the CSRM forecasts shown in Table 11, which indicated that a car park of between 400 and 575 spaces would be required to support the station. In short the methods involved:

1) Reducing the CSI car mode share based on the difference between car mode share calculated through CSRM and NRTS data;
2) Correcting car mode journeys based on Cambridge Station;
3) Correcting walk / bus mode share at Cambridge Station.
This provides a range of ‘likely’ provision and the upper limit is in accordance with the ‘first principle’ forecasts of demand arriving by car identified in Table 10 of the previous chapter.

6.3.2. Benchmarking approach
An alternative analysis of car parking demand was undertaken using a ‘top down’ approach by benchmarking provision at other station car parks in the sub-region. Using station entry passenger demand for 2009-2010 published by the Office of the Rail Regulator, a ratio of car parking spaces per 1,000 boarding passengers per annum has been derived across a number of stations in the sub-region. Table 13 below provides this analysis.

---

2 Data on station car park size is drawn from National Rail’s website.
Table 13. Ratio of parking spaces per boarding passengers at various sub region stations

<table>
<thead>
<tr>
<th>Station</th>
<th>Station Entries p.a. 2009-2010 (000’s)</th>
<th>Car Park Size as at 2012</th>
<th>Ratio of car park space per 1,000 passenger p.a.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge</td>
<td>3,831</td>
<td>435</td>
<td>0.11</td>
</tr>
<tr>
<td>Newmarket</td>
<td>83</td>
<td>12</td>
<td>0.14</td>
</tr>
<tr>
<td>Ely</td>
<td>790</td>
<td>121</td>
<td>0.15</td>
</tr>
<tr>
<td>Shepreth</td>
<td>40</td>
<td>11</td>
<td>0.28</td>
</tr>
<tr>
<td>Waterbeach</td>
<td>133</td>
<td>40</td>
<td>0.30</td>
</tr>
<tr>
<td>Meldreth</td>
<td>103</td>
<td>46</td>
<td>0.45</td>
</tr>
<tr>
<td>Royston</td>
<td>556</td>
<td>341</td>
<td>0.61</td>
</tr>
<tr>
<td>St.Neots</td>
<td>501</td>
<td>349</td>
<td>0.70</td>
</tr>
<tr>
<td>Huntingdon</td>
<td>771</td>
<td>742</td>
<td>0.96</td>
</tr>
<tr>
<td>Whittlesford</td>
<td>159</td>
<td>379</td>
<td>2.39</td>
</tr>
</tbody>
</table>

As shown in Table 13, City Centre locations like Cambridge, where people can more easily access the station by other modes such as walking, cycling and public transport, and the land availability for providing car parking is more limited, the ratio is low and nearer to zero. Meanwhile in the case of Whittlesford, which is located in proximity to the A11 and M11 trunk roads, the ratio is much greater.

The above analysis provides the basis for considering an appropriate ratio of car parking provision for use at CSI taking into account wider considerations of accessibility by other modes and proximity to existing areas of population and employment. In summary, there are three broad categories:

1. Cambridge station which is highly accessible for non-car modes and would represent the lower end of car parking provision for CSI;
2. The average of stations in the sub-region including Waterbeach, St.Neots, Huntingdon, Royston, Meldreth and Shepreth which would represent a good sample of similar sized stations in the sub-region and reflects varying levels of accessibility by non-car mode; and
3. Whittlesford which acts very much as a parkway station where access by non-car mode is limited.

Based on the above approach, Table 14 below sets out the size of the car park at CSI that would be required using ratios appropriate for the three categories above. This has been done for a range of demand forecasts for CSI as forecast in the original MSBC work (for 2021 which was 10 years after opening) as well as for CSRM 2026 and a CSRM 2026 plus 25% (as a sensitivity). The MSBC annual forecast of parking at the development in Table 14 has been sourced directly from MSBC (830,000). The CSRM annual forecast is based on an annualisation of 285 to factor up all day to annual demand derived from the MSBC. CSRM forecasts that in 2026 there will be 2769 boarders per 12 hour weekday (2769*285=789,165). The margin of error between a 12 hour day and all day demand is not significant for the purposes of car park assessment.

Table 14. Range of CSI car parking requirements

<table>
<thead>
<tr>
<th>Station category</th>
<th>Ratio of car park spaces per 1,000 boarding passengers</th>
<th>MSBC forecast plus 10 years (830,000)</th>
<th>CSRM forecast 2026 (790,000)</th>
<th>CSRM forecast 2026 plus 25% (986,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambridge</td>
<td>0.11</td>
<td>91</td>
<td>87</td>
<td>108</td>
</tr>
<tr>
<td>Nearby Similar Stations</td>
<td>0.49</td>
<td>407</td>
<td>387</td>
<td>483</td>
</tr>
<tr>
<td>Whittlesford</td>
<td>2.39</td>
<td>1,984</td>
<td>1,888</td>
<td>2,357</td>
</tr>
</tbody>
</table>

CSI will not be as accessible as the existing Cambridge station and it is likely to be more attractive to car users given its location adjacent to the A14. However it will be well served by public transport including
Busway services along the A14 corridor, and it will be well connected to walking and cycling routes given its urban location. Applying the “nearby similar stations” ratio of half a parking space per 1,000 boarding passengers p.a. would indicate that a car park of between 390 and 480 is appropriate for CSI.

6.3.3. Sense Check

A sense check on the proposed car park has been undertaken based on an accumulation profile derived from CSRM as well as the first principles approach detailed in Chapter 5 above. Table 10 in Chapter 5 shows that 594 car trips (excluding drop offs) are estimated to be generated by CSI over an entire day indicating that, when taking account of short stay parking, ‘churn’ of parking spaces and the alternative sustainable travel options available, a 450 space car park would be appropriate. It is also noted that this size will serve to encourage take up of non-car modes for access to CSI, and that this would be appropriate for a part of the country which is noted for its higher use of non-vehicular trips as compared to the UK average.

6.3.4. Overspill parking

Concerns about fly parking in the vicinity of the station were expressed during public consultation of the CSI proposals. Considerable attention and analysis has been paid to the demand for car parking which is detailed in the preceding sections of this document. Our analysis provides a most likely range of car park size on which a 450 space car park has been selected. This size has been derived through interrogating a number of data sources and by adopting a number of different means of predicting demand for car parking, including the “first principles” approach documented in the previous chapter. However, such analysis can never be presented as being scientifically conclusive, and there will always be uncertainty in forecasts.

It is therefore proposed to control parking in the vicinity of the station through Traffic Regulation Orders. These would be implemented along the entire length of Cowley Road. In addition, the Council recognises that there are concerns about on-street parking and will monitor parking within the residential area before and after the opening of the new station. If it is found that problems are arising from on-street parking then any necessary controls will be developed and introduced in consultation with local residents and businesses.

6.3.5. Conclusion

Taking into account the analysis outlined above which uses a range of differing data sets and considers a range of likely forecasts, a station car park with a capacity of 450 spaces is considered appropriate for CSI. Whilst this does not meet the upper limits indicated by both the benchmarking and CSRM forecasts, in accordance with planning policy it is imperative that car parking is not overprovided as this will serve to encourage access by car at the expense of the considerable provision for public transport, walking and cycling which will be provided at CSI. Moreover, forecasts are for 2026, ten years after the station opening date and in the case of the benchmarking approach, the upper limit incorporates a ‘plus 25%’ test. Technical Note 10 (Appendix H) provides a more detailed analysis of the car park size calculations.

6.4. Highway Network Assignment (SATURN)

The previous sections have outlined how the capacity of car parking has been determined and which will – in turn – influence the volume of traffic attracted to CSI on the local highway network. The SATURN highway assignment model is a component of the CSRM modelling suite and it has been used to determine the flows and routes that traffic will take to arrive at, and depart, CSI. Whist a car park with 450 spaces has been determined as being most appropriate, for the purposes of undertaking a ‘worst case’ highway impact assessment, a car park with a capacity of 600 spaces (i.e. 150 more parking spaces than that proposed and therefore an increase in vehicle trip generation of 33% compared with that anticipated) has been assumed in the SATURN highway modelling to ensure robustness in assessing highway impacts. Information for the forecast 2026 AM and PM peak hours, taking account of a constraint on car parking of 600 spaces, has been extracted. The results are shown and summarised in this section.

SATURN output flows were audited against radial passing counts undertaken in 2012 on Milton Road south of A14 / Milton Road Interchange, a 2012 turning count at the Golden Hind Junction, and passing counts at the Science Park entrance carried out in 2010. Count data for the two sites is presented in Appendix I. This audit showed that the 2011 SATURN model approximately matched the Golden Hind 12 hour turning count in both peak hours. However, the audit also showed that the SATURN model was 500 vehicles lower in the PM peak period on the northbound Milton Road link between the Science Park and the A14 as well as the exit movement from the Science Park compared with the count data. In the AM peak the model was 400 vehicles short on the same southbound Milton Road link as well as the right entry to the Science Park. The
SATURN model base turning flows have been corrected for this discrepancy before undertaking the impact assessments of CSI. The adjustments made to the base SATURN flows were also replicated as part of the future year SATRUN flow calibration.

The CSRM model forecasts do not take account of non-parking traffic exiting CSI (for example drop-off trips by car or taxi). An additional SATURN model assignment was undertaken which had been adjusted to allow for a proportion of vehicular trips to exit the station and re-enter highway network. The proportion of trips assumed was based upon the proportion of inbound car trips currently exiting at Cambridge Station as derived from the NRTS database (Tab 3 Box 5). The taxi drop off/pick up proportion to/from CSI was obtained from the NRTS data. NTRRS suggests that only 70% of the inbound car trips actually park, and the other 30% immediately exit. This 30% drop off/pick up return trips were added manually (to the departure or origin trips) by adding 30%. A comparison of the model runs with and without this adjustment indicated that there was very little impact on the overall network and thus the SATURN assignment forecasts without this adjustment have been used and are the ones referred to in the subsequent assessments. However, the junction capacity assessments reported in the next chapter do include appropriate adjustments for drop-off traffic exiting CSI.

Figure 23 shows the volumes and routing of highway traffic destined for the station in the AM peak hour (08:00 to 09:00) - 236 vehicles are attracted to CSI in the AM peak. This figure shows that the majority of these 236 vehicles destined for CSI in the AM peak hour originate from the north and west of Cambridge, with little traffic originating from the centre, east and south of Cambridge. Because of congestion on the A14 (there are no upgrades to the A14 assumed in the highway network modelling) some of the inbound traffic routes via Huntingdon Road and around the ring road and out along Milton Road.

Figure 24 shows the net impact on traffic (changes in flows) as a result of CSI. It clearly shows that there are decreases in traffic on a wide range of roads across the network including the A14 and M11. These changes are brought about primarily by the abstraction of rail travel from Cambridge Station, but also by what are referred to as ‘secondary’ effects; that is that rail travellers in changing their station of choice to CSI, may also be able to change their mode of access to the station, bringing walking / cycling and public transport options into play. Overall, there is a benefit of around 100 less passenger car units on Station Road in Cambridge in the AM peak hour. CSI will therefore have a beneficial effect on the environment for all users of Station Road, not least the bus operators and pedestrians / cyclists.

Detailed traffic flow data taken from SATURN is provided in Appendix J.

Figure 25 highlights the highway links predicted to have greater than a 5% increase/decrease in traffic flow in 2026 as a result of the CSI development. The key links experiencing increases in traffic flow of more than 5% are:

- Cowley Road;
- Green End Road/Chesterton High Street;
- Milton Road southbound between Queen Elizabeth Way and Mitchams Corner;
- Milton Road between Cowley Road and Green End Road;
- Kings Hedges Road between Cowley Road and St. Kilda Avenue;
- NIAB orbital site road; and
- Alex Wood Road.

The changes experienced on the NIAB orbital site road and Alex Wood Road represent a change of less than 15 passenger car units (pcu) and as a result it was agreed with the LPA that these areas will not need to be assessed within this TA.

Routeing via Chesterton High Street and Green End Road is a function of the congestion on Milton Road as drivers re-route. To a large extent, the increasing congestion on the outbound Milton Road is caused by wider growth in the area and which causes this ‘overspill’ onto adjacent roads. Analysis of the 2016 SATURN model indicates that there are around 100 car trips distributing towards CSI, of which around half try to route via Chesterton High Street and Green End Road because of congestion on Milton Road itself. A significant proportion of these vehicles will already be on the highway network though as CSI is not generating many brand new car trips. In terms of two way flow the level of CSI traffic on Green End Road makes up approximately 7% of existing traffic levels in 2016 in the AM peak and 2% in the PM peak. In addition, whilst SATURN routes traffic via the best route in terms of capacity the model does not take full account of driver
behaviour (for example; drivers following signage along main routes and drivers sticking to the most direct route irrelevant of capacity as they don't know a quicker rat run).

Provision for additional vehicular capacity on Milton Road to mitigate this issue would be expensive and hinder local residents and, in any case, would only serve to ‘encourage’ the routing of traffic to CSI via the Inner Ring Road, rather than via the A14. The root cause is thus the A14 for which the Highways Agency has been instructed to develop a significant enhancement scheme which could, realistically, be in place by the early to mid 2020s. It is not therefore considered necessary to provide any capacity mitigation to Milton Road in this location, however it is considered prudent to provide high-quality signing to the site for all major routes (i.e. encouraging Milton Road as a route rather than Green end Road).

The proposed 20mph zone area within Chesterton has been noted as part of this TA but the detailed impact these zones will have on CSI trips has not been taken into account within the junction modelling as the final details of the zones is not yet known. However, the proposed 20mph zones will only serve to encourage more cars onto the main routes and away from local residential roads, which will benefit the local area.

On the basis of the links experiencing increases in traffic flow of more than 5% outlined above, it was agreed that the following junctions would be assessed in more detail as part of the TA:

- Cowley Road / Milton Road – LinSig;
- Cowley Park / Milton Road – LinSig;
- Kings Hedges Road / Milton Road/Green End Road – LinSig;
- Union Lane / Arbury Road / Milton Road - LinSig ;
- Milton Road/Elizabeth Way / Highworth Avenue – ARCADY/LinSig; and
- Chesterton Junction Level Crossing.

Whilst the impact on the A14 / A10 interchange junction is predicted to be less than 5% it was agreed with the HA that the impact on delay at this junction would also be assessed in more detail, specifically the A14 off slips. Further operational analysis has been undertaken for the HA and they have confirmed their support for CSI.
Figure 23. Volumes and Routing of Highway Traffic Destined for the Station – AM Peak Hour
Figure 24. Net difference in traffic flows on highway network (with and without CSI)
Figure 25. Links with change in flow greater than 5%
6.5. Traffic Impact

6.5.1. Percentage Impact Assessment

A percentage impact assessment has been carried out on the local highway network as agreed with the LPA for the design year 2026. Table 15 shows the results of the impact assessment for the worst case turning movements. It is acknowledged that the percentage impact on Cowley Road will be high as this road forms the access to the site. This is especially the case for the northbound right turn movement onto Cowley Road and the left turn out of Cowley Road at the Science Park junction as few vehicles currently make these movements compared with the number of vehicles that will following the opening of CSI.

Table 15. Percentage Impact Assessment (2026)

<table>
<thead>
<tr>
<th>Arm</th>
<th>AM Peak (08:00-09:00)</th>
<th>PM Peak (17:00-18:00)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A14 / A10 Intersection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastbound off slip</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>A10</td>
<td>-3%</td>
<td>-1%</td>
</tr>
<tr>
<td>Cambridge Road</td>
<td>4%</td>
<td>-1%</td>
</tr>
<tr>
<td>Westbound off slip</td>
<td>0%</td>
<td>-1%</td>
</tr>
<tr>
<td>Milton Road</td>
<td>-2%</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Total Junction</strong></td>
<td>0.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td><strong>Milton Road / Cowley Road North</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road Southbound</td>
<td>2%</td>
<td>-2%</td>
</tr>
<tr>
<td>Cowley Road</td>
<td>11%</td>
<td>19%</td>
</tr>
<tr>
<td>Milton Road Northbound</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total Junction</strong></td>
<td>1.7%</td>
<td>1.1%</td>
</tr>
<tr>
<td><strong>Milton Road / Science Park / Cowley Road</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road Southbound</td>
<td>-2%</td>
<td>-4%</td>
</tr>
<tr>
<td>Cowley Road</td>
<td>24%</td>
<td>111%</td>
</tr>
<tr>
<td>Milton Road Northbound</td>
<td>11%</td>
<td>2%</td>
</tr>
<tr>
<td>Science Park</td>
<td>2%</td>
<td>-1%</td>
</tr>
<tr>
<td><strong>Total Junction</strong></td>
<td>2.6%</td>
<td>2.1%</td>
</tr>
<tr>
<td><strong>Milton Road / Cowley Park</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road Southbound</td>
<td>-1%</td>
<td>6%</td>
</tr>
<tr>
<td>Cowley Park</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Milton Road Northbound</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total Junction</strong></td>
<td>4.1%</td>
<td>2.6%</td>
</tr>
<tr>
<td><strong>Milton Road / Kings Hedges Road / Green End Road</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road Southbound</td>
<td>-2%</td>
<td>6%</td>
</tr>
<tr>
<td>Green End Road</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>Milton Road Northbound</td>
<td>12%</td>
<td>1%</td>
</tr>
<tr>
<td>King Hedges Road</td>
<td>5%</td>
<td>-3%</td>
</tr>
<tr>
<td><strong>Total Junction</strong></td>
<td>5.1%</td>
<td>2.6%</td>
</tr>
<tr>
<td><strong>Milton Road / Union Lane / Arbury Road</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road Southbound</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Union Lane</td>
<td>-7%</td>
<td>-6%</td>
</tr>
<tr>
<td>Milton Road Northbound</td>
<td>8%</td>
<td>0%</td>
</tr>
<tr>
<td>Arbury Avenue</td>
<td>-6%</td>
<td>-4%</td>
</tr>
<tr>
<td><strong>Total Junction</strong></td>
<td>2.7%</td>
<td>0.7%</td>
</tr>
</tbody>
</table>
A diagram showing the impact of each turning movement is attached in Appendix K. Table 15 shows that the percentage impact of the development traffic on the local highway network is on the whole minimal. Some turning movements are predicted to have a noticeable increase but the total impact (all movements combined) at every junction falls below 5%.

It is again worth noting that this impact assessment takes into account a very robust assumption where 133% of the anticipated vehicle trips generated by CSI have been added onto the highway network. Of the 236 vehicle trips assumed to enter CSI in the AM peak hour only 160 are anticipated to actually hit the highway network in reality.

Despite the minimal impact, a capacity assessment has been carried at all of the above junctions and the results are reported in Chapter 7.

## 6.6. Chesterton Junction Level Crossing (Fen Road)

### Background

The existing level crossing at Fen Road will be impacted upon by changes in frequency of train services associated with the proposals for CSI. This section of the report reviews the impact of any increases in barrier down time on existing road users.

The existing level crossing is a CCTV monitored crossing controlled by the signaller at Cambridge. Existing barrier downtime per train in each direction is approximately 180 seconds\(^3\). As a result of trains calling at CSI the following is anticipated:

- Trains not scheduled to stop at the new station will not affect the current barrier down time which will remain at 124 seconds per train. This will be the case for Cross Country train services.
- The project rail engineering team is currently in the process of designing ‘Stopping / Non-stopping’ controls for the Level Crossing, which will be in place prior to the opening of CSI. This will allow trains which are due to leave the station towards Cambridge (either from the bay or mainline platform) to undertake platform duties before the barriers are lowered, thus minimising the barrier down time and inconvenience to users of Fen Road.
- With these controls, it is estimated that the barrier down time per Cambridge bound train will remain the same (approximately 124 seconds per train), as the time lost through the need to accelerate from the platform will be gained by the barrier only needing to be called once the train is ready to depart the platform 200 metres from the barrier.
- It is envisaged that northbound trains which stop at the new station, will increase the barrier down time slightly, by a maximum of 20 seconds, due to the deceleration of the train as it approaches CSI.

The only increases to barrier down time due to the proposed development of CSI, will be as a result of:

- Additional trains extended from Cambridge to CSI (and which do not currently pass Fen Road), increasing the total hourly barrier down time by 144 seconds per new train (existing average plus 20 seconds), per direction. There will be a maximum of one new train per hour throughout the day making two movements.
- Existing northbound services which will stop additionally at CSI will increase the barrier down time slightly, by a maximum of 20 seconds, due to train deceleration.

\(^3\) Derived from existing Network Rail data
Based on the above, an analysis of the impacts on road users has been undertaken. In support of this, a traffic survey was undertaken for a 10 day period between 8th – 17th December 2012. The full results of this survey are attached in Appendix L.

**Table 16 summarises the results of the survey.** The table includes for the busiest period for each travel mode and therefore provides for an absolute worst case scenario.

<table>
<thead>
<tr>
<th>Train / Pedestrian / Vehicle</th>
<th>Period</th>
<th>Northbound</th>
<th>Southbound</th>
<th>Northbound</th>
<th>Southbound</th>
<th>Northbound</th>
<th>Southbound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Northbound</td>
<td>Southbound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trains</td>
<td></td>
<td>70</td>
<td>73</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eastbound</td>
<td>Westbound</td>
<td>Eastbound</td>
<td>Westbound</td>
<td>Eastbound</td>
<td>Westbound</td>
</tr>
<tr>
<td>Pedestrians</td>
<td></td>
<td>85</td>
<td>68</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vehicles</td>
<td></td>
<td>1,244</td>
<td>1,226</td>
<td>75</td>
<td>122</td>
<td>16</td>
<td>46</td>
</tr>
</tbody>
</table>

Table 16 shows that during an absolute worst case peak hour, two vehicles pass the railway line (in any one direction) every minute and are opposed by one train every 10 minutes.

In terms of barrier downtime, the survey showed that on the busiest day, (in terms of trains), the level crossing barrier was down for an average of 22 minutes 45 seconds per hour (an average of 124 seconds per train), which led to a total barrier downtime during the day of 6 hours 49 minutes. This shows that in a worst case peak hour, only 46 of the 122 vehicles counted are currently impacted upon by the barrier being down.

On an average weekday the barrier downtime reduced to 19 minutes 14 seconds during the off-peak period.

Over an average day (seven day week) the barrier down time was just 17 minutes 44 seconds per hour.

**Impact per Hour**

One extra train terminating in the bay platform and then leaving the bay platform within the same hour (i.e. two movements) would lead to an increase in barrier down time of 288 seconds per hour (144 seconds per movement).

An increase of 20 seconds per existing northbound train, which are planned to call at CSI (maximum of two trains per hour), would lead to an increase in barrier downtime of 40 seconds per hour.

Based on these increases the new average daily barrier down time per hour is anticipated to be on average 28 minutes 23 seconds per peak hour, a maximum increase of 5 minutes 28 seconds per hour (a 24% increase).

This level of increase is based on an absolute worst case which is unlikely to occur for the following reasons:

- Signal timings are to be improved to reduce barrier down times;
- For southbound trains leaving the platform, the barrier downtime could be reduced to just 120 seconds offering a 60 seconds benefit per hour per southbound train; and
- The additional barrier down time for existing northbound stopping trains will likely be much less than the maximum of 20 seconds which has been assumed to test a worst case.
It is expected that in reality barrier downtime will be less than that used within the impact analysis.

**Average Weekday Increase in Barrier Downtime Over Time**

The average anticipated daily increase in barrier downtime compared to existing barrier time per hour is shown Figure 26. The data used is taken from data collected on Wednesday 12th December 2012, which represented an average day during the week surveyed where the highest numbers of existing trains were recorded.

![Figure 26. Average Daily Barrier Downtime (per hour)](image)

Figure 26 shows that throughout most of the day the anticipated increase in barrier down time is expected to have some impact on users but compared to the existing barrier downtime this additional delay is proportionally low.

**Impact per Barrier Cycle**

To determine the impact that increases in barrier downtime could have on Fen Road traffic the worst case downtime period per hour has been analysed against the flow of traffic on Fen Road per barrier cycle.

For every existing northbound train the individual barrier cycle time will increase by a maximum of 20 seconds from 124 to 144 seconds on average. For every new terminating train a new barrier cycle time of 124 seconds will be required.

Taking into account the average barrier downtime (124 seconds) and the peak hour flow rate of vehicles currently crossing the railway line (two per minute) a potential queue of five vehicles could build up each time the crossing is closed to traffic within the peak hour. For every additional 60 seconds of barrier downtime two additional vehicles will add to the back of the five vehicle queue. During the worst case peak quarter hour period the flow rate of vehicles increases to three per 60 seconds.

Assuming downtime is increased by a maximum of 20 seconds for every existing northbound train there will be one additional vehicle (totaling seven vehicles) queuing at the stop line in any one direction during the worst case peak quarter hour period. This additional downtime will only occur up to four times in a peak hour. During the rest of the day the impact on cars will be less than one additional vehicle queuing per cycle. In reality though the increase in downtime will be much less than 20 seconds.
Taking into account both scenarios it is clear that all vehicles will be able to clear the crossing after each barrier down cycle before the next barrier down cycle is called. Considering this and the fact that only four trains per hour will be subject to any increase in downtime (two of which will only be subject to only a few seconds of delay) it is likely that most motorists using Fen Road will not notice any difference in their journey time. The occasional vehicle will be stopped by an additional closed barrier but this will only occur twice per hour and the vehicle will only be delayed to the same extent as that experienced during the average barrier downtime.

**Summary**

This section of the TA has provided a detailed analysis to confirm that the development will have little impact on Chesterton Junction Level Crossing. In summary a survey was undertaken at the level crossing to determine the average weekday flow of pedestrians, motor vehicles and trains at the level crossing. During the peak hour there were 11 two way train movements, 4 two way pedestrian movements, and a maximum of 122 motor vehicle movements in any one direction. It is proposed that the development will generate a maximum of one new train per hour throughout the day making two movements. Existing northbound services, which will stop additionally at the station, will increase the barrier downtime by a maximum of 20 seconds due to train deceleration. Analysis of the survey results show that:

- 122 vehicles per peak hour translates into an average of two vehicles per minute, with three vehicles per minute during the peak 15 minute period;
- 11 trains per hour translates to one every five minutes;
- An existing barrier down time of 124 seconds per train translates into a queue of five vehicles per downtime on average in a peak hour or six within the peak 15 minute period;
- An additional 20 seconds barrier downtime would lead to a total queue of seven vehicles each time the barrier is down during the peak hour (i.e. an increase of less than one vehicle per train based on a 15 minute peak arrival rate of three vehicles every minute). Each vehicle will incur an additional 20 seconds delay compared with the existing situation. This is not deemed excessive, especially as it is a worst case scenario and will only occur for two 15 minute periods each day;
- Twice an hour an additional train is anticipated, which could lead to up to an additional 7 vehicles being delayed by approximately two minutes. This level of queue is not deemed excessive as the number of vehicles affected will be minimal. Only the vehicles that arrive as the barrier comes down will be delayed by the full 2 minutes.
- The analysis provides a worst case scenario as it does not take into account instances where two trains pass the barrier together therefore reducing the number of vehicles stopping per hour.

Based on the above information it is evident that CSI will have minimal impact on vehicles using Fen Road in comparison to other level crossings in the local area.

**6.7. Summary**

In summary, this Chapter indicates that the overall impact of CSI on the local highway network overall will be minimal. There are some increases in traffic flow and for some turning movements this increase will be noticeable, but the total increase in traffic at each junction is anticipated to be less than 5%. Further afield the impact will be negligible and there will be beneficial impacts to other parts of the local highway network (i.e. southbound movements past the site access on Milton Road and car trips within Cambridge City Centre) as a result of rail trips transferring from Cambridge station to CSI; around 100 less PCUs are forecast on Station Road Cambridge as a result of CSI.

While the total impact at all junctions along Milton Road falls below 5% capacity analysis has been carried in Chapter 7.

The size of the station car park has been based on a considered approach of a range of data sources and methods. A capacity of 450 spaces is in line with the range of forecasts and is towards the lower end of these forecasts to ensure that there is no over-provision. Over provision would encourage access by car at the expense of the considerable provision for public transport users, walking and cycling. This is also in accordance with planning policy as noted earlier in this TA. A sense check of the numbers also accords for the forecasts of arrivals by mode provided in the previous chapter which have been derived from ‘first principles’ analysis of trips to and from CSI.
This chapter also shows that whilst CSI will increase the total barrier downtime at Chesterton Junction Level Crossing per hour, this increase will be minimal throughout most of the day and will have minimal impact on vehicles using Fen Road to cross the railway line.
7. Junction Capacity Assessments

7.1. Introduction
This Chapter provides a summary of the junction capacity analysis carried out for the local highway network in the vicinity of CSI. These assessments are derived from the trip generation assumptions made in Chapter 5 and base traffic flows obtained from CCC’s SATURN model as explained above.

7.2. Methodology and Scope
As per the TA Scoping Note, six off-site junctions have been assessed to determine the estimated impact that new vehicle trips generated by CSI will have on the existing highway network. These junctions are:

- Cowley Road / Milton Road North Signalised Junction;
- Cowley Road / Milton Road South Signalised Junction;
- Milton Road / Cowley Park Signalised Junction;
- Committed extension of Busway across Milton Road into CSI site
- Kings Hedges Road / Milton Road / Green End Road Signalised Junction;
- Arbury Road / Milton Road / Union Lane Signalised Junction ; and
- Milton Road / Elizabeth Way / Highworth Avenue Roundabout.

In addition, at the request of the Highways Agency, the A14 / A10 Interchange junction has also been assessed for capacity to determine the impact on the eastbound off slip where CSI is anticipated to increase traffic flows by 10%.

The assessments have been carried out for the weekday AM and PM peak hours for a base year 2011 and future design year using 2026 SATURN demand flows (with and without CSI). The summary of the assessments are discussed in this section and the detailed LinSig and ARCADY outputs have been included in Appendix M of this report.

LinSig modelling software (version 3) has been used to assess the capacity of all junctions listed above and ARCADY modelling software (version 8.0) has been used to determine the coefficients used within the LinSig model for the roundabout junction (Milton Road / Elizabeth Way / Highworth Avenue). TRANSYT modelling software (version 14) has been used to assess the capacity of the A14 / A10 interchange junction.

Generally a Degree of Saturation (DoS) of below 90% (for signalled junctions) or 85% (for roundabouts) indicates that a specific arm of a junction is predicted to operate within capacity for the assessed flows. A DoS between 90% and 100% is considered to be ‘approaching capacity’ and a DoS greater than 100% demonstrates that the traffic flow exceeds the available ‘theoretical’ capacity.

For signalised junction a Practical Reserve Capacity (PRC) of greater than zero percent indicates that all arms of a junction are predicted to operate with a DoS of less than 90% and therefore the junction is predicted to operate within capacity for the assessed flows on all arms.

It should be noted that the capacity analysis summarised within this TA is based on the following robust assumptions:

- All trips are assumed to be brand new trips:
- No account has been taken of existing pass-by trips that will now move to CSI from Cambridge Station
- Abstracted trips from Cambridge will no longer travel into the centre of Cambridge
- No account has been taken for the reduction in car trips to the Science Park and CRC
- The number of vehicle trips generated by CSI is based on the car park providing 600 spaces (150 more than that proposed). The capacity analysis therefore assumes 33% additional development trips than that anticipated.
7.3. Cowley Road / Milton Road North Signalised Junction

Without CSI

Table 17 shows how the Cowley Road / Milton Road north junction currently operates and is predicted to operate based on 2011 base year traffic flows, 2016 opening year flows and 2026 future design year flows (i.e. without CSI scenario).

Table 17. Cowley Road / Milton Road North Junction (without CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>2011 Base Year (without CSI scenario)</th>
<th>2016 Future Year (without CSI scenario)</th>
<th>2026 Future Year (without CSI scenario)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg Delay</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>22%</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Milton Road S (Ahead, RT)</td>
<td>25%</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>Milton Road N (Left)</td>
<td>107%</td>
<td>105</td>
<td>150</td>
</tr>
<tr>
<td>Milton Road N (Ahead, Left)</td>
<td>38%</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>14%</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Cowley Road (RT)</td>
<td>13%</td>
<td>1</td>
<td>39</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>74.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-18.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Movement</th>
<th>2011 Base Year (without CSI scenario)</th>
<th>2016 Future Year (without CSI scenario)</th>
<th>2026 Future Year (without CSI scenario)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg Delay</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>25%</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Milton Road S (Ahead, RT)</td>
<td>29%</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>Milton Road N (Left)</td>
<td>107%</td>
<td>103</td>
<td>149</td>
</tr>
<tr>
<td>Milton Road N (Ahead, Left)</td>
<td>39%</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>15%</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Cowley Road (RT)</td>
<td>15%</td>
<td>1</td>
<td>39</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>73.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-18.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 17 above shows that the existing 2011 signalised junction currently operates over capacity in the AM peak with a PRC of -18.8 and is predicted to continue to operate beyond capacity in the future design year.

The main movement that is over capacity is the Milton Road southbound ahead / left turn filter lane, which has a DoS of 107% and a queue of 105 PCUs in 2011. The DoS and queue are predicted to steadily increase to 109% and 125 PCUs in the future 2026 design year. This is clearly caused by the “City Only” lane, a lane which CSI traffic will not use (in fact the opening of CSI is anticipated to decrease the level of traffic using this lane), being oversaturated and therefore blocking back to the A14 interchange (i.e. stopping vehicles from entering the left turn filter lane leading to the site via Cowley Road).
In the PM peak the junction operates within capacity currently and is predicted to continue to operate within capacity in the opening and future design year.

With CSI

Table 18 shows how the Cowley Road / Milton Road north junction is predicted to operate in the 2016 opening and 2026 future design year following the opening of CSI (with CSI scenario).

Table 18. Cowley Road / Milton Road North Junction (with CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>25%</td>
<td>0</td>
</tr>
<tr>
<td>Milton Road S (Ahead, RT)</td>
<td>29%</td>
<td>19</td>
</tr>
<tr>
<td>Milton Road N (Ahead, Left)</td>
<td>109%</td>
<td>123</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>39%</td>
<td>11</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>13%</td>
<td>1</td>
</tr>
<tr>
<td>Cowley Road (RT)</td>
<td>17%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cycle Time</strong></td>
<td>90</td>
<td></td>
</tr>
<tr>
<td><strong>Total Delay (pcuHr)</strong></td>
<td>93.58</td>
<td></td>
</tr>
<tr>
<td><strong>PRC (%)</strong></td>
<td>-21</td>
<td></td>
</tr>
</tbody>
</table>

**2026 Future Year (with CSI scenario)**

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>24%</td>
<td>0</td>
</tr>
<tr>
<td>Milton Road S (Ahead, RT)</td>
<td>29%</td>
<td>19</td>
</tr>
<tr>
<td>Milton Road N (Ahead, Left)</td>
<td>111%</td>
<td>141</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>40%</td>
<td>12</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>13%</td>
<td>1</td>
</tr>
<tr>
<td>Cowley Road (RT)</td>
<td>21%</td>
<td>1</td>
</tr>
<tr>
<td><strong>Cycle Time</strong></td>
<td>90</td>
<td></td>
</tr>
<tr>
<td><strong>Total Delay (pcuHr)</strong></td>
<td>111.70</td>
<td></td>
</tr>
<tr>
<td><strong>PRC (%)</strong></td>
<td>-23.3</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 18 above shows that in the AM peak 2016 / 2026 with CSI scenario the junction is predicted to continue to operate over capacity (PRC -21.0 and -23.3 respectively). Overall the junction is predicted to operate slightly worse following the opening of CSI, most notably on the southbound Milton Road “City Only” lane, which blocks the left turn filter lane into Cowley Road and therefore the site.

It also clear from Tables 17 and 18 that this junction is constrained by existing traffic levels and then further constrained by background traffic growth. The junction is predicted to operate at similar levels of capacity in the 2026 base year scenario and 2016 with CSI scenario.

Of specific note is the underutilisation of the two outside southbound ahead lanes which are currently designated for Science Park traffic only. By constraining all traffic heading to the City Centre to one lane significantly reduces the capacity of this lane and leads to significant queues back to the A14. Whereas, there are two underutilised southbound lanes for Science Park traffic only.

Table 18 also shows that in the PM peak 2026 with CSI scenario the junction is predicted to continue to operate within capacity (PRC 10.0 in 2016 and 2.0 in 2026).

Despite the capacity constraint at this junction being an existing issue a potential mitigation measure for this junction have been considered and the final proposal is described in Chapter 8 and the residual impact is discussed in Chapter 9. This mitigation measures includes for revisions to the lane designation to allow better utilisation of the southbound approach lanes.
7.4. Cowley Road / Milton Road South Signalised Junction

Without CSI

Table 19 shows how the Cowley Road / Milton Road south junction currently operates and is predicted to operate based on 2011 base year traffic flows, 2016 opening year flows and 2026 future design year flows (i.e. without CSI scenario).
### Table 19. Cowley Road / Milton Road South Junction (without CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th></th>
<th>PM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg Delay</td>
</tr>
<tr>
<td><strong>2011 Base Year (without CSI scenario)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td></td>
<td>124%</td>
<td>145</td>
<td>412</td>
</tr>
<tr>
<td>Milton Road N (RT offside)</td>
<td></td>
<td>66%</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Milton Road N (RT nearside)</td>
<td></td>
<td>66%</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Cowley Road</td>
<td></td>
<td>18%</td>
<td>2</td>
<td>27</td>
</tr>
<tr>
<td>Science Park (LT nearside)</td>
<td></td>
<td>4%</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Science Park (LT offside)</td>
<td></td>
<td>3%</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Science Park (Ahead, RT)</td>
<td></td>
<td>1%</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Milton Road S (LT,Ahead)</td>
<td></td>
<td>72%</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td></td>
<td>65%</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Milton Road S (RT)</td>
<td></td>
<td>14%</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td></td>
<td>34%</td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td><strong>Cycle Time</strong></td>
<td></td>
<td></td>
<td>90</td>
<td></td>
</tr>
<tr>
<td><strong>Total Delay (pcuHr)</strong></td>
<td></td>
<td></td>
<td>140.9</td>
<td>20.56</td>
</tr>
<tr>
<td><strong>PRC (%)</strong></td>
<td></td>
<td></td>
<td>-38.2</td>
<td>10.3</td>
</tr>
<tr>
<td><strong>2016 Future Year (without CSI scenario)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td></td>
<td>124%</td>
<td>146</td>
<td>420</td>
</tr>
<tr>
<td>Milton Road N (RT offside)</td>
<td></td>
<td>72%</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Milton Road N (RT nearside)</td>
<td></td>
<td>72%</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Cowley Road</td>
<td></td>
<td>19%</td>
<td>2</td>
<td>27</td>
</tr>
<tr>
<td>Science Park (LT nearside)</td>
<td></td>
<td>4%</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Science Park (LT offside)</td>
<td></td>
<td>3%</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Science Park (Ahead, RT)</td>
<td></td>
<td>1%</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>Milton Road S (LT,Ahead)</td>
<td></td>
<td>78%</td>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td></td>
<td>71%</td>
<td>8</td>
<td>28</td>
</tr>
<tr>
<td>Milton Road S (RT)</td>
<td></td>
<td>14%</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td></td>
<td>37%</td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td><strong>Cycle Time</strong></td>
<td></td>
<td></td>
<td>90</td>
<td></td>
</tr>
<tr>
<td><strong>Total Delay (pcuHr)</strong></td>
<td></td>
<td></td>
<td>148.00</td>
<td>24.40</td>
</tr>
<tr>
<td><strong>PRC (%)</strong></td>
<td></td>
<td></td>
<td>-38.2</td>
<td>-0.2</td>
</tr>
<tr>
<td><strong>2026 Future Year (without CSI scenario)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td></td>
<td>124%</td>
<td>148</td>
<td>415</td>
</tr>
<tr>
<td>Milton Road N (RT offside)</td>
<td></td>
<td>74%</td>
<td>13</td>
<td>27</td>
</tr>
<tr>
<td>Milton Road N (RT nearside)</td>
<td></td>
<td>74%</td>
<td>13</td>
<td>27</td>
</tr>
<tr>
<td>Cowley Road</td>
<td></td>
<td>20%</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>Science Park (LT nearside)</td>
<td></td>
<td>3%</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Science Park (LT offside)</td>
<td></td>
<td>3%</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Science Park (Ahead, RT)</td>
<td></td>
<td>0%</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Milton Road S (LT,Ahead)</td>
<td></td>
<td>82%</td>
<td>9</td>
<td>32</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td></td>
<td>75%</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>Milton Road S (RT)</td>
<td></td>
<td>13%</td>
<td>1</td>
<td>58</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td></td>
<td>40%</td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td><strong>Cycle Time</strong></td>
<td></td>
<td></td>
<td>90</td>
<td></td>
</tr>
<tr>
<td><strong>Total Delay (pcuHr)</strong></td>
<td></td>
<td></td>
<td>146.80</td>
<td>39.05</td>
</tr>
<tr>
<td><strong>PRC (%)</strong></td>
<td></td>
<td></td>
<td>-37.9</td>
<td>-12.4</td>
</tr>
</tbody>
</table>

**Note:** %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity.
Table 19 above shows that the existing 2011 signalised junction currently operates over capacity in the AM peak (PRC -38.2) but within capacity in the PM peak (PRC 10.3). In 2016 and 2026 the junction is predicted to begin to operate beyond capacity in the PM peak and continue to operate beyond capacity during the AM peak.

In the 2011 AM peak the movement over capacity is the Milton Road southbound ahead lane with a DoS of 124% and queue of 145 PCUs. In 2016 and 2026 the Dos on this arm is predicted to remain at 124% with slight increases in queue. During the PM peak the Dos on this movement is anticipated to increase to 90% and in 2016 and 101% in 2026 with a queue of 12 and 41 PCUs respectively.

It is clear from Table 19 that background traffic growth between 2016 and 2026 is predicted to have a significant impact on the operation of this junction.

With CSI

Table 20 shows how the Cowley Road / Milton Road south junction is predicted to operate in the 2016 opening year and 2026 future design year following the opening of CSI (with CSI scenario).

Table 20. Cowley Road / Milton Road South Junction (with CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th></th>
<th>PM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Milton Road N (Ahead)</td>
<td>120%</td>
<td>127</td>
<td>360</td>
<td>86%</td>
</tr>
<tr>
<td>Milton Road N (RT offside)</td>
<td>72%</td>
<td>12</td>
<td>25</td>
<td>8%</td>
</tr>
<tr>
<td>Milton Road N (RT nearside)</td>
<td>71%</td>
<td>12</td>
<td>25</td>
<td>8%</td>
</tr>
<tr>
<td>Cowley Road</td>
<td>20%</td>
<td>2</td>
<td>27</td>
<td>53%</td>
</tr>
<tr>
<td>Science Park (LT nearside)</td>
<td>4%</td>
<td>0</td>
<td>12</td>
<td>64%</td>
</tr>
<tr>
<td>Science Park (LT offside)</td>
<td>3%</td>
<td>0</td>
<td>12</td>
<td>60%</td>
</tr>
<tr>
<td>Science Park (Ahead, RT)</td>
<td>1%</td>
<td>0</td>
<td>50</td>
<td>33%</td>
</tr>
<tr>
<td>Milton Road S (LT,Ahead)</td>
<td>78%</td>
<td>8</td>
<td>27</td>
<td>83%</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>70%</td>
<td>6</td>
<td>22</td>
<td>78%</td>
</tr>
<tr>
<td>Milton Road S (RT)</td>
<td>60%</td>
<td>3</td>
<td>75</td>
<td>12%</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>52%</td>
<td>7</td>
<td>30</td>
<td>9%</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>126.20</td>
<td>28.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-33.2</td>
<td>-11.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2026 Future Year (with CSI scenario)

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th></th>
<th>PM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Milton Road N (Ahead)</td>
<td>119%</td>
<td>120</td>
<td>343</td>
<td>97%</td>
</tr>
<tr>
<td>Milton Road N (RT offside)</td>
<td>74%</td>
<td>13</td>
<td>26</td>
<td>8%</td>
</tr>
<tr>
<td>Milton Road N (RT nearside)</td>
<td>74%</td>
<td>13</td>
<td>26</td>
<td>9%</td>
</tr>
<tr>
<td>Cowley Road</td>
<td>24%</td>
<td>2</td>
<td>27</td>
<td>57%</td>
</tr>
<tr>
<td>Science Park (LT nearside)</td>
<td>3%</td>
<td>0</td>
<td>12</td>
<td>65%</td>
</tr>
<tr>
<td>Science Park (LT offside)</td>
<td>3%</td>
<td>0</td>
<td>12</td>
<td>61%</td>
</tr>
<tr>
<td>Science Park (Ahead, RT)</td>
<td>1%</td>
<td>0</td>
<td>50</td>
<td>32%</td>
</tr>
<tr>
<td>Milton Road S (LT,Ahead)</td>
<td>76%</td>
<td>7</td>
<td>26</td>
<td>80%</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>70%</td>
<td>6</td>
<td>22</td>
<td>75%</td>
</tr>
<tr>
<td>Milton Road S (RT)</td>
<td>70%</td>
<td>4</td>
<td>83</td>
<td>15%</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>52%</td>
<td>7</td>
<td>31</td>
<td>12%</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>121.40</td>
<td>31.74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-32.0</td>
<td>-8.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity
Table 20 shows that in the AM peak 2016 with CSI scenario the junction is predicted to continue to operate beyond capacity with a PRC of -33%. In the PM peak the junction is predicted to operate at theoretical capacity levels with a PRC of -11.5%. Despite operating with a negative PRC in the PM peak the maximum degree of saturation on any arm is predicted to be 86% with a mean max queue of 11 PCUs.

Table 20 also shows that in the AM peak 2026 with CSI scenario the junction is predicted to continue to operate over capacity with a PRC of -32%. In the PM peak the junction is predicted to operate at capacity with a PRC of -8.2%, where all arms are predicted to operate within 85% capacity except for the Milton Road Northern arm which is predicted to operate at 97% capacity.

Overall Table 20 shows that, whilst this junction is predicted to continue to operate beyond capacity in the AM peak and at capacity in the PM peak in 2016 and 2026, the opening of CSI will have a positive impact on this junction in the AM peak and a neutral impact in the PM peak. Delay and queuing on all the major arms is predicted to decrease following the opening of CSI in both the 2016 opening year and 2026 design year. This is due to the decrease in southbound traffic through this junction that is directly related to the location of CSI. CSI will offer an alternative to travelling southbound into the City Centre.

In summary it is clear that the capacity constraint at this junction is an existing issue that currently occurs in the 2011 base year and that CSI and background traffic growth will have minimal impact on the operation of the junction.
7.5. **Milton Road / Cowley Park Signalised Junction**

Table 21 shows how the Milton Road / Cowley Park junction currently operates and is predicted to operate based on 2011 base year traffic flows, 2016 opening year flows and 2026 future design year flows (i.e. without CSI scenario).

**Table 21. Milton Road / Cowley Park Junction (without CSI) - Capacity Summary**

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th></th>
<th>PM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg</td>
<td>%Sat</td>
</tr>
<tr>
<td><strong>2011 Base Year (without CSI scenario)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (LT)</td>
<td>27%</td>
<td>1.7</td>
<td>8.9</td>
<td>3%</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>57%</td>
<td>1.1</td>
<td>4.1</td>
<td>89%</td>
</tr>
<tr>
<td>Cowley Park</td>
<td>34%</td>
<td>1.5</td>
<td>55.7</td>
<td>87%</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>23%</td>
<td>4.5</td>
<td>5.3</td>
<td>31%</td>
</tr>
<tr>
<td>Milton Road S (RT,Ahead)</td>
<td>25%</td>
<td>4.6</td>
<td>7.7</td>
<td>33%</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>3.71</td>
<td></td>
<td>13.43</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>58.0</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2016 Future Year (without CSI scenario)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (LT)</td>
<td>27%</td>
<td>0.9</td>
<td>5.4</td>
<td>3%</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>57%</td>
<td>1.9</td>
<td>3.9</td>
<td>96%</td>
</tr>
<tr>
<td>Cowley Park</td>
<td>33%</td>
<td>1.5</td>
<td>55.3</td>
<td>95%</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>27%</td>
<td>3.8</td>
<td>5.9</td>
<td>30%</td>
</tr>
<tr>
<td>Milton Road S (RT,Ahead)</td>
<td>30%</td>
<td>4.3</td>
<td>7.7</td>
<td>31%</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>3.67</td>
<td>21.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>57.3</td>
<td>-6.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2026 Future Year (without CSI scenario)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (LT)</td>
<td>26%</td>
<td>1.1</td>
<td>6.1</td>
<td>3%</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>57%</td>
<td>1</td>
<td>3.9</td>
<td>104%</td>
</tr>
<tr>
<td>Cowley Park</td>
<td>34%</td>
<td>1.5</td>
<td>55.7</td>
<td>101%</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>29%</td>
<td>5.3</td>
<td>5.4</td>
<td>27%</td>
</tr>
<tr>
<td>Milton Road S (RT,Ahead)</td>
<td>31%</td>
<td>5.7</td>
<td>7</td>
<td>29%</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>3.69</td>
<td>45.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>57.0</td>
<td>-15.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 21 above shows that the 2011 existing signalised junction currently operates within capacity in both the AM and PM peak (AM peak PRC 58 and PM peak PRC 1.7).

Table 21 above also shows that in 2016 the junction is predicted to operate at capacity in the PM peak with a PRC of -6.8 with all arms operating below 100% degree of saturation.

In the 2026 without CSI the junction is predicted to continue to operate within capacity in the AM peak (PRC 57) but over capacity, with a PRC of -15.0 in the PM peak. There are 2 movements over capacity in the 2026 PM peak period, these are Milton Road southbound (ahead) with a DoS of 104% and Cowley Park with a DoS of 101%.

Queues are predicted to increase significantly following the introduction of background traffic growth between 2016 and 2026.
With CSI

Table 22 shows how the Cowley Road / Milton Road junction is predicted to operate in the 2016 opening year and 2026 future design year following the opening of CSI (with CSI scenario).

Table 22. Milton Road / Cowley Park Junction (with CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
</tr>
<tr>
<td><strong>2016 Future Year (with CSI scenario)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (LT)</td>
<td>27%</td>
<td>1.6</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>57%</td>
<td>1.1</td>
</tr>
<tr>
<td>Cowley Park</td>
<td>33%</td>
<td>1.5</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>28%</td>
<td>5.1</td>
</tr>
<tr>
<td>Milton Road S (RT,Ahead)</td>
<td>34%</td>
<td>6.7</td>
</tr>
<tr>
<td>Cycle Time</td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>4.04</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>58.1</td>
<td></td>
</tr>
<tr>
<td><strong>2026 Future Year (with CSI scenario)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (LT)</td>
<td>27%</td>
<td>1.5</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>58%</td>
<td>1.2</td>
</tr>
<tr>
<td>Cowley Park</td>
<td>34%</td>
<td>1.5</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>27%</td>
<td>4.6</td>
</tr>
<tr>
<td>Milton Road S (RT,Ahead)</td>
<td>34%</td>
<td>6.8</td>
</tr>
<tr>
<td>Cycle Time</td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>3.99</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>54.6</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 22 shows that in the AM peak 2016 and 2026 with CSI scenario the junction is predicted to continue to operate within capacity with a PRC of 58.1 and 54.6 respectively.

In the PM peak the junction is predicted to continue to operate at capacity following the opening of CSI in 2016. Queues are predicted to increase slightly from 22 PCUs to 26 PCUs on the Milton Road southbound lane. Overall the junction is predicted to operate within a degree of saturation of 100% on all arms of the junction.

In the PM peak 2026 scenario the junction is predicted to continue to operate beyond capacity following the opening of CSI. Queues are predicted to increase from 52 PCUs to 74 PCUs on the Milton Road southbound lane.

Overall, the junction is predicted to operate significantly worse during the 2026 base scenario when compared with the 2016 with CSI scenario. It is therefore clear to see that traffic generated by CSI is predicted to have a minimal impact on capacity, whereas background traffic growth is predicted to have an adverse impact on capacity. Capacity constraints at this junction can therefore be associated with background traffic growth generated between 2016 and 2026 rather than the proposed opening of CSI.
7.6. **Committed Extension of the Busway across Milton Road into CSI site**

The committed extension of the Busway across Milton Road into the CSI site will impact upon traffic using Milton Road. Currently guided buses will turn right out of the guide way onto Milton Road and left onto the guide way from Milton Road. This junction is currently controlled by traffic signals to stop the main Milton Road flow of traffic when buses turn onto Milton Road. Buses turning onto the guide way from Milton Road are not opposed by other traffic movements and are therefore not part of the existing traffic signals.

As part of the committed extension of the Busway the existing traffic signals will be upgraded to stop main line traffic flow for every Busway service movement into the CSI site in addition to every movement leaving the site towards Cambridge City Centre. Additional red time will also need to be given to allow for pedestrian and cyclists using the Busway as a crossing point. The committed extension of the Busway will therefore increase the overall red period given to main line traffic on Milton Road and will therefore increase delay and queue levels at this junction.

As part of the LinSig model used to assess the impact of CSI on the local highway network the extension of the Busway has been included for and the impact on delay and queue lengths assessed. To assess a robust scenario it has been assumed that the Busway green period will be called every 90 seconds. With this assumption, following the opening of the station, junction capacity analysis at the busway crossing shows that delay is anticipated to increase along Milton Road from approximately 6 seconds to 7 seconds in the AM peak and remain the same in the PM peak.

In summary, the LinSig model shows that in the 2026 Base scenario queues are predicted to reach a mean maximum level of 18 PCUs, in a peak hour, in any one direction with a degree of saturation of 67%. Following the opening of CSI the mean maximum queue is anticipated to remain at 18 PCUs with an increase in degree of saturation to 68%. This shows that whilst the extension of the Guided Busway will impact on Milton Road traffic this impact is not directly associated with the opening of CSI. It is also worth noting that given the maximum predicted degree of saturation of 68% all traffic is anticipated to get through each cycle of the traffic signals. The full LinSig results are presented in Appendix M.

As an existing traffic model of the busway and Milton Road is not available, it is not possible to compare the delay to buses under the scheme conditions with the existing scenario. However, the delay to buses in the 2026 scheme scenario is predicted to be 48.6 seconds per pcu. As LinSig does not model bus priorities it does not represent bus delay as it would be on the road. In reality buses on the busway would call the traffic signals via a detection loop in the carriageway therefore delay is likely to be considerably less.

It can therefore be concluded that CSI will have no impact on the operation of the extended Busway in terms of delay and queue levels predicted on Milton Road.
7.7. Kings Hedges Road / Milton Road / Green End Road Signalised Junction

Without CSI

Table 23 shows how the Kings Hedges Road / Milton Road / Green End Road junction currently operates and is predicted to operate based on 2011 base year traffic flows, 2016 opening year flows and 2026 future design year flows (i.e. without CSI scenario).

Table 23. Kings Hedges Road / Milton Road / Green End Road Junction (without CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th></th>
<th>PM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg Delay</td>
<td>%Sat</td>
</tr>
<tr>
<td>2011 Base Year (without CSI scenario)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (LT, Ahead)</td>
<td>66%</td>
<td>4</td>
<td>11.4</td>
<td>65%</td>
</tr>
<tr>
<td>Milton Road N (RT)</td>
<td>65%</td>
<td>3.2</td>
<td>53.4</td>
<td>95%</td>
</tr>
<tr>
<td>Green End</td>
<td>86%</td>
<td>9.1</td>
<td>66</td>
<td>89%</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>79%</td>
<td>11</td>
<td>46.6</td>
<td>101%</td>
</tr>
<tr>
<td>Kings Hedges Road</td>
<td>77%</td>
<td>4.8</td>
<td>63.2</td>
<td>55%</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>18.99</td>
<td></td>
<td>36.4</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>5.1</td>
<td>-12.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 2016 Future Year (without CSI scenario) |      |        |           |      |        |           |      |
| Milton Road N (LT, Ahead) | 66%  | 5.1    | 22.9      | 74%  | 6.5    | 10.6      |      |
| Milton Road N (RT)     | 62%  | 2.9    | 62.3      | 99%  | 11.1   | 148.2     |      |
| Green End             | 94%  | 12.9   | 91.9      | 88%  | 7.9    | 80.2      |      |
| Milton Road S         | 90%  | 14.7   | 63        | 100% | 26.1   | 100.1     |      |
| Kings Hedges Road     | 97%  | 11.1   | 115.3     | 68%  | 4      | 57.4      |      |
| Cycle Time            | 90   | 90     |           |      |        |           |      |
| Total Delay (pcuHr)   | 32.78|       | 36.54     |      |        |           |      |
| PRC (%)               | -7.5 | -10.6  |           |      |        |           |      |

| 2026 Future Year (without CSI scenario) |      |        |           |      |        |           |      |
| Milton Road N (LT, Ahead) | 66%  | 4      | 14.9      | 75%  | 6.2    | 11.3      |      |
| Milton Road N (RT)     | 70%  | 3.6    | 59.4      | 101% | 13.2   | 159.9     |      |
| Green End             | 109% | 35.1   | 238       | 85%  | 7.2    | 70.6      |      |
| Milton Road S         | 104% | 28.3   | 170       | 104% | 34.4   | 146.2     |      |
| Kings Hedges Road     | 105% | 22     | 191.2     | 64%  | 3.7    | 54.7      |      |
| Cycle Time            | 90   | 90     |           |      |        |           |      |
| Total Delay (pcuHr)   | 76.91|       | 46.27     |      |        |           |      |
| PRC (%)               | -21.5| -15.0  |           |      |        |           |      |

Note: %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 23 above shows that in the 2011 AM peak the existing signalised junction currently operates within capacity with a PRC of 5.1. During the PM peak the junction operates over capacity with a PRC of -12.4.

Table 23 above also shows that both the AM and PM peak 2016 without CSI scenarios are predicted to operate at capacity. In the AM peak 2016 scenario the PRC is -7.5 and in the PM peak the PRC is 10.6. All arms are predicted to operate with a degree of saturation of 100% or below.

Both the AM and PM peak 2026 without CSI scenarios are predicted to operate beyond capacity. In the AM peak 2026 scenario the PRC is -21.5 and all movements except Milton Road North have a DoS over 100%. In the PM peak the PRC is -15.0 and Milton Road North (RT) and Milton Road South have DoS over 100%.
(101% and 104% respectively). Queues are anticipated to increase significantly on the minor roads, as well as the northbound Milton Road arm, following the introduction of background growth between 2016 and 2026.

Overall Table 23 shows that the junction is predicted to operate at capacity in 2016 but then well beyond capacity in 2026. Background traffic growth, between 2016 and 2026, is anticipated to significantly exacerbate the capacity constraint at this junction.

With CSI

Table 24 shows how the Cowley Road / Milton Road junction is predicted to operate in the 2016 opening year and 2026 future design year following the opening of CSI (with CSI scenario).

Table 24. Kings Hedges Rd / Milton Rd / Green End Rd Junction (with CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
</tr>
<tr>
<td><strong>2016 Future Year (with CSI scenario)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (LT, Ahead)</td>
<td>67%</td>
<td>3.9</td>
</tr>
<tr>
<td>Milton Road N (RT)</td>
<td>55%</td>
<td>2.5</td>
</tr>
<tr>
<td>Green End</td>
<td>102%</td>
<td>21.1</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>101%</td>
<td>24.5</td>
</tr>
<tr>
<td>Kings Hedges Road</td>
<td>100%</td>
<td>13.8</td>
</tr>
<tr>
<td>Cycle Time</td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>49.70</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td></td>
<td>-13.5</td>
</tr>
</tbody>
</table>

| **2026 Future Year (with CSI scenario)** |      |        |     |      |        |     |
| Milton Road N (LT, Ahead) | 70%  | 4.7   | 15  | 75%  | 6.1   | 12  |
| Milton Road N (RT)        | 59%  | 2.8   | 49.5| 107% | 17.7  | 224.2|
| Green End                 | 129% | 75.5  | 490.5| 83%  | 6.8   | 67.1 |
| Milton Road S             | 113% | 46.2  | 285.8| 105% | 38.5  | 165.3|
| Kings Hedges Road         | 102% | 18    | 144.6| 69%  | 4     | 58.6 |
| Cycle Time                |       | 90    |      |       | 90    |      |
| Total Delay (pcuHr)       | 129.80|       |      | 54.52 |       |      |
| PRC (%)                   |       | -43.0 |      |       | -18.8 |      |

**Note:** %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 24 above shows that during both the AM and PM peak 2026 with CSI scenarios the junction is predicted to continue to operate beyond capacity. Overall PRC is predicted to increase to -43.0 in the AM peak and -18.8 in the PM peak.

During the 2016 opening year the junction is predicted to operate just beyond capacity following the opening of CSI, whereas during the 2026 without CSI scenario, the junction is predicted to operate well beyond capacity.

It is therefore clear that the capacity constraints at this junction are created by background traffic growth generated between 2016 and 2026 rather than the proposed opening of CSI.
7.8. **Arbury Road / Milton Road / Union Lane Signalised Junction**

**Without CSI**

Table 25 shows how the Arbury Road / Milton Road / Union Lane junction currently operates and is predicted to operate based on 2011 base year traffic flows, 2016 opening year flows and 2026 future design year flows (i.e. without CSI scenario).

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
</tr>
<tr>
<td>2011 Base Year (without CSI scenario)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N</td>
<td>95%</td>
<td>21.5</td>
</tr>
<tr>
<td>Unicorn Lane</td>
<td>59%</td>
<td>2.8</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>72%</td>
<td>9.7</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>90%</td>
<td>10.6</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>25.00</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-5.0</td>
<td></td>
</tr>
<tr>
<td>2016 Future Year (without CSI scenario)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N</td>
<td>94%</td>
<td>20.6</td>
</tr>
<tr>
<td>Unicorn Lane</td>
<td>88%</td>
<td>6.7</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>83%</td>
<td>13.3</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>96%</td>
<td>13.3</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>32.00</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-7.0</td>
<td></td>
</tr>
<tr>
<td>2026 Future Year (without CSI scenario)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N</td>
<td>96%</td>
<td>20.9</td>
</tr>
<tr>
<td>Unicorn Lane</td>
<td>100%</td>
<td>12.4</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>91%</td>
<td>15.9</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>98%</td>
<td>15.3</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>42.00</td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-10.0</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity.

Table 25 shows that in both the AM and PM peak scenarios in 2011 the junction operates over capacity. In the AM peak the overall PRC is -5.0 where Milton Road southbound and Arbury Road arms are over capacity with a DoS of 95% and 90% respectively. In the PM peak the overall PRC is -41.0 where Milton Road South is overcapacity with a DoS of 127%.

Table 25 also shows that, in both the 2016 and 2026 AM / PM peaks without CSI scenarios, the junction is predicted to continue to operate beyond capacity.

In the 2016 AM peak the overall PRC is predicted to be -7.0. In the PM peak the overall PRC is predicted to be -52.0. In the 2026 AM peak the overall PRC is predicted to be -10.0. In the PM peak the overall PRC is predicted to be -60.0.
With CSI

Table 26 shows how the Arbury Road / Milton Road / Union Lane junction is predicted to operate in the 2016 opening year and 2026 future design year following the opening of CSI (with CSI scenario).

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
</tr>
<tr>
<td>Milton Road N</td>
<td>91%</td>
<td>18.4</td>
</tr>
<tr>
<td>Unicorn Lane</td>
<td>84%</td>
<td>6</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>87%</td>
<td>15.6</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>92%</td>
<td>10.7</td>
</tr>
<tr>
<td>Cycle Time</td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>28.00</td>
<td>19.00</td>
</tr>
<tr>
<td>PRC (%)</td>
<td></td>
<td>-2.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
</tr>
<tr>
<td>Milton Road N</td>
<td>93%</td>
<td>19.3</td>
</tr>
<tr>
<td>Unicorn Lane</td>
<td>100%</td>
<td>12.2</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>91%</td>
<td>17.6</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>98%</td>
<td>14.2</td>
</tr>
<tr>
<td>Cycle Time</td>
<td></td>
<td>90</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>40.00</td>
<td>27.00</td>
</tr>
<tr>
<td>PRC (%)</td>
<td></td>
<td>-11.0</td>
</tr>
</tbody>
</table>

Note: %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity.

Table 26 above shows that during both the AM and PM peak 2026 with CSI scenarios the junction is predicted to continue to operate beyond capacity. In the AM peak the overall PRC is predicted to be -11.0 where all arms are over capacity. In the PM peak the overall PRC is predicted to be -64.0 where both Milton Road arms are over capacity with a DoS of 148% and 109% respectively.

However, Table 26 also shows that the opening of CSI is predicted to have a beneficial impact on the junction in the 2016 opening year. The PRC is predicted to drop by 4% in the AM and 2% in the PM.
7.9. Milton Road / Elizabeth Way / Highworth Avenue Roundabout

Without CSI

Table 27 shows how the Milton Road / Elizabeth Way / Highworth Avenue junction currently operates and is predicted to operate based on 2011 base year traffic flows, 2016 opening year flows and 2026 future design year flows (i.e. without CSI scenario).

Table 27. Milton Road / Elizabeth Way / Highworth Avenue Roundabout (without CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>2011 Base Year (with CSI scenario) AM</th>
<th>2011 Base Year (with CSI scenario) PM</th>
<th>2026 Base Year (with CSI scenario) AM</th>
<th>2026 Base Year (with CSI scenario) PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg</td>
<td>%Sat</td>
</tr>
<tr>
<td>Elizabeth Way</td>
<td>39%</td>
<td>0.3</td>
<td>2</td>
<td>71%</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>10%</td>
<td>0.1</td>
<td>2.3</td>
<td>35%</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>17%</td>
<td>0.1</td>
<td>2.3</td>
<td>13%</td>
</tr>
<tr>
<td>Milton Road N</td>
<td>81%</td>
<td>17.3</td>
<td>12.6</td>
<td>50%</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Movement</th>
<th>2011 Base Year (with CSI scenario) AM</th>
<th>2011 Base Year (with CSI scenario) PM</th>
<th>2026 Base Year (with CSI scenario) AM</th>
<th>2026 Base Year (with CSI scenario) PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg</td>
<td>%Sat</td>
</tr>
<tr>
<td>Elizabeth Way</td>
<td>43%</td>
<td>0.4</td>
<td>2.2</td>
<td>75%</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>10%</td>
<td>0.1</td>
<td>2.3</td>
<td>54%</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>18%</td>
<td>0.1</td>
<td>2.4</td>
<td>13%</td>
</tr>
<tr>
<td>Milton Road N</td>
<td>84%</td>
<td>22.7</td>
<td>13.2</td>
<td>58%</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 27 shows that in both the 2011 AM and PM peak the existing junction operates within capacity with no movements over capacity.

In the 2016 without CSI scenario the junction is predicted to continue to operate within capacity during both peaks.

In the 2026 without CSI scenario the junction is predicted to operate within capacity in the AM peak but beyond capacity during the PM peak with Milton Road northbound arm predicted to operate over capacity with a DOS of 98%.

It should be noted that in reality vehicles queuing back from the Arbury Road junction will impact on this roundabout although it is not possible to take this into account within LinSig modelling software.
Transport Assessment

With CSI

Table 28 shows how the Milton Road / Elizabeth Way / Highworth Avenue junction is predicted to operate in the 2016 opening year and 2026 future design year following the opening of CSI (with CSI scenario).

Table 28. Milton Road / Elizabeth Way / Highworth Avenue Roundabout (with CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM RFC</th>
<th>Queue</th>
<th>Delay</th>
<th>PM RFC</th>
<th>Queue</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>2026 Base Year (with CSI scenario)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elizabeth Way</td>
<td>41%</td>
<td>0.3</td>
<td>2.1</td>
<td>76%</td>
<td>1.6</td>
<td>4.9</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>18%</td>
<td>0.1</td>
<td>2.5</td>
<td>53%</td>
<td>0.6</td>
<td>6.5</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>18%</td>
<td>0.1</td>
<td>2.4</td>
<td>13%</td>
<td>0.1</td>
<td>3.6</td>
</tr>
<tr>
<td>Milton Road N</td>
<td>81%</td>
<td>16.4</td>
<td>11.5</td>
<td>61%</td>
<td>14.5</td>
<td>8.9</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM RFC</th>
<th>Queue</th>
<th>Delay</th>
<th>PM RFC</th>
<th>Queue</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>2026 Base Year (with CSI scenario)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elizabeth Way</td>
<td>45%</td>
<td>0.4</td>
<td>2.4</td>
<td>80%</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Milton Road S</td>
<td>20%</td>
<td>0.1</td>
<td>2.6</td>
<td>100%</td>
<td>24.4</td>
<td>75.1</td>
</tr>
<tr>
<td>Arbury Road</td>
<td>19%</td>
<td>0.1</td>
<td>2.5</td>
<td>20%</td>
<td>0.1</td>
<td>5.2</td>
</tr>
<tr>
<td>Milton Road N</td>
<td>85%</td>
<td>22.7</td>
<td>13.5</td>
<td>69%</td>
<td>14.5</td>
<td>11.5</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 28 shows that in the AM peak 2026 with CSI scenario the junction is predicted to continue to operate at capacity. In the 2016 opening year the junction is predicted to operate well within capacity following the opening of CSI. In fact the opening of CSI in 2016 is predicted to have a beneficial impact on this junction where queues are predicted to decrease. It is therefore clear that background traffic growth is predicted to have a greater adverse impact on the operation of this junction compared with the impact generated by CSI.

It should again be noted that in reality vehicles queuing back from the Arbury Road junction will impact on this roundabout although it is not possible to take this into account within LinSig modelling software. However, as stated above the capacity constraint at the Arbury Road junction is clearly a background traffic growth issue between 2016 and 2026 and the opening of CSI in 2016 reduces traffic flow on critical arms and hence has a positive impact on this junction in the opening year.

7.10. A14 / A10 Interchange Junction

In terms of the A14 / A10 Interchange junction CSI is anticipated to have greatest impact on the A14 eastbound off slip where an additional 49 vehicles are anticipated to turn right from this link towards Milton Road in the morning peak hour (08:00 to 09:00). This translates into a 10% increase in traffic in the ‘with CSI’ scenario on this slip road. In total CSI is anticipated to only increase traffic flows at this junction by one percent in both peaks. The HA have requested further analysis of the impact operationally.

Whilst 49 vehicles per hour translates into less than one vehicle per minute and the reduction of circulating vehicles will enhance the operation of the eastbound off slip arm, Atkins have used an existing Transyt model of Milton Interchange developed for the A14 ECI project to determine the operational impact on the off-slip (Transyst provides a more robust analysis of the operational impacts with regard to the junction layout...
and geometry by allowing for delay and queue levels to be determined rather than just percentage increase in traffic flow).

The full output files of the TRANSYT file are provided for in Appendix M.

The results of the TRANSYT model show that vehicle delay (seconds per vehicle) on the eastbound off slip is anticipated to increase by 37 seconds to 86 seconds per vehicle. As a result, predicted mean maximum queues are predicted to increase by 11 PCUs from 21 PCUs to 32 PCUs. The eastbound off slip at Milton is 340 metres long and can accommodate up to 56 queuing PCUs before blocking back onto the A14 mainline eastbound carriageway.

This analysis indicates that the CSI proposals do not significantly impact on the operation of the off-slip, and that sufficient road space still exists for queuing traffic, assuming no other local factors impact on the operation of the junction. This analysis is based on the 2026 forecast year which also includes significant background growth in the wider Cambridge sub-region.

7.11. Summary

In summary, this chapter shows that CSI is predicted to have minimal impact on the capacity of most of the highway network.

The local highway network along Milton Road is currently approaching capacity. The capacity constraint along Milton Road is anticipated to be exacerbated by background traffic growth with or without the development of CSI, most notably between the years 2016 and 2026.

The Cowley Road South junction is anticipated to experience reduced queue levels and delay, following the opening of CSI, due to the reduction in southbound traffic passing through this junction into the City Centre.

Overall the capacity constraint on the network is an existing issue that is exacerbated by long term background traffic growth. The traffic generated by CSI is anticipated to increase queues marginally on some links but also decrease queues on other links. Whilst the increase in queue levels and delay, created by the opening of CSI, are noticeable on some links the percentage increase in traffic flow is minimal compared to the ‘without’ CSI scenario at most junctions.

The capacity constraint on the network is not purely due to background traffic. It is acknowledged that CSI will have a negative impact on certain arms at junctions along Milton Road. However background traffic will gave a much greater impact on capacity when compared with the development.

The only junction that is anticipated to experience noticeable increases in queue levels following the opening of CSI is the Cowley Road / Milton Road northern junction. However, this junction is predicted to operate with higher levels of queue and delay during the 2026 future base year compared with the 2016 with CSI scenario. Whilst the capacity constraint is an existing issue a mitigation measure is proposed in Chapter 9 to limit the impact of CSI on this junction and help improve accessibility to the site.

On the wider highway network CSI is anticipated to increase queues on the eastbound off slip of the A14 / A10 interchange by approximately 10 PCUs. It is be concluded that the resultant mean maximum queue levels expected after the opening of CSI on this off slip can be accommodated well within the slip road and away from the main A14 eastbound carriageway. Whilst CSI will have a negligible negative impact on the A14 eastbound off slip the proposed mitigation at the Milton Road / Cowley Road junction (see Chapter 9) will reduce the potential queuing back onto the main A14 / A10 junction from the Milton Road exit. This mitigation will therefore limit the potential for the westbound off slip from being impeded by queuing traffic on the circulatory (currently caused by vehicles queuing back from Milton Road). In addition, the development of CSI has positive impacts on specific areas of the network, including Cambridge City Centre and the southbound link between the two Cowely Road Junctions, and so overall is deemed to have a minimal impact on the network as a whole.

Again it is worth noting that the junction capacity analysis takes into account a very robust assumption where 133% of the anticipated vehicle trips generated by CSI have been added onto the highway network. Of the
236 vehicle trips assumed to enter CSI in the AM peak hour only 160 are anticipated to actually hit the highway network in reality.
8. Impact on Sustainable Travel Modes

8.1. Introduction
This Chapter provides a summary of the anticipated impact generated by the proposed station on the existing sustainable transport network, including; cyclists, pedestrians, public transport and the local sustainable travel infrastructure in general. This Chapter has been informed by the data provided or calculated in the preceding chapters, specifically Chapters 3, 4 and 5.

8.2. Public Transport
The extension of existing Busway services into the site will open up a new route for public transport users to the proposed CSI and is likely to be a popular travel choice for existing people located along the Busway route that currently travel to Cambridge Rail Station by bus or car. The extension is supported by stagecoach.

As stated previously it is anticipated the existing bus service Citi2 will be diverted into the site therefore providing a north-south link through the site every 10 minutes between Addenbrookes Hospital, the City Centre and Milton.

The number of people predicted to arrive atCSI by bus and Guided Bus has been taken from the first principles approach detailed in Chapter 5. Analysis of this data shows that at the very least approximately 300 outbound rail passengers plus 100 inbound rail passengers are expected to use the extended Busway to access CSI. An assessment of bus trips throughout the day shows peak use of the bus interchange between 08:00 and 10:00 and again between 17:00 and 19:00 with just over 100 passengers interchanging. Flows are more even in the hours beginning 09:00 and 17:00 and more tidal in the hour beginning 08:00 (inbound off trains) and 18:00 (outbound onto trains). This reflects travel to and from the workplace locally.

The number of people predicted to arrive at CSI by bus and Guided Bus could increase in the future compared to that estimated within this TA. However, the committed infrastructure being provided through the extension of the Busway would be able to accommodate a significant increase in Busway services with minimal impact. In particular, the bus turning area at the station building has been reviewed to ensure that the provision of stands and turning area meets the needs of any significant increase in Busway services. A swept path of a double decker bus using the turning area is shown in Figure 27, showing that each vehicle can comfortably turn without impacting on other users. Based on a busway service every 10 minutes and a Citi 2 service operating every 10 minutes, there will be four vehicles using the tuning area and two bus stands every 10 minutes. Even if all four services arrive together, there is space for all to wait. The turning area is located downstream of the stands therefore eliminating the potential for stationary buses impacting on buses using the turning area. The width of the carriageway adjacent to each bus stand provides sufficient width to allow buses to pass each other as well as overtake safely. The provision of two stands and a large turning area is therefore deemed sufficient to accommodate these four vehicles as well as additional growth. As shown in Chapter 7 the impact of the extended Busway on Milton Road is also predicted to be minimal even if traffic on Milton Road is stopped every 90 seconds.
8.3. Cyclists

Projected Cycle Demand and Desire Lines

A number of improvements to the cycle network in the vicinity of the site are inherent in the CSI proposals. However in order to further understand the likely cycle desire lines to CSI a mapping exercise has been undertaken. The map includes the existing and proposed cycle network within Cambridge and identifies the key areas within cycle distance of CSI (based on isochrones at 2.5km, 5km and 10km from the station location). A review of the key routes between the areas within cycling distance of the station and the station itself has been undertaken to identify the likely desire lines for cyclists. A site visit has been undertaken to review areas which are on the key desire lines for cyclists to ensure that existing facilities are adequate. This process has allowed for areas where key desire lines are not accommodated by existing infrastructure to be identified and mitigated against.

Figures 28 and 29 show that the proposed site is highly accessible to the local community as well as the wider transport network by sustainable travel modes such as cycling.

Figure 28 shows the local cycle network and likely desire lines.
Figure 28. Local Cycle Network and Cycle Desire Lines
Figure 29 shows accessibility of the site for cyclists based on the average Cycling Accessibility Journey Distances for the UK.

**Figure 29. Cycling Accessibility**

Figures 28 and 29 show that the site is highly accessible to the local and wider community by cycle. It is important to note that Figure 29 only includes for a maximum 10km cycle radius. As stated previously it is well known that Cambridgeshire is noted for its higher use of cycling as a travel mode in addition to the distance locals are prepared to cycle to their destination. CSI is therefore even more accessible by cycling than shown in Figure 29 above.
Proposed Cycle Infrastructure

Figure 30 shows the proposed on-site cycle infrastructure and likely desire lines.

Figure 30. On Site Cycle/Pedestrian Network

Figure 30 shows that the development proposals include for high quality, safe and accessible cycle infrastructure along Cowley Road that connect to the existing wider sustainable infrastructure available. Two segregated cycle routes in to the site will be provided; one along the Busway and one along Cowley Road. In addition, new pedestrian / cycle links to the busway are proposed from Moss Bank, The Bramblefields LNR and Nuffield Road. These routes will provide links directly up to the station building as well as the 1,000 proposed cycle stands. The number of points of interaction with other traffic (i.e. cars and HGVs) and carriageway crossing points have been kept to a minimum through plan led design.

The number of cyclists predicted to arrive at CSI has been taken from the first principles approach detailed in Chapter 5. Analysis of this data (Table 10) shows that over 200 outbound and 100 inbound (CRC and CSP) rail passengers could choose to cycle along the extended Busway throughout a day. These values assume a worst case scenario that all local trips will utilise the busway to access the site. In reality a small proportion of these will use Cowley Road and some will use the links from the residential areas to the south. Assuming all of these passengers travel by rail within a two hour peak period this would translate into three cyclists per minute. Based on these demand figures it can be concluded that the existing Busway and committed extended Busway will be able to easily accommodate future levels of cyclists.
Further analysis of Chapter 5 shows that, in addition to the 300 cyclists using the Guided Busway, over 300 passengers are anticipated to cycle from the local area. This translates into a maximum of five cyclists per minute assuming they all travel within one peak hour. Based on site observations, knowledge of existing cycle crossing signal timings and cycle infrastructure geometry, it can be concluded that existing plus proposed cycle infrastructure will more than accommodate 300 new cyclists crossing Milton Road throughout each day.

The extension of the Busway across Milton Road will allow for a beneficial impact for cyclists.

The number of cycle parking spaces required to support the proposed development has been ascertained based on patronage data for the proposed CSI. A sense check on the proposed cycle park has been undertaken based on an accumulation profile derived from CSRM data as well as the first principles approach detailed in Chapter 5. This sense check shows that the proposed 1000 cycle spaces will provide sufficient space to encourage CSI passengers to cycle. Nearly 700 CSI passengers are anticipated to cycle and nearly 1400 walk. There is potential for a proportion of cycle spaces to be taken up by commuters who leave their bikes at the station overnight, as is seen at Cambridge Station. In addition, given that a proportion of the passengers that are estimated to walk could choose instead to cycle it is more than likely that the proposed 1,000 cycle spaces will be sufficient but well used.

If demand for cycle spaces begins to outweigh provision then the number of cycle spaces will be reviewed by the future station operator as part of the Station Travel Plan. Good management should be devised to ensure that bikes that have been discarded at the station for a certain period of time should be removed to free up space for other users.

8.4. Pedestrians

Projected Pedestrian Demand and Desire Lines

A number of improvements to the pedestrian network in the vicinity of the site are also inherent in the CSI proposals. However in order to further understand the likely pedestrian desire lines to CSI a mapping exercise has also been undertaken to identify the key areas within walking distance of CSI (based on isochrones ranging from 250m to 3km from the station location). A review of the key routes between the areas within walking distance of the station and the station itself has been undertaken to identify the likely desire lines for pedestrians. Following a site visit the areas which are on the key desire lines for pedestrians has been reviewed to ensure that existing facilities are adequate.

Figure 31 shows the accessibility of the site for pedestrians.
Figure 31. Pedestrian Accessibility

Figure 31 above shows that the proposed site is highly accessible to the local community by walking.
**Proposed Pedestrian Infrastructure**

Figure 32 shows the proposed onsite pedestrian infrastructure and likely desire lines.

![Figure 32. On Site Pedestrian Infrastructure Provision](image)

Figure 32 shows that the proposed site layout provides for very good links to existing pedestrian infrastructure. The proposed layout allows for the site to be very permeable by foot.

The number of pedestrians predicted to arrive at CSI has been taken from the first principles approach detailed in Chapter 5. Analysis of this data shows that more than 1,000 rail passengers (500 outbound plus 600 inbound) are anticipated access CSI from the west of Milton Road. Assuming these trips are spread over a two hour peak period this translates into just over eight pedestrians per minute crossing Milton Road.

Based on site observations, knowledge of existing pedestrian crossing signal timings and footway geometry, it can be concluded that existing and proposed pedestrian infrastructure will more than accommodate anticipated pedestrian demand across Milton Road. In the unlikely event that all 1200 one way pedestrian trips are generated within a two hour peak period this would translate into an average of one pedestrian every 6 seconds. The wide shared cycle/footway to be provided on Cowley Road and wide shared cycle/footway to be provided on the busway would more than accommodate this level of movement. In reality, pedestrians will be more evenly spread as 50% of pedestrian trips will be inbound and 50% outbound.
Further analysis of Chapter 5 shows that approximately 50 passengers are anticipated to walk from the local businesses located to the north plus 150 from the residential area to the south, via the following links:

- Discovery Way
- Pippin Drive
- Ribston Way
- Long Reach Road
- Bramblefields Local Nature Reserve and
- Nuffield Road Industrial Estate

This level of pedestrian demand is not expected to have a noticeable impact on the Bramblefields Local Nature Reserve or the rest of the local area, especially given the proposals to significantly improve the permeability and accessibility of the site for pedestrians and cyclists to/from the local area.

8.5. Taxi and Passenger Drop Off / Pickup

Table 10, in Chapter 5, shows that 242 taxi/passenger drop off trips are anticipated daily (plus 242 pickups). Based on this level of demand per day the 38m long drop off / pickup bay (provision for eight cars) is anticipated to provide sufficient facilities to more than meet average demand, especially given the following:

- Some passengers will be sharing a lift with another car driving passenger and will therefore use the car park rather than the drop off bay (treated as separate trips in Section 6 to assume worst case scenario);
- Arrival time of drop offs will be spread throughout the down time period between the previous train and the next train; and
- The access road leaving to the layby area is 146m long and can therefore accommodate a minimum of 24 additional vehicles parked along the kerb line. This access road will only be served by vehicles using the drop off area and so vehicles waiting will not impact any other user.

Even if all of the 242 passenger drop offs are assumed to arrive within a two hour period, to catch one of the eight trains proposed to stop at the station, then this will translate into a maximum of 30 cars arriving within the drop off area over the 15 minute period preceding each train arrival. Even if all of these cars arrive at the same time, the full drop off access road will be able to accommodate these vehicles without any impact on other road users. In reality some passengers will arrive early and others just before the train departs. This road will therefore provide more than enough space to meet the worst case level of demand.

8.6. Summary

Overall this chapter shows that in combination the proposed CSI and existing / proposed sustainable infrastructure will provide sufficient infrastructure to meet the travel demand of passengers by all modes.

The number of pedestrians and cyclists crossing Milton Road to Cambridge Science Park could incur additional delay on motorists, however, on the whole this impact is likely to be minimal for the following reasons:

- The development reduces the number of vehicles travelling between the two Cowely Road junctions in a southbound direction;
- The busway link offers a more direct, viable alternative to crossing Milton road at the Cowley Road Junction. The busway can be called every 90 seconds and incur minimal impact to Milton Road traffic, as shown in section 7.6; and
- The development has positive impacts on delay elsewhere on the network.

In terms of sustainable travel the impact on the local highway network will be beneficial. In addition to limiting the car park size the proposed sustainable infrastructure that will accompany CSI will encourage sustainable travel, especially; the committed extension of the Busway, anticipated extension of bus service Citi2 into the site and good quality servicing access for existing and proposed users that limits the impact on other users.
9. Mitigation Proposals

9.1. Introduction
This chapter provides a summary of the mitigation measures proposed as part of the development. Some of the mitigation measures have arisen through negative impacts identified as part of this TA, whereas other mitigation measures were already identified, prior to the provision of this TA, but have still been included in this chapter to show where negative transport impacts have been eliminated or even improved upon.

9.2. Station Travel Plan
A Station Travel Plan will be developed following planning permission for CSI due to the high volume of passengers travelling through the interchange as well as the staffing and servicing needs of the associated facilities. The Station Travel Plan will use SMART objectives in order to:

- help encourage the use of sustainable transport to access the site for staff and rail users;
- monitor parking in the station car park and surrounding roads; and,
- create a servicing and delivery plan to manage the servicing of the station facilities and infrastructure by network rail and retail suppliers.

The Station Travel Plan will be developed in consultation with CCC who have recently worked with Cambridge Rail Station to develop a Station Travel Plan.

9.3. Highway Network
Following capacity analysis of the local highway network this TA has demonstrated that the proposed CSI will have minimal impact on a network that is already operating at or beyond capacity.

Whilst background traffic growth is predicted to have a much greater impact on the highway network compared with the traffic generated by CSI, the existing inside lane queuing constraint that occurs on the southbound Milton Road exit arm, of the A14 / A10 interchange junction, will negatively impact on the accessibility of the site from the north. Vehicles wishing to access the site in the morning peak will have to sit in a long queue from the A14 before being able to use the 60m long underutilised left turn filter lane. The following mitigation measure is therefore proposed to limit the impact of the proposed CSI further.

9.3.1. Revised Lane Designation at Northern Cowley Road / Milton Road Junction
It proposed that the southbound road markings at the northern Cowley Road / Milton Road junction are revised to include for the following lane designation, from inside lane to outside lane:

- Left turn filter into Cowley Road – as per existing;
- “City Only” – as per existing;
- No lane designation – in place of “Science Park Only”
- “Science Park Only” – as per existing;

Whilst CSI has a positive impact on the northern Cowley Road / Milton Road junction, by reducing the number of vehicles travelling into the City Centre, the first mitigation measure listed above will allow for improved access to CSI via Cowley Road. By revising the lane designation here vehicles travelling into the City Centre will be able to utilise two lanes rather than one therefore helping to mitigate the existing queuing issue that regularly extends back to the A14 interchange and in turn allow for improved accessibility into the left turn filter lane.

This mitigation measure will also help to improve the operation of the A14 / A10 by limiting the potential for vehicles to queue back onto the roundabouts circulatory section from Milton Road. Currently vehicles queuing back from Milton Road occasionally block the westbound A14 off slip arm of the A14 / A10 junction.
9.4. On-street Parking
The site will have its own 450 space car park. Access by bus, cycle and foot will be encouraged and high quality routes to the new station interchange are proposed. Should additional car parking provision be required, then the land within the area of the station interchange readily lends itself for the rail industry to increase the number of spaces available to meet increases in demand once the station is opened.

Parking on the streets surrounding CSI will be controlled through Traffic Regulation Orders (TROs) located along the entire length of Cowley Road to stop cars from parking for free along Cowley Road. This control will also stop the potential for overspill from the car on to local roads.

It is recognised that there are concerns about on-street parking and will monitor parking before and after the opening of the new station. If it is found that problems are arising from on-street parking then any necessary controls will be developed and introduced in consultation with local residents and business.

9.5. Public Transport
As part of the development proposals it is anticipated the Citi2 bus service, which runs along Milton Road, will be diverted into the station via Cowley Road. As part of this anticipated proposal the Citi2 service will then be diverted up to the main station building via an internal road linking onto the Busway. At the end of the Busway a turning head suitable for buses will be provided to allow the Citi2 and Busway services space to turn around and head back out of the main Cowley Road vehicle entrance. It is proposed the Citi2 service will continue to operate every 10 minutes.

As stated previously, as part of the Transport and Works Act Order for the Busway, permission to extend the Busway across Milton Road and along the former St. Ives Branch Line were given in anticipation of the new station proposals. These rights will be exercised as part of this development proposal enabling Busway services to access the station forecourt directly from Milton Road on a section of new Busway.

Whilst the extension of the Busway up to the proposed station does not form a part of this planning application it will help to mitigate and improve links to the site by public transport. The potential for passengers to step off the platform and straight onto a bus (or vice versa) to continue their journey, with minimal delay along both routes, will encourage a significant take up of sustainable travel trips to/from CSI.

9.6. Pedestrian / Cycle Infrastructure
The provision of new pedestrian and cycle links to surrounding area including; Discovery Way, Pippin Drive, Ribston Way, Long Reach Road, Nuffield Road Industrial Estate and through Bramblefields Local Nature Reserve will significantly improve the permeability and accessibility of the site for pedestrians and cyclists.

9.7. High Quality Signage to CSI
Access to the site will be signed from the A14 and the southern end of Milton Road for passengers travelling by car to encourage the use of Milton Road rather than other minor side roads.

Access to/from the site will also be signed to/from local facilities, residential areas and local businesses to encourage sustainable travel. The site will also be well publicised as a destination along the Busway.

9.8. Summary
Based on findings made in earlier chapters in this TA the following mitigation measures are proposed to limit the impact generated by CSI and improve accessibility to the site.

- Revised lane designation on the southbound Milton Road approach to the northern Cowley Road junction
- Provision of above standard pedestrian / cycle links to the local surrounding area
- TROs introduced along Cowley Road adjacent to CSI car park to discourage passengers from parking on-street for free.
- Monitor parking within the local residential area before and after the opening of the new station. Necessary controls will be developed and introduced in consultation with local residents if issues are observed.

In addition the committed extension of the Guided Busway into the site up to the station building will significantly improve the sustainable accessibility of the site.
10. Residual Impact

10.1. Introduction
This Chapter provides a summary of the residual impacts that are anticipated to remain, following the introduction of the mitigation measures proposed in Chapter 9, including the impact on highway capacity, public transport accessibility and pedestrian/cycle infrastructure.

10.2. Highway Network
Given that the existing highway network is currently operating at or beyond capacity along Milton Road, there will be some minor residual impact on the network in terms of increased queuing and driver delay. Whilst some of this residual impact can be linked directly to CSI, most is caused by; existing capacity issues, indirect reassignment of traffic on the network and most notably long term background traffic growth.

Overall CSI will have a positive residual impact on the highway network for the following reasons:

- Traffic travelling into / out of the City Centre will be reduced
- A large proportion of vehicles trips using CSI are anticipated to be on the same section of the highway network in the future whether CSI is opened or not

Whilst CSI is anticipated to have an overall positive impact on the highway network, a mitigation measure is proposed in Chapter 9 and analysed in this chapter below for the northern Cowley Road / Milton Road junction.

10.2.1. Revised Lane Designation at Northern Cowley Road / Milton Road Junction
The northern Cowley Road / Milton Road junction as well as the Science Park junction have been assessed for capacity to determine the impact of the following mitigation measure:

- Update the southbound road markings at the northern Cowley Road / Milton Road junction to include for the following lane designation, from inside lane to outside lane:
  - Left turn filter into Cowley Road – as per existing;
  - “City Only” – as per existing;
  - No lane designation – in place of “Science Park Only”
  - “Science Park Only” – as per existing;

The summary of the capacity assessments are discussed in this section and the detailed LinSig outputs have been included in Appendix N of this report.
### 10.2.1.1. Cowley Road / Milton Road North Signalised Junction

Table 29 shows how the Cowley Road / Milton Road north junction is predicted to operate in the 2026 future design year following the opening of CSI (with CSI scenario) with and without revised lane designation at the northern Cowley Road / Milton Road junction.

#### Table 29. Cowley Road / Milton Road North Junction with and without revised lane designation (with CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th></th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg Delay</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>26%</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Milton Road S (Ahead, RT)</td>
<td>34%</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Milton Road N (Left)</td>
<td>109%</td>
<td>125</td>
<td>193</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>40%</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>14%</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Cowley Road (RT)</td>
<td>18%</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>Cycle Time</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>96.81</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-21.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**2026 Future Year (with CSI) – without mitigation**

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th></th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg Delay</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>24%</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Milton Road S (Ahead, RT)</td>
<td>29%</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>Milton Road N (Left)</td>
<td>111%</td>
<td>141</td>
<td>216</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>40%</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>13%</td>
<td>1</td>
<td>49</td>
</tr>
<tr>
<td>Cowley Road (RT)</td>
<td>21%</td>
<td>1</td>
<td>39</td>
</tr>
<tr>
<td>Cycle Time</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>111.70</td>
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<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>-23.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**2026 Future Year (with CSI) – with mitigation**

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM</th>
<th></th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%Sat</td>
<td>Queue</td>
<td>Avg Delay</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>27.0%</td>
<td>0.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Milton Road S (Ahead, RT)</td>
<td>32.2%</td>
<td>22.2</td>
<td>8.1</td>
</tr>
<tr>
<td>Milton Road N (Ahead, Left)</td>
<td>71.9%</td>
<td>8.5</td>
<td>8.5</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>50.1%</td>
<td>8.9</td>
<td>9.2</td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>61.1%</td>
<td>12.5</td>
<td>10.7</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>13.3%</td>
<td>0.6</td>
<td>49.9</td>
</tr>
<tr>
<td>Cowley Road (RT)</td>
<td>21.2%</td>
<td>0.9</td>
<td>35.8</td>
</tr>
<tr>
<td>Cycle Time</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Delay (pcuHr)</td>
<td>9.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC (%)</td>
<td>25.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity

Table 29 above shows that by revising the lane road markings at the northern Cowley Road junction there will be a residual positive impact on the operation of the junction most notably on the southbound Milton Road arm. The revised lane designation will help to reduce the queue that currently extends back to the A14 interchange to a much more manageable level. This in turn will significantly improve the potential usage of the left turn filter lane leading into Cowley Road (i.e. limiting the potential for the middle lane to block access to the left turn filter lane).
10.2.1.2. Cowley Road / Milton Road South Signalised Junction

Table 30 shows how the Cowley Road / Milton Road south junction is predicted to operate in the 2026 future design year following the opening of CSI (with CSI scenario) with and without revised lane designation at the northern Cowley Road / Milton Road junction.
## Table 30. Cowley Road / Milton Road South Junction (with CSI) - Capacity Summary

<table>
<thead>
<tr>
<th>Movement</th>
<th>AM %Sat</th>
<th>AM Queue</th>
<th>AM Avg Delay</th>
<th>PM %Sat</th>
<th>PM Queue</th>
<th>PM Avg Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>2026 Future Year (without CSI) – without mitigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>124%</td>
<td>148</td>
<td>417</td>
<td>101%</td>
<td>41</td>
<td>90</td>
</tr>
<tr>
<td>Milton Road N (RT offside)</td>
<td>76%</td>
<td>13</td>
<td>28</td>
<td>9%</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Milton Road N (RT nearside)</td>
<td>76%</td>
<td>13</td>
<td>28</td>
<td>9%</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Cowley Road</td>
<td>20%</td>
<td>2</td>
<td>26</td>
<td>29%</td>
<td>2</td>
<td>27</td>
</tr>
<tr>
<td>Science Park (LT nearside)</td>
<td>3%</td>
<td>0</td>
<td>13</td>
<td>68%</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Science Park (LT offside)</td>
<td>3%</td>
<td>0</td>
<td>12</td>
<td>64%</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>Science Park (Ahead, RT)</td>
<td>0%</td>
<td>0</td>
<td>0</td>
<td>35%</td>
<td>2</td>
<td>56</td>
</tr>
<tr>
<td>Milton Road S (LT, Ahead)</td>
<td>79%</td>
<td>9</td>
<td>29</td>
<td>77%</td>
<td>10</td>
<td>21</td>
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<tr>
<td>Milton Road S (Ahead)</td>
<td>73%</td>
<td>7</td>
<td>24</td>
<td>73%</td>
<td>8</td>
<td>19</td>
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<tr>
<td>Milton Road S (RT)</td>
<td>13%</td>
<td>1</td>
<td>58</td>
<td>14%</td>
<td>1</td>
<td>61</td>
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<tr>
<td>Cowley Road (LT)</td>
<td>40%</td>
<td>5</td>
<td>28</td>
<td>12%</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td><strong>Cycle Time</strong></td>
<td>90</td>
<td></td>
<td></td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Delay (pcuHr)</strong></td>
<td>147.20</td>
<td></td>
<td></td>
<td>39.39</td>
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<td></td>
</tr>
<tr>
<td><strong>PRC (%)</strong></td>
<td>-37.9</td>
<td></td>
<td></td>
<td>-12.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2026 Future Year (with CSI) – without mitigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>119%</td>
<td>120</td>
<td>343</td>
<td>97%</td>
<td>20</td>
<td>56</td>
</tr>
<tr>
<td>Milton Road N (RT offside)</td>
<td>74%</td>
<td>13</td>
<td>26</td>
<td>9%</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Milton Road N (RT nearside)</td>
<td>74%</td>
<td>13</td>
<td>26</td>
<td>9%</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Cowley Road</td>
<td>24%</td>
<td>2</td>
<td>27</td>
<td>57%</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>Science Park (LT nearside)</td>
<td>3%</td>
<td>0</td>
<td>12</td>
<td>67%</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Science Park (LT offside)</td>
<td>3%</td>
<td>0</td>
<td>12</td>
<td>62%</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Science Park (Ahead, RT)</td>
<td>1%</td>
<td>0</td>
<td>50</td>
<td>32%</td>
<td>1</td>
<td>56</td>
</tr>
<tr>
<td>Milton Road S (LT, Ahead)</td>
<td>76%</td>
<td>7</td>
<td>26</td>
<td>77%</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>Milton Road S (Ahead)</td>
<td>70%</td>
<td>6</td>
<td>23</td>
<td>73%</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Milton Road S (RT)</td>
<td>70%</td>
<td>4</td>
<td>83</td>
<td>15%</td>
<td>1</td>
<td>61</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>52%</td>
<td>7</td>
<td>30</td>
<td>12%</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td><strong>Cycle Time</strong></td>
<td>90</td>
<td></td>
<td></td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Delay (pcuHr)</strong></td>
<td>121.20</td>
<td></td>
<td></td>
<td>31.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PRC (%)</strong></td>
<td>-32.0</td>
<td></td>
<td></td>
<td>-8.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2026 Future Year (with CSI) – with mitigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milton Road N (Ahead)</td>
<td>131.7%</td>
<td>186.7</td>
<td>505.2</td>
<td>97.4%</td>
<td>23.5</td>
<td>55.8</td>
</tr>
<tr>
<td>Milton Road N (RT offside)</td>
<td>82.9%</td>
<td>16.0</td>
<td>34.8</td>
<td>8.4%</td>
<td>1.0</td>
<td>15.8</td>
</tr>
<tr>
<td>Milton Road N (RT nearside)</td>
<td>72.7%</td>
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<td>28.0</td>
<td>8.5%</td>
<td>1.1</td>
<td>16.3</td>
</tr>
<tr>
<td>Cowley Road</td>
<td>24.1%</td>
<td>2.0</td>
<td>26.9</td>
<td>57.0%</td>
<td>4.4</td>
<td>30.5</td>
</tr>
<tr>
<td>Science Park (LT nearside)</td>
<td>3.5%</td>
<td>0.4</td>
<td>13.1</td>
<td>65.1%</td>
<td>11.3</td>
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</tr>
<tr>
<td>Science Park (LT offside)</td>
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<td>13.0</td>
<td>61.0%</td>
<td>10.8</td>
<td>21.2</td>
</tr>
<tr>
<td>Science Park (Ahead, RT)</td>
<td>0.6%</td>
<td>0.0</td>
<td>49.5</td>
<td>32.2%</td>
<td>1.4</td>
<td>55.5</td>
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<tr>
<td>Milton Road S (LT, Ahead)</td>
<td>79.4%</td>
<td>10.3</td>
<td>33.3</td>
<td>78.5%</td>
<td>11.6</td>
<td>23.6</td>
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<tr>
<td>Milton Road S (Ahead)</td>
<td>73.1%</td>
<td>9.7</td>
<td>28.6</td>
<td>74.2%</td>
<td>10.3</td>
<td>20.8</td>
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<tr>
<td>Milton Road S (RT)</td>
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<td>4.5</td>
<td>96.8</td>
<td>15.0%</td>
<td>0.6</td>
<td>61.4</td>
</tr>
<tr>
<td>Cowley Road (LT)</td>
<td>57.9%</td>
<td>8.2</td>
<td>27.4</td>
<td>12.2%</td>
<td>1.4</td>
<td>21.3</td>
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<td><strong>Cycle Time</strong></td>
<td>90</td>
<td></td>
<td></td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Delay (pcuHr)</strong></td>
<td>190.37</td>
<td></td>
<td></td>
<td>75.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PRC (%)</strong></td>
<td>-46.3</td>
<td></td>
<td></td>
<td>-20.0</td>
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</table>

**Note:** %Sat is Degree of Saturation, Queue is the mean maximum queue measured in PCUs, Delay is average delay per vehicle in seconds per PCU and PRC is Practical Reserve Capacity.
Table 30 above shows that by revising the lane road markings at the northern Cowley Road junction there will be a residual negative impact on the operation of the Science Park / Milton Road junction. The revised lane designation will allow more traffic to travel south from the northern Cowley Road junction into the “City Only” lane at the Science Park junction therefore increasing delay and queuing in this lane.

The results show that the increase in queue on the “City Only” lane will block back to the northern Cowley Road junction during peak periods. However, the level of southbound queue predicted at both junctions combined is significantly lower following the introduction of the revised lane designation compared with the existing situation.

The mitigation measure will move the existing “City Only” lane capacity constraint further south. On the whole this will have a positive impact on the highway network by increasing the carriageway length available for ‘city bound’ vehicles to queue in, therefore reducing the impact on the A14 interchange, and also significantly improving accessibility to the Cowley Road left turn filter lane.

Overall the proposed mitigation measure to revise the lane markings on Milton Road will not fully resolve the significant queuing that occurs in the “City Only” lane at the Science Park junction, however it will offer a significant improvement on the existing situation and therefore offer nil detriment in terms of capacity impact.

10.3. Traffic Control along Access Roads

The proposal to provide traffic control along Cowley Road will limit any potential impact on accessibility to the site as this will allow the access road to be kept free flowing. In addition, traffic control will encourage more passengers to travel by sustainable mode by removing the potential to park for free close to the new rail station.

10.4. Public Transport

Following the committed extension of the Busway and the anticipated extension of Citi2 bus service into the site the residual impact on public transport will be highly beneficial for the site, local businesses and local residents. The extensions will open up links to/from the station via the west where existing links are currently minimal as well as Milton and the City Centre.

10.5. Pedestrian / Cycle Infrastructure

The provision of high quality pedestrian / cycle links to the local surrounding area will allow for a large beneficial residual impact to be realised. The provision of this infrastructure will not only benefit passengers but will also benefit the local highway network, local businesses and local residents through the improved permeability and accessibility of the site to the surrounding area.

10.6. High Quality Signage to CSI

The provision of high quality signage along the main routes (i.e. A14 and Milton Road for cars and from local trip generators for pedestrians and cyclists) make it clear to rail passengers how to access the site by the appropriate route/travel mode and more importantly discourage use of less appropriate routes.

Specifically routing all traffic via Milton Road will limit the impact on minor roads (for example Green End Road).
10.7. Summary

In summary, this Chapter shows that following the introduction of the following proposed and committed mitigation measures the residual impact of CSI would be beneficial to the local transport network, especially in terms of sustainable travel:

- Proposed
  - Revised lane designation on the southbound Milton Road approach to the northern Cowley Road junction
  - Revised signal staging sequence at Kings Hedges / Milton Road junction in the AM peak
  - Provision of above standard pedestrian / cycle links to the local surrounding area
- Committed
  - Extension of the Busway into the site up to the station building
11. Summary and Conclusions

11.1. Summary

Atkins has been appointed by Network Rail to undertake a Transport Assessment (TA) to support the planning application for the proposed new Cambridge Science Park Interchange (CSI).

CSI is a new station interchange facility proposed within the north-eastern area of Cambridge City and accessed from Cowley Road. CSI will comprise the following:

- **Train Station**
  - Approx 450 sqm building (passenger waiting facilities; toilets; ticket office; retail; amenity space; rail staff accommodation and facilities)
  - Two main line platforms
  - One terminating bay platform
  - Pedestrian/cycle bridge linking station building and platforms over the main line (lift and stair access)
  - Operational times expected to be 05:30-01:00 daily

- **Interchange Facility**
  - New pedestrian and cycle links to surrounding area including; Discovery Way, Pippin Drive, Ribston Way, Long Reach Road, through Bramblefields Local Nature Reserve and Nuffield Road Industrial Estate
  - Approximately 1000 space cycle parking
  - Extension of the Cambridgeshire Guided Busway into the site
  - Multi-modal interchange for cars, buses, trains, cyclists, pedestrians and heavy rail
  - Highway access from Cowley Road / Milton Road
  - 450 space car park

The proposed site is located approximately 1.9 miles northeast of Cambridge City Centre on the edge of Chesterton. The new station interchange will be located on the Ely to Cambridge line.

The CSI site is approximately 9.95 hectares of railway operational freight sidings. The site is bounded by the Cowley Road industrial area to the west and north, the West Anglia Main Line Railway to the east, Nuffield Road allotments to the south and Cambridge Business Park to the west.

The site is easily accessible from the highway network with almost direct access to the trunk road network and various local residential areas.

Sustainable infrastructure linking the site to the wider area is currently either limited in certain directions or difficult to access from within the site. However, as part of the proposed development there is significant potential to provide for very good sustainable infrastructure on-site, whilst also improving links to the immediate and therefore wider area, without having to improve the wider network.

This TA shows that the proposed development is in accordance with national, regional and local transport policies. The site will promote sustainable modes of travel by its very nature of being a rail station and interchange. The location of CSI will also encourage existing Cambridge Station passengers, currently travelling by private car or other travel modes, to avoid the City Centre by offering an attractive alternative option to Cambridge City Centre Rail Station. Its location will also promote sustainable land use development around the northern fringes of Cambridge in accordance with local planning policies. A considerable number (60% of total passengers) of non-vehicular access trips (i.e. walking and cycling) are anticipated to be generated by CSI. If public buses are included then 75% of passengers generated by CSI are anticipated to travel to/from the site by sustainable travel modes (i.e. walking, cycling and bus).

In addition, the proposed development will provide for; sufficient cycle parking storage for passengers to encourage sustainable travel, a sufficient number of car parking spaces that meets necessary demand without over provision, appropriate access for disabled passengers, a direct link with the Busway and safe and convenient cycle and pedestrian access.
11.2. Development Impact

Analysis of the accident history at a range of junctions local to the site access shows there to be no obvious highway safety concern within the local area that could be amplified following the opening of the new development.

The scale of the proposed car park has been based on a considered approach. The potential for the over provision of car park spaces has been negated by basing the number of spaces proposed on a value that just meets anticipated demand. Providing a car park that just meets demand will encourage users to use more sustainable travel options to get to and from CSI.

In addition to limiting the car park size the proposed sustainable infrastructure that will accompany CSI will encourage sustainable travel, especially; the committed extension of the Busway, potential extension of bus service Citi2 into the site and good quality servicing access for existing and proposed users that limits the impact on other users.

The impact assessment and junction capacity analysis undertaken as part of this TA takes into account a very robust assumption where 133% of the anticipated vehicle trips generated by CSI have been added onto the highway network. Of the 236 vehicle trips assumed to enter CSI in the AM peak hour only 160 are anticipated to actually hit the highway network in reality.

This TA shows that the impact on the local highway network will overall be minimal in terms of percentage increase in car trips and impact on junction capacity. Overall the total increase in traffic at each junction is anticipated to be less than 5%. Further afield the impact will be negligible and there will be beneficial impacts to other parts of the local highway network as a result of rail trips transferring from Cambridge station to CSI; around 100 less PCUs are forecast on Station Road Cambridge as a result of CSI.

The local highway network along Milton Road is currently at/approaching/beyond capacity. The capacity constraint along Milton Road is anticipated to be exacerbated by background traffic growth with or without the development of CSI. At some junctions along Milton Road the opening of CSI is anticipated to have a beneficial impact on capacity.

The only junction that is anticipated to experience noticeable increases in queue levels following the opening of CSI is the Cowley Road / Milton Road northern junction, specifically on the northern Milton Road arm.

In terms of the Highways Agency’s Trunk Road Network the resultant mean maximum queue levels expected after the opening of CSI on the eastbound A14 / A10 off slip can be accommodated well within the slip road and away from the main A14 eastbound carriageway. In addition the proposed lane designation changes proposed at the Milton Road / Cowley Road junction will improve the operation of the A14 / A10 junction and therefore improve the operation of the A14 westbound off slip.

This TA shows that whilst CSI will increase the downtime of Chesterton Junction Level Crossing, located to the south of CSI, this increase will be minimal throughout most of the day and will have minimal impact on vehicles crossing the railway in this location.

Based on findings made within this TA the following mitigation measures are proposed to limit the impact generated by CSI and improve accessibility to the site.

- Revised lane designation at the northern Cowley Road junction
- Provision of above standard pedestrian / cycle links to the local surrounding area
- TROs introduced along the entire length of Cowley Road to prevent on-street parking
- High quality signage to the site will be provided for all travel modes
- Monitor parking within the local residential area before and after the opening of the new station. Necessary controls will be developed and introduced in consultation with local residents if issues are observed.

Following the implementation of the above measures, in addition to the committed extension of the Busway into the site up to the station building, the residual impact of CSI will be beneficial in transport terms.
11.3. Conclusion

In light of the assessments undertaken in this report it is considered that overall the proposed development of CSI will have minimal impact on the surrounding transport networks.

The impact of CSI will be beneficial in terms of sustainable travel and neutral in terms of vehicular travel. Given that most of the new passenger trips will need access to the local highway network whether CSI is opened or not it can be argued that this TA provides a very robust assessment of transport impact. Overall it can therefore be concluded that CSI will have a beneficial impact on the transport network as a whole.

Whilst existing deficiencies in junction capacity are noted along Milton Road, additional infrastructure provision would be necessary with or without CSI. It is also clear that background traffic growth between 2016 and 2026 has a greater adverse impact on capacity compared with the opening of CSI. In fact CSI is predicted to have a beneficial impact on some junctions along Milton Road. In addition, the abstraction of trips from other stations including Cambridge Rail Station means that areas such as the City Centre are predicted to see a reduction in congestion as a result of CSI.

Whilst the impact in terms of junction capacity is noticeable at some junctions this impact has been mitigated against and the residual impact is anticipated to be minimal.
Appendices
Appendix A. Scoping Correspondence
Dear Rebecca,

_Chesterton Station interchange – Transport Assessment Scoping_

Following on from our discussions please find our comments for the above site listed out by paragraph number as per your scoping note.

Section 1 para 3: although we would want to move towards agreement in principle to the proposed scope we reserve the right to request further information if it becomes apparent this will be needed as the TA process unfolds.

Section 3.2 para 1: arrangements for the CGB crossing of Milton Road may well be part of the existing TWAO and, presumably, can be implemented without further permission. The scoping document also notes that this is not part of the TA. However, providing high quality bus access to the interchange will be critical so we will need to be reassured that adequate bus services to CSI are provided; if this suggests that the Milton Road crossing will be implemented to facilitate this, we may need some sensitivity tests to examine the impact (if any) that implementation of the crossing would have on local network performance.

Section 4 para 1 fifth bullet: quantitative assessment of the impact of the proposals on 'sustainable transport users' [presumably this means non-car modes?]. For example, all-mode trip generation estimates will be required and likely flows on key desire lines so that the adequacy of existing provision can be assessed. In addition we wish to understand potential bus demand, and be reassured, for example, that adequate capacity at the right time of day exists, or can be provided, to support this demand.

Section 4.1.1 para 5 first bullet: a LINSIG assessment of Cowley Road / Milton Road will be required by CCC's signals engineers in addition to PARAMICS.

Section 4.1.1 para 5: the proposed junctions for assessment are acceptable but consideration should also be given to examining the Arbury Road junction - although the changes in flow...
appear to be less than 5% from the model tests this appears to be as a result of the model assigning traffic via Scotland Road / Green End Road which should be discouraged

Section 4.1.1 final para: the applicant should liaise with the HA on their requirements for the assessment of the A10/A14 Milton Interchange. As a minimum, given the importance of this junction to the local network, we would like to see forecast turning movements for with/without CSI scenarios. Depending on what this shows, and how discussions with HA progress, we reserve the right to potentially require an operational assessment

Section 4.1.3: we would like to see an evidenced justification for the level of proposed car parking; this could be based on a first principles arrivals/departures/accumulation assessment based on anticipated train service patterns and also derived from other local stations. This approach could also be used to examine vehicular trip generation and to validate any approach adopted using CSRM

Section 4.2 para 1: Atkins should also liaise further with CCC’s cycling officer on these aspects as these are progressed

Section 4.2 para 3: is there any further evidence on cycle parking demand based on existing Cambridge Station? A lot of the bikes that are at Cambridge station are left there overnight and used by commuters to get to and from work. This means that a lot of the spaces are already taken up already so that any additional rail users can’t find a space. A survey should be undertaken at Cambridge rail station to determine how many spaces are required in order to deal with this type of additional use. A good management plan should also be proposed to ensure any bikes that have been discarded at the station for a certain period of time and not used again should be removed to free up the spaces for other users.

Some additional funding and space could be allocated so once the station has been open and in use for 6 months or so a survey can be undertaken to ensure there is sufficient cycle parking and if not then this funding should be drawn upon to provide more.

Section 4.4 para 1: the TA should review the scope to divert bus services if appropriate, consider times of operation to review compatibility with proposed train services, and also available capacity.

para 4.24 to 4.32 in the environmental scoping report - We require clarification as to the extent to which in the “operational phase” assessment it will be possible to estimate the environmental pollution savings through car traffic (mostly from the north and west) accessing the new station rather than journeying through Cambridge to the central station.

On a more general point: we would wish to see consideration of how provision for taxis will be made. Also consideration should be given to any construction traffic related issues. It is noted that this new station will provide wider benefits to the rest of Cambridge, particularly around the congested existing station area.

It not clear that all of the points made at the initial scoping meeting have been reflected in the draft; a review of these would be helpful

Please do not hesitate to contact me if you have any queries regarding this.

Kind regards