

# Technical note

|                 |   |              |                             |
|-----------------|---|--------------|-----------------------------|
| <b>Project:</b> | <b>Stratford-on-Avon<br/>Additional Road Capacity</b> | <b>To:</b>   | Warwickshire County Council |
| <b>Subject:</b> | Evidence Review                                       | <b>From:</b> | Atkins                      |
| <b>Date:</b>    | May 2016  | <b>cc:</b>   |                             |

## 1. Introduction

### 1.1. Background to the Study

Atkins has been commissioned by Warwickshire County Council (WCC) to undertake a study to evaluate the impact of additional highway capacity in Stratford-on-Avon. This is in response to a number of existing transport issues within the area and to take account of the likely impact of Stratford on Avon District Council's proposals for potential housing and employment growth sites for the Local Development Framework up to 2031.

The study will also assess whether there are opportunities for reducing traffic dominance in the town centre (e.g. on Bridge Street, High Street and Clopton Bridge) as a result of the provision of additional highway capacity.

A number of discrete tasks have been identified as being required for this Study. A list of the tasks is shown below:

- (i) **Stage 1 - Evidence Review**
- (ii) Stage 2 - Road Capacity Options
- (iii) Stage 3 - Assessment of Options
- (iv) Stage 4 - Cost assessment
- (v) Stage 5 - Cost-benefit Analysis
- (vi) Stage 6 - High level environmental assessment
- (vii) Stage 7 - Town Centre Benefits
- (viii) Stage 8 - Recommended Approach

This Technical Note presents the findings from **Stage 1 – Evidence Review**.

### 1.2. Purpose of the Evidence Review

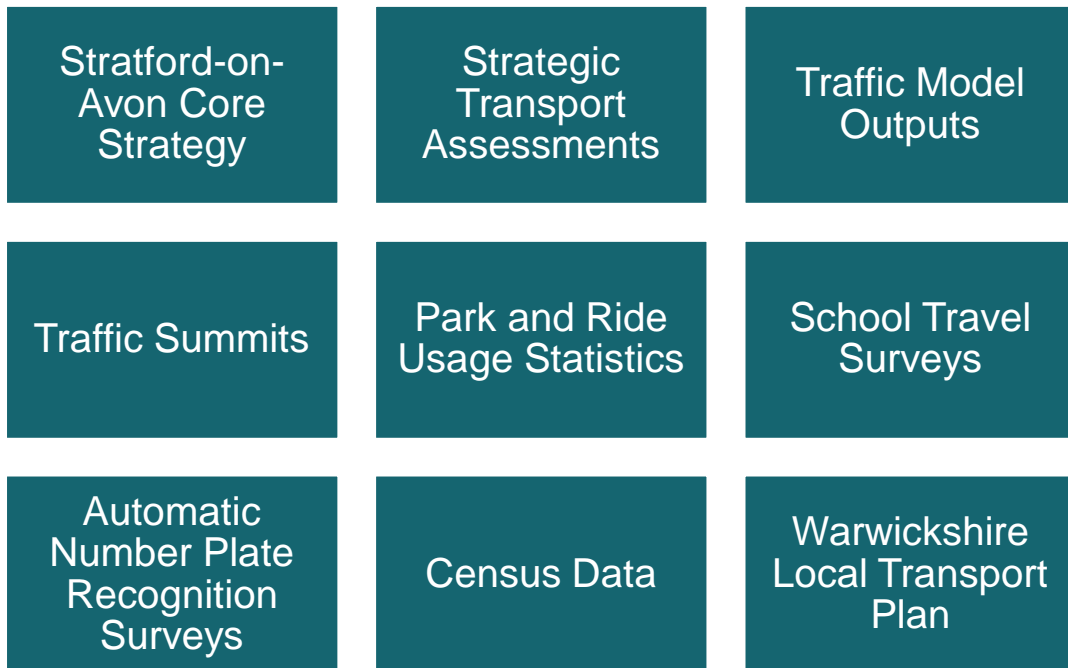
A review of pre-existing datasets and documentation has been undertaken to identify the existing and future transport related issues and problems affecting Stratford-on-Avon. The aim of this review is to summarise the network conditions and local travel demand behaviours relevant to Stratford-on-Avon. Detailed surveys were not undertaken specifically for this study. Instead, the evidence review takes into account existing data available from WCC, Stratford DC (District Council) and existing traffic modelling outputs to establish if there is a clear basis for highway capacity intervention in Stratford-on-Avon. The outcome from this Evidence Review is a set of objectives that any highway capacity interventions, both in and outside the town, should address.

### 1.3. Summary of Available Evidence

This evidence review will analyse the existing local transport data and reports available, utilising the data and current information to identify current issues, future issues and whether there is a need for additional road capacity and for a reduction in traffic dominance in Stratford town centre. The evidence sources used are summarised in Figure 1.

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Figure 1. Summary of Main Evidence Sources



Further detail regarding the main evidence sources is provided below:

- **Stratford-on-Avon Core Strategy (Currently in Draft, not yet adopted)** – Sets out the core proposals for wider economic growth, including, but not limited to, housing and employment infrastructure.
  - **Interim Housing Sites Schedule (31 December 2015)** - The most recent examination, including an updated housing trajectory outlining housing allocation for the period 2011 to 2031.
- **Strategic Transport Assessments (STAs)** – These reports comprise the evidence for the Core Strategy, the transport impact of potential future scenarios for additional growth, and identifying possible mitigation measures. The reports also discuss strategic options for housing and employment allocation within the Stratford-on-Avon area:
  - **STA S-Paramics Traffic Modelling Report (2012)** – A report prepared by Arup on behalf of WCC, undertaking detailed testing on the impacts of growth and development in Stratford-on-Avon district.
  - **Options Analysis Report (2014)** – An updated report by Arup for WCC, testing five options for housing and employment across Stratford District, with mitigation strategies assessed.
  - **Further Focused Development Options in the Stratford-on-Avon & Southam Areas (July 2015)** – A report examining the impacts of increased housing and employment allocation.
  - **Stratford-on-Avon Model Update Local Model Validation Report (LMVR) (October 2015)** – A report detailing the update of the S-Paramics traffic model extending network coverage to a 2013 base model, utilising census data and capturing any changes to the extent of development indicated in the Core Strategy modifications.
- **Traffic Summits (2014/2015)** – Three Traffic Summits were held in July 2014, October 2014 and March 2015 where discussions and feedback forms relating to various traffic issues in the town

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were handed out to attendees. This evidence review has drawn on the key findings documents prepared following the Traffic Summits.

- **Park and Ride (P&R) Usage Statistics (2015)** – A study undertaken by Atkins on behalf of WCC, investigating options to reduce the ongoing revenue support for the Bishopton P&R site and bus service.
- **School Travel Surveys (2010)** – Information on the method by which pupils made their journey to school, as well as the origin post code. Data was collected in 2010, and has been provided by WCC.
- **ANPR (Automatic Number Plate Recognition) Survey Data** – WCC commissioned an ANPR survey which was carried out in 2013 which captured a wide area cordon around Stratford-on-Avon. Additional surveys around the Birmingham Road Corridor (2014) and Tiddington Road/Banbury Road/Shipston Road Junctions (2015) were also undertaken.
- **Census Journey to Work Data (2011)** – Journey to work data for local district workplace zones, including mode of transport taken to work and distance travelled to work.
- **Warwickshire Local Transport Plan 2011-2026** – The third Warwickshire Local Transport Plan (LTP3) came into effect on 1st April 2011. LTP3 sets out the transport policies and strategies for the County for period the 2011-2026 and replaces LTP2 (2006-2011).

## 1.4. Report Structure

The remainder of this Technical Note is structured as follows:

| Section Number | Theme  | Page Number |
|----------------|--|-------------|
| 2              | Wider Socio-economic Context   | 4           |
| 3              | What are the local transport issues in Stratford-on-Avon?  | 8           |
| 4              | What are the future growth plans for Stratford-on-Avon?  | 23          |
| 5              | What are the implications of no highway intervention in Stratford-on-Avon and what are the options for intervention? | 24          |
| 6              | What should be the objectives of highway capacity improvements in Stratford-on-Avon                                  | 31          |

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## 2. Wider Socio-Economic Context

The demand for travel by all modes of transport is not only influenced by the provision of transport networks, it is also influenced by the study area’s economic, social, and geographic context. This section introduces the wider context in relation to the Stratford-on-Avon District.

### 2.1. Economic Overview

The local economy in Stratford-on-Avon District is comparatively strong when compared to the wider Warwickshire and West Midlands economies. In 2012 Stratford-on-Avon District residence based earnings were £27,547, and workplace earnings £26,948. This compares to £27,414 and £26,308 for Warwickshire and £24,617 and £24,600 for the West Midlands respectively<sup>1</sup>.

Stratford-on-Avon is an important local centre and is home to the world’s most important Shakespeare heritage sites including Shakespeare’s birthplace. It is also home to the internationally renowned Royal Shakespeare Company. As a result, approximately five million people visit the District (three million to Stratford-on-Avon town) each year spending around £336m per year and supporting over 8,000 jobs. This revenue derived from tourism is crucial to vitality of the local economy<sup>2</sup>. Table 1 shows the three year average from 2012-2014 of tourism day visits and 3 hour leisure day visits in Stratford-on-Avon Local Authority and Warwickshire county.

**Table 1. Number of tourist trips from 2012-2014<sup>3</sup>**

|                                     | Tourism day visits |                 |                                       | 3 hour+ leisure day visits |                 |                             |
|-------------------------------------|--------------------|-----------------|---------------------------------------|----------------------------|-----------------|-----------------------------|
|                                     | Visits             | Expenditure (£) | 2012-2014 Sample (tourism day visits) | Visits                     | Expenditure (£) | 2012-2014 (3 hour + visits) |
|                                     | Millions           | Millions        |                                       | Millions                   | Millions        |                             |
| Stratford-on-Avon (Local Authority) | 4.36               | 131.01          | 160                                   | 5.58                       | 146.99          | 210                         |
| Warwickshire (Ceremonial County)    | 13.99              | 371.69          | 552                                   | 23.96                      | 513.39          | 785                         |

Unemployment across the District remains low with 0.9% of workers claiming jobseekers allowance in February 2014. For context, the UK average is 3% and the West Midlands average is 3.7%<sup>4</sup>. However, there is a considerable imbalance between the number of jobs in the District and its working population. Since 1981, an increasing number of residents commute to higher paid employment outside the District, while lower paid jobs are often filled by people coming into the District from adjoining areas. These commuting patterns impose significant pressures on the transport system<sup>5</sup>.

<sup>1</sup> Quality of Life in Warwickshire, Warwickshire Observatory, April 2014.

<sup>2</sup> Stratford-upon-Avon Core Strategy, June 2015.

<sup>3</sup> [https://www.visitengland.com/sites/default/files/gbdvs\\_annual\\_report\\_2014\\_160915\\_rev\\_0.pdf](https://www.visitengland.com/sites/default/files/gbdvs_annual_report_2014_160915_rev_0.pdf)

<sup>4</sup> Stratford-upon-Avon Core Strategy, June 2015.

<sup>5</sup> Warwickshire Local Transport Plan 2011-2026 Part A: The Strategy.

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## 2.2. Wider Growth Context

The Stratford-on-Avon Core Strategy has set the District Council a challenging target in terms of new homes provision over the next 20 years. The most recent Core Strategy at the time of writing set out a strategic objective of approximately 14,485 additional homes to be built between 2011 and 2031.

This planned growth will generate additional demands for all modes of transport which, if left unmitigated, will impact adversely on the performance of the transport network. The impact of this growth is considered in more detail later in this Technical Note on Page 23.

## 2.3. Public Health Context

Transport has an important role in facilitating healthier lifestyles by encouraging active travel behaviours, including greater public transport and uptake of walking and cycling, whilst travel by sustainable modes of travel can also play a role in improving social interaction and connectivity, providing wider benefits to community cohesion. Transport networks also have a role in providing the connections people need to access local health care facilities (predominantly hospitals).

The population of Stratford-on-Avon District benefits from relatively good levels of health, with levels of obesity, health deprivation and average life expectancy better than the national average.<sup>6</sup> However, there is an evident imbalance in general quality of health across the District, with a difference in life expectancy of over six years between the least and most deprived areas.

The District is relatively healthy when compared to national trends. For example, 13.2% of school children (year 6) are obese, compared to a national average of 19.1%. Likewise, 21.4% of adults are obese compared to 23% nationally<sup>7</sup>.

## 2.4. Environmental Context

### 2.4.1. Air Quality

Stratford-on-Avon is covered by an Air Quality Management Area (AQMA), shown in Figure 2, which was declared in 2010.

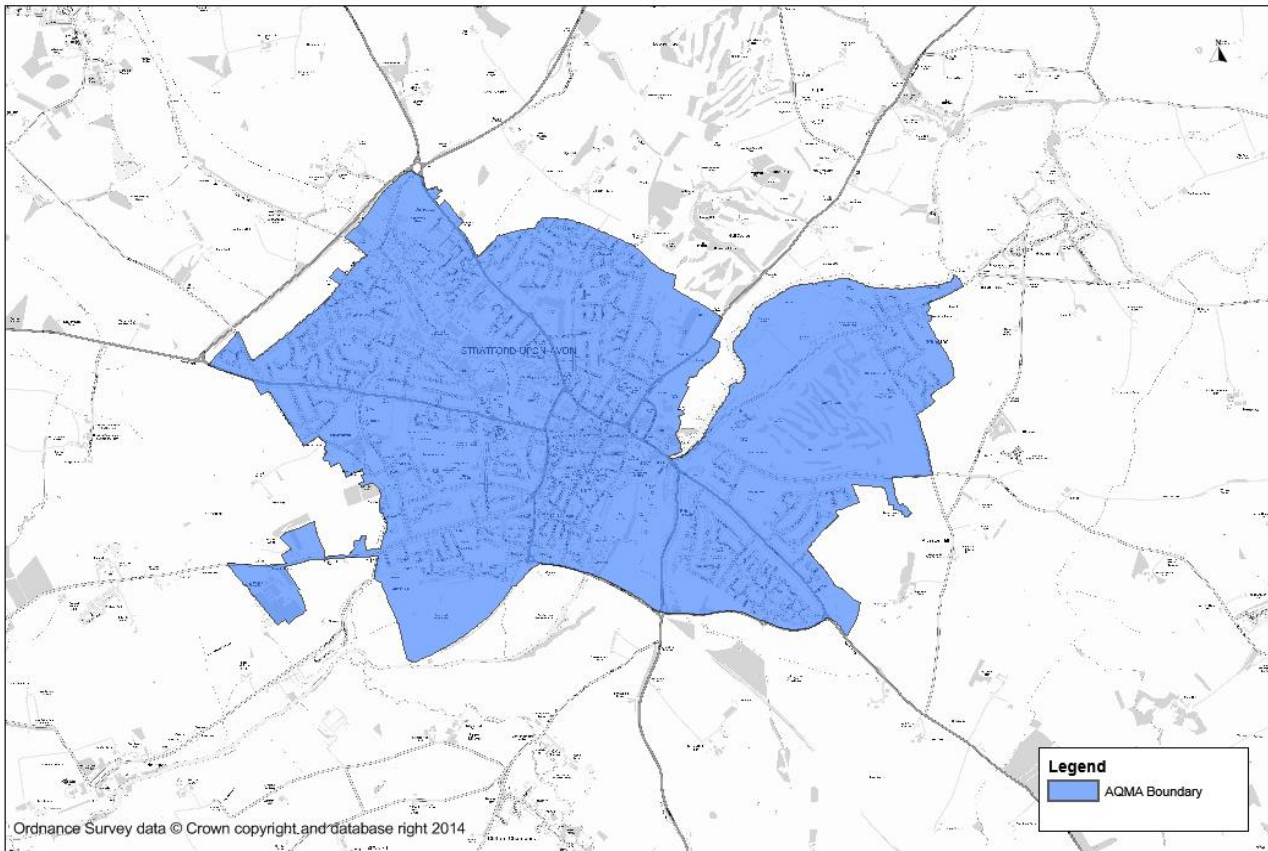
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<sup>6</sup> Stratford-upon-Avon District Health Profile 2015, Public Health England, June 2015.

<sup>7</sup> Stratford-upon-Avon District Health Profile 2015, Public Health England, June 2015.

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**Figure 2. Stratford-on-Avon Air Quality Management Area boundary (AQMA)**



However, in the most recent Air Quality Progress Report<sup>8</sup> (May 2014), no significant increases in measured concentrations or new emission sources were identified in the Stratford AQMA, following trends of reduced measured concentrations over the last five years. However, continued monitoring under the Local Air Quality Action Plan is still in effect.

Road transport is the main contributor of polluting emissions. Transport infrastructure and behavioural change measures to encourage modal shift will be key to achieving an acceptable level of air quality in Stratford-on-Avon whilst providing benefits to public health and the economy. As a result, any development proposals for the town will need to show that air quality will not deteriorate as a result, in line with the county-wide Air Quality Strategy in Warwickshire County Councils Local Transport Plan 2011-2026<sup>9</sup>.

## 2.4.2. Climate Change and Flood Risk

Warwickshire County Council have set a specific objective to *'reduce transport's emissions of carbon dioxide and other greenhouse gases, and address the need to adapt to climate change'*.<sup>10</sup>

Stratford-on-Avon District is susceptible to flooding and was badly affected by the flood events at Easter 1998 and July 2007. These caused considerable damage to property and put lives at risk. These experiences emphasise the importance of making sure that future development in the District does not

<sup>8</sup> 2014 Air Quality Progress Report for Stratford-on-Avon District Council, May 2014.

<sup>9</sup> Warwickshire LTP 2011-2026 Part A – The Strategy.

<sup>10</sup> Warwickshire LTP 2011-2026 Part A – The Strategy.



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increase the risk of flooding. The Environment Agency has mapped the main areas subject to flood risk and these cover a significant amount of land within the District.<sup>11</sup>

It is anticipated that there will be changes in climate conditions in the future. It is forecast that over the next few decades the UK will see milder, wetter winters and hotter, drier summers. In Stratford District it is expected that there will be greater river flooding. The existing rivers will not be able to cope with the increased rainfall in winter and flooding is likely to occur.<sup>12</sup> Additionally, changing climate conditions will impact on the transport system and therefore the transport system should be able to adapt – particularly in withstanding extreme weather events. This was evident during the flooding events in 1998 and 2007.

Sustainable transport provision plays a crucial role in reducing carbon emissions by reducing numbers of single occupancy car trips and increasing the use of active and sustainable modes of travel.

## 2.5. Historic Built Environment Context

Stratford-on-Avon has a unique built environment with a historic town centre with many listed buildings, including the Grade 1 listed Shakespeare's birthplace and Clopton Bridge crossing the River Avon.

A key aspiration is to significantly improve the public realm in Stratford-on-Avon town centre on a route which has become known as the 'Historic Spine'. This connects Shakespeare's birthplace in Henley Street to his burial place in Holy Trinity Church and features some of the town's finest Grade 1 and Grade 2\* listed buildings. The rationale behind improving the route is to promote and support economic regeneration by making the town a more attractive place to live, work and visit.

The historic nature of Stratford-on-Avon means that the road layout is constrained. This means that there are competing demands for space on the transport network. If there is a network disruption then issues quickly develop, particularly during the busy summer season when tourist numbers are at their highest.

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<sup>11</sup> Warwickshire LTP 2011-2026 Part A – The Strategy.

<sup>12</sup> Stratford-upon-Avon Core Strategy, June 2015.

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## 3. What are the local transport issues in Stratford-on-Avon and what are the causes?

Stratford-upon-Avon frequently suffers from severe congestion and delays, both during the peak commuting periods and during holiday periods due to the volume of visitors. The issue is compounded because there are only two road crossings over the River Avon. One of which is the listed Clopton Bridge in the Town Centre.

Currently dependency on the car for travel within the Stratford-upon-Avon area is above the national average. A high proportion of residents travel to work by car, whilst the proportion of residents travelling by sustainable modes of transport is relatively low.

This section considers the current situation in Stratford-on-Avon in terms of congestion and delays and secondly goes on to explore the evidence for the reasons surrounding these problem areas

### 3.1. What are the local transport issues in Stratford-on-Avon?

Stratford-on-Avon town centre frequently suffers from traffic congestion, particularly during the morning and evening weekday peaks, as well as congestion associated with tourist traffic, predominantly on summer weekends and bank holidays.

#### 3.1.1. Journey Times on key routes into Stratford-on-Avon Town Centre

Journey times on key routes to and from Stratford-on-Avon town centre (utilising Traffic Master data<sup>13</sup>) have been analysed and are presented in this section.

Figure 3 shows a diagram of the routes selected and Table 2 shows the AM and PM peak average journey times and speeds on these routes.

The table shows that there are some notable areas of congestion with average speeds across both peaks generally less than 20mph. These are highlighted in the table:

- A422 Alcester Road between Stratford Station and Stratford Gyratory (Route 1, Section 2).
- A3400 Birmingham Road between Maybird Retail Park and the Stratford Gyratory (Route 2, Section 2).
- Clopton Road/Arden Street (Route 4, Section 2).
- A439 Warwick Road (Route 5) westbound towards the Stratford Gyratory.

<sup>13</sup> Stratford-upon-Avon Model Update, Local Model Validation Report, Vectos, October 2015.



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Figure 3. Stratford-on-Avon Journey Times and Speeds on Key Routes

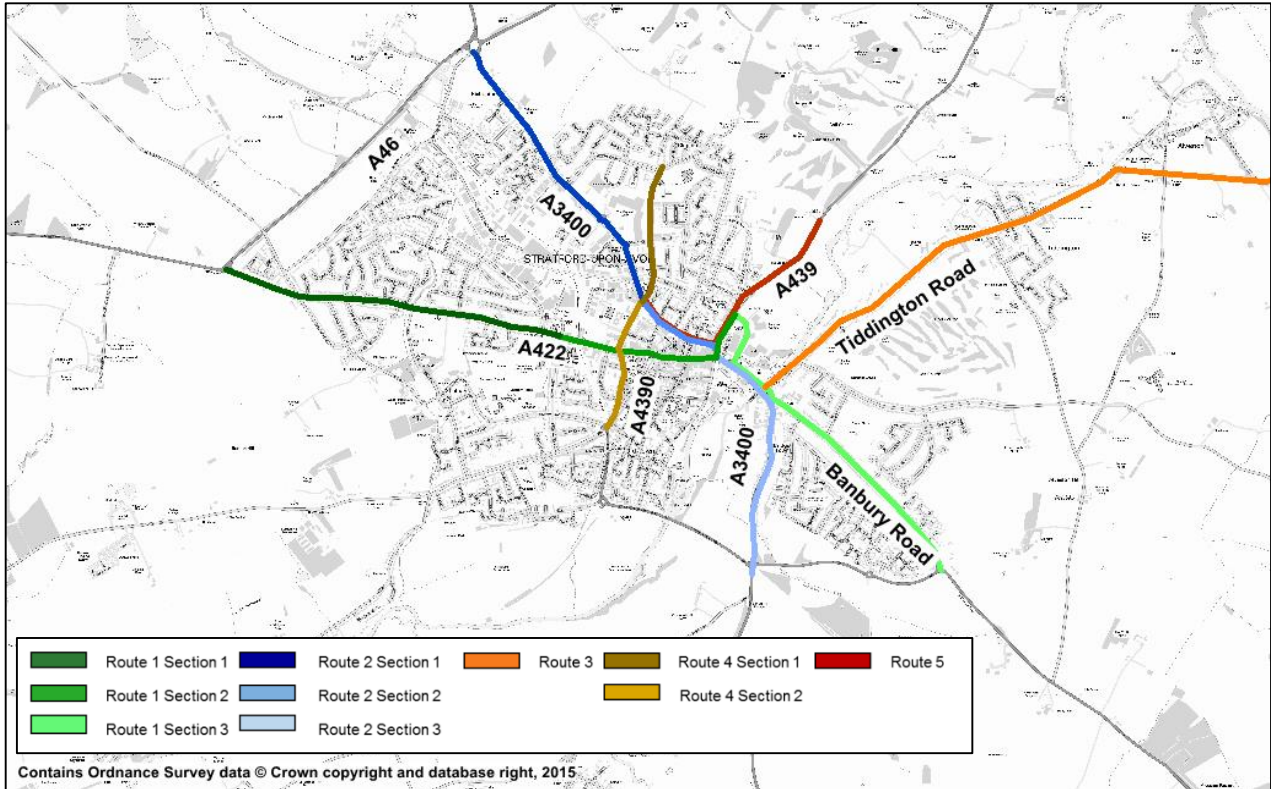


Table 2. Stratford-on-Avon Journey Times and Speeds on Key Routes

| ROUTE | Section | Direction | AM         |               |                 | PM         |                |                 |
|-------|---------|-----------|------------|---------------|-----------------|------------|----------------|-----------------|
|       |         |           | Time (Min) | Distance (Mi) | Avg Speed (Mph) | Time (Min) | Distance (Min) | Avg Speed (Mph) |
| 1     | 1       | EB        | 02:54      | 1.3           | 27              | 03:01      | 1.3            | 26              |
|       | 1       | WB        | 02:41      | 1.3           | 29              | 03:43      | 1.3            | 21              |
|       | 2       | EB        | 03:00      | 0.8           | 16              | 03:27      | 0.8            | 14              |
|       | 2       | WB        | 02:32      | 0.8           | 19              | 02:41      | 0.8            | 18              |
|       | 3       | EB        | 03:11      | 1.4           | 26              | 02:46      | 1.4            | 30              |
|       | 3       | WB        | 03:19      | 1.4           | 25              | 03:26      | 1.4            | 24              |
| 2     | 1       | SB        | 03:30      | 1.2           | 21              | 05:31      | 1.2            | 13              |
|       | 1       | NB        | 02:55      | 1.2           | 25              | 03:25      | 1.2            | 21              |
|       | 2       | SB        | 01:51      | 0.3           | 11              | 02:35      | 0.3            | 8               |
|       | 2       | NB        | 01:25      | 0.3           | 14              | 01:38      | 0.3            | 12              |
|       | 3       | SB        | 02:11      | 0.9           | 25              | 02:12      | 0.9            | 25              |
|       | 3       | NB        | 03:16      | 0.9           | 17              | 02:46      | 0.9            | 20              |
| 3     | EB      | 05:12     | 3.2        | 37            | 05:21           | 3.2        | 36             |                 |
|       | WB      | 05:50     | 3.2        | 33            | 05:46           | 3.2        | 33             |                 |
| 4     | 1       | SB        | 02:12      | 0.5           | 15              | 02:03      | 0.5            | 16              |
|       | 1       | NB        | 01:28      | 0.5           | 22              | 01:30      | 0.5            | 22              |
|       | 2       | SB        | 01:38      | 0.5           | 20              | 01:48      | 0.5            | 18              |
|       | 2       | NB        | 02:05      | 0.5           | 15              | 02:10      | 0.5            | 15              |
| 5     | EB      | 02:23     | 1.1        | 27            | 01:50           | 1.1        | 35             |                 |
|       | WB      | 03:30     | 1.1        | 18            | 04:06           | 1.1        | 15             |                 |

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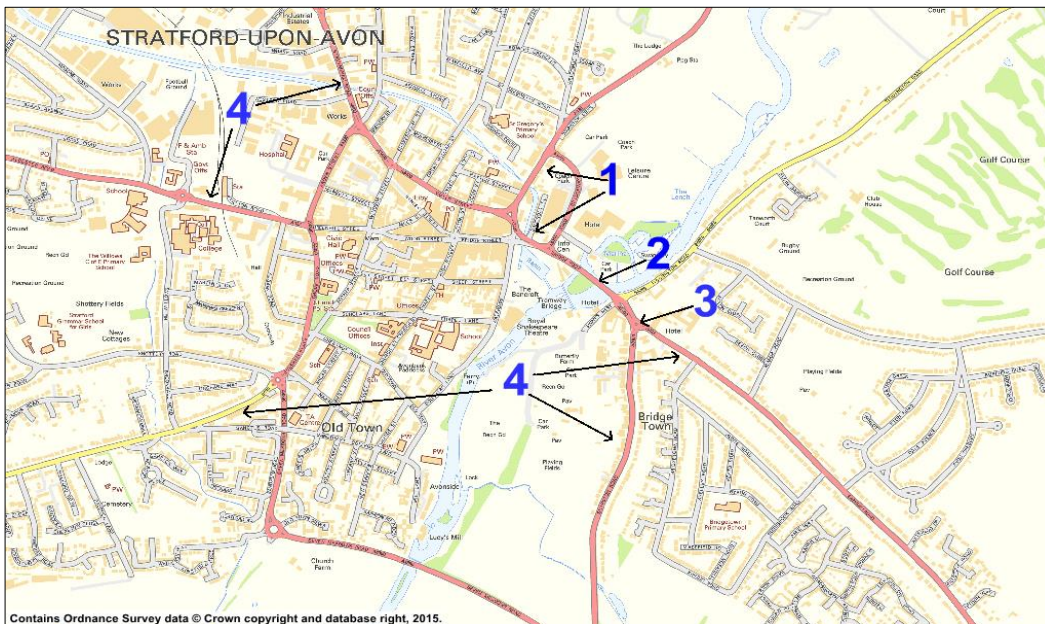
## 3.1.2. Congestion Hotspots

Site survey observations of key areas of the network were undertaken on 30<sup>th</sup> September 2015<sup>14</sup>. The survey identified some routes where congestion hot-spots occurred. These are outlined in Table 3. A common issue with the routes below is queuing traffic which will impact journey time and reliability. The site locations are shown in Figure 4.

**Table 3. Site Survey Observations Summary**

| Ref | Location                                    | Issue  |
|-----|---|--|
| 1   | Stratford Central Gyrotary                  | <ul style="list-style-type: none"> <li>• Pedestrian crossings serve to control the flow of traffic across the junction.</li> <li>• Vehicle hesitancy around Warwick Road entry arm.</li> </ul>   |
| 2   | Clopton Bridge                              | <ul style="list-style-type: none"> <li>• Queues on the bridge were noted in both directions.</li> <li>• Northbound the queues were caused by hesitancy across the stop-line as well as the presence of the pedestrian crossings.</li> <li>• Southbound queues most likely linked to issues at the downstream junctions.</li> </ul> |
| 3   | Tiddington Rd & Shipston/Banbury Roundabout | <ul style="list-style-type: none"> <li>• Notable congestion hot spot with heavy queuing on Banbury Rd SB entry to roundabout.</li> <li>• Queuing also observed on Shipston Road but not to the same extent.</li> <li>• Queues on Banbury Road are exacerbated by heavy right turn HGV movement (from Clopton Bridge).</li> </ul>   |
| 4   | Birmingham Road/Alcester Road/Evesham Road  | <ul style="list-style-type: none"> <li>• Queues at the signalised junctions and then slowly dissipate downstream, reforming at the next significant junction.</li> </ul>   |

**Figure 4. Observation Locations**



<sup>14</sup> Stratford-upon-Avon Model Update Local Model Validation Report, Vectos, October 2015.

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## 3.2. What are the reasons for the transport problems in Stratford-on-Avon?

Drawing on documented evidence, statistics and local traffic modelling data, it is evident that there are a range of factors contributing to local congestion prevalent on parts of the Stratford-on-Avon highway network, particularly during peak periods. These factors have been grouped under the following headings:

- High car dependency (page 11)
- Town centre through trips & limited cross river capacity (page 18)
- School travel contributing to local congestion (page 22)
- Public Transport provision (page **Error! Bookmark not defined.**)
- Parking Supply (page **Error! Bookmark not defined.**) & location
- Use of walking and cycling

*Specific aspects of the town's infrastructure and services are under heavy pressure and are reaching capacity thresholds. This is the case with traffic on the road network, particularly during the morning and afternoon peaks and on certain days during the year such as Bank Holidays, when queuing and delays on routes into the town centre are considerable. Traffic causes adverse environmental impacts on various parts of the town due to noise, air quality and visual intrusion.*

(Stratford-Upon-Avon Core Strategy Proposed Modifications, June 2015)

This is not necessarily an exhaustive list, but aims to pick up on the main issues identified following a review of the available evidence.

### 3.2.1. High Car Dependency

#### 3.2.1.1. Car Ownership

High levels of car ownership place greater demand on the road network and potentially increases resistance to modal shift to more sustainable modes. Table 4 shows the level of car ownership in Stratford-on-Avon compared to county-wide and nation-wide census data.

**Table 4. Car Ownership Statistics for Study Area**

| Area                              | Car Ownership % of Households |     |     |     |    |
|-----------------------------------|-------------------------------|-----|-----|-----|----|
|                                   | None                          | 1   | 2   | 3   | 4  |
| England and Wales                 | 26%                           | 42% | 25% | 5%  | 2% |
| Warwickshire                      | 18%                           | 41% | 31% | 7%  | 3% |
| <b>Stratford-on-Avon District</b> | 13%                           | 38% | 35% | 10% | 4% |

Source: Census 2011.

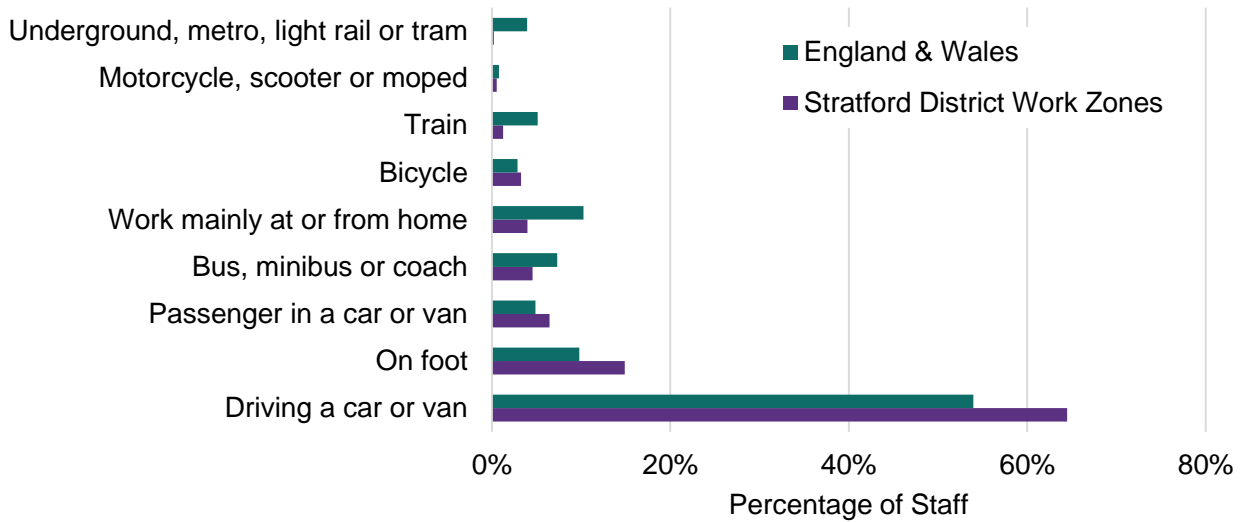
Overall car ownership trends in the area show that the proportion of households in Stratford-on-Avon District owning one or more cars is 87%, this is compared to 74% nationally.

Census 2011 Journey to Work data for seven different work zones in Stratford-on-Avon town was provided by Warwickshire County Council (WCC). This gives provides insight into local travel to work

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behaviours. Figures for the total number of journeys across all seven work zones<sup>15</sup> in the town can be found below in Figure 5 and highlight the dependency on the car for travel to work.

**Figure 5. Staff Travel Survey Results - % of staff travelling by each mode of transport**



Source: Census (2011).

The data shown in Figure 5 shows that:

- The majority of journeys to work are by car as a driver or passenger.
- The proportion of journeys to work by car (as driver or passenger) in Stratford-on-Avon District (71%) is above the England and Wales average of 59%.
- The pedestrian and cycle mode share (19%) is higher than the national average (13%).
- The bus mode share in Stratford-on-Avon District (5%) is lower than the national average (7%).

### 3.2.1.2. Journey to work: Distance travelled

Understanding the distance people travel to work provides a useful insight into the scope for modal shift towards more sustainable modes. Journeys within 2km are considered an appropriate distance to walk whilst journeys less than 5km are appropriate to cycle. Bus and rail services can cater for demand to travel longer distances. However, the data presented earlier in Figure 5 demonstrates that a high proportion of the journeys to work are undertaken by car. Table 5 shows that within Stratford-on-Avon 23% of journeys are less than 5km, whilst 15% are less than 2km. Collectively this evidence suggests that there is some local potential to encourage a shift towards sustainable modes (predominantly walking and cycling).

<sup>15</sup> Stratford –upon-Avon town Work Zones provided by WCC include Stratford Town, Enterprise Park, Maybird, Avenue Farm, Timothy’s Bridge Road/Masons Road, Western Road, NFU Tiddington and NFU Ryon Hill.

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**Table 5. Distance travelled to work**

| Distance travelled to work  | Stratford-on-Avon town % of travel to work trips |
|-----------------------------|--|
| Less than 2km               | 15%  |
| 2km to less than 5km        | 8%   |
| 5km to less than 10km       | 12%  |
| 10km to less than 20km      | 21%  |
| 20km to less than 30km      | 9%   |
| 30km to less than 40km      | 5%   |
| 40km to less than 60km      | 3%   |
| 60km and over               | 4%   |
| Work mainly at or from home | 17%  |
| Other                       | 8%   |

Source: Census 2011.

### 3.2.1.3. Journey to work: Destinations

The majority (51%) of Stratford-on-Avon town residents work within Stratford-on-Avon town as shown in Table 6, whilst a much smaller proportion travel to places of employment within the wider region including Warwick, Birmingham, Coventry and Redditch.

**Table 6. Journeys to work from Stratford on Avon town to Workplace**

| Workplace/Destination | % of Total Journeys from Stratford-on-Avon town to workplace |
|-----------------------|--|
| Stratford-on-Avon     | 51%  |
| Warwick               | 13%  |
| Birmingham            | 5%   |
| Coventry              | 4%   |
| Redditch              | 4%   |
| Solihull              | 3%   |
| Cherwell              | 3%   |
| Wychavon              | 2%   |
| Cotswold              | 2%   |
| Other                 | 5%   |

Source: Census 2011.

Table 7 shows where people who work in Stratford-on-Avon town travel from. These patterns are broadly similar to those presented in Table 6.



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**Table 7. Journeys to work to Stratford-on-Avon town from place of residence**

| Place of Residence | % of Total Journeys to Stratford-on-Avon town from residence |
|--------------------|--|
| Stratford-on-Avon  | 48%  |
| Warwick            | 11%  |
| Redditch           | 7%   |
| Wychavon           | 5%   |
| Birmingham         | 4%   |
| Coventry           | 4%   |
| Solihull           | 3%   |
| Rugby              | 2%   |
| Cherwell           | 2%   |
| Other              | 9%   |

### 3.2.1.4. Park and Ride Usage

The evidence presented so far has demonstrated there is high car ownership and high car dependency within the Stratford-on-Avon area. For trips destined for Stratford town centre, there is the potential to capture this market and convert to Park and Ride. Usage of the bus based P&R at Bishopton adjacent to the Stratford-on-Avon parkway railway station is considered in this section based on the findings from a recent study<sup>16</sup>.

A count of passengers boarding and alighting the number 222 bus service between the P&R Site in Bishopton and Stratford town centre (Bridge Street) across three days in 2015 was conducted. Survey results showed that for a P&R site that has a capacity of 500 parking spaces:

- 74 passengers were recorded boarding towards the town centre, and 104 alighting on Tuesday 24<sup>th</sup> February 2015; and
- 202 passengers were recorded boarding at the site, and 207 alighting on Thursday 26<sup>th</sup> February 2015.

Recorded numbers on Thursday 26<sup>th</sup> February were heavily concentrated with the majority of passengers boarding at the start of the survey between 10:00am and 11:40am. A further study was conducted on Saturday 28<sup>th</sup> February 2015 where 537 passengers were recorded boarding at the P&R site, and 595 alighting. Services were generally well loaded between the 10:25am and 13:25pm departure, falling rapidly after this time.

Apart from the high level of P&R usage on Saturday 28<sup>th</sup> February 2015, usage levels recorded on the other two visits were far below the capacity of the site. Figure 11 highlights the availability of car park spaces in the town centre and Table 8 highlights the relatively low cost of parking, therefore drivers may choose these town centre car park sites instead of the P&R facility.

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<sup>16</sup> Stratford-upon-Avon Park and Ride: Stage 2b Report, Atkins, 2015.



# Technical note

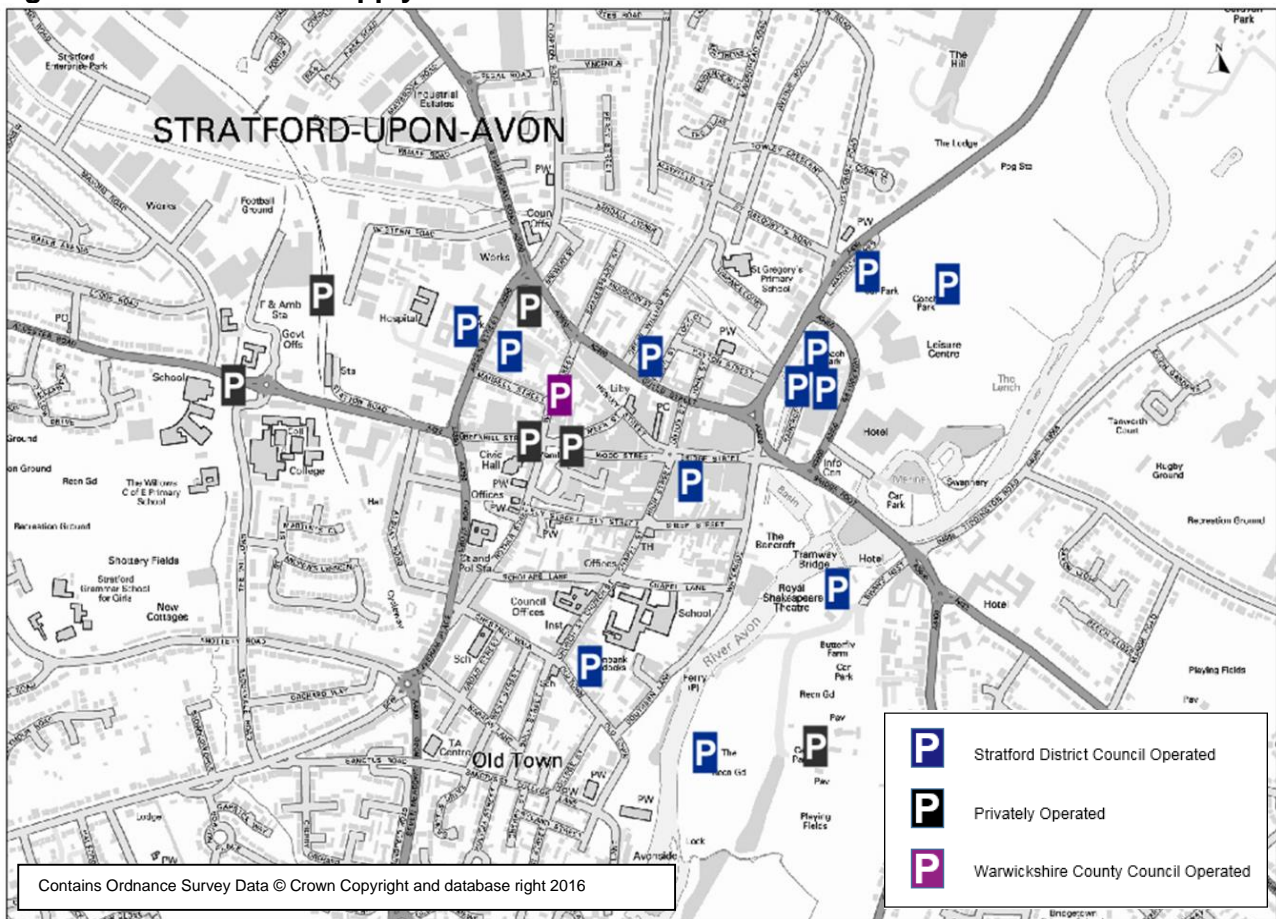
## 3.2.1.5. Parking Supply

The availability of car parking can influence peoples' travel choice. If there is plentiful supply, located in an accessible and convenient location at a competitive price, it can seem far more attractive than other modes of travel.

Issues of demand and supply as well as the high level of car ownership in the District, and high number of tourists, highlighted the need to provide efficient access to town centres whilst creating an effective balance between car based travel and other alternatives.

Numbers from the Stratford-on-Avon District Council website show the town centre has a number of car parking facilities, including 12 District Council facilities charging the same tariff (shown in Figure 11 and Table 7). Long stay options are available in the Council facilities. At Bridgeway Car Park drivers can park for free for up to one hour. There are over 2,500 parking spaces at these 12 sites, as well as other privately owned car park sites. On street parking is also an option, where parking meters charge for short stays.

**Figure 11. Car Park Supply in Stratford-on-Avon Town Centre**



# Technical note

**Table 8. Car parking provision in Stratford-on-Avon Town Centre<sup>17</sup>**

| Site Location   | Operator                    | Capacity | Duration             | Fee (£)      |
|---|-----------------------------|----------|----------------------|--------------|
| On-Street Parking in Stratford-on-Avon                | Stratford District Council  | various  | 30 minutes - 2 hours | £0.50-£2.00  |
| Rail Station  | Privately Operated          | 72       | 24 hours             | up to £4.00  |
| Birmingham Road                                       | Privately Operated          | no data  | 12 hours             | £3.00        |
| Rother Street NCP                                     | Privately Operated          | 247      | Long Stay            | up to £15.00 |
| Rother Street Market Square                           | Warwickshire County Council | 27       | Short Stay           | £0.50-£1.00  |
| Arden Street  | Stratford District council  | 240      | Long Stay            | up to £20.00 |
| Windsor Street  | Stratford District council  | 243      | Long Stay            | up to £20.00 |
| Leisure Centre Coach Park                             | Stratford District Council  | 69       | Long Stay            | up to £20.00 |
| Leisure Centre Car Park                               | Stratford District Council  | 625      | Long Stay            | up to £20.00 |
| Bridgeway Surface *                                   | Stratford District Council  | 66       | Long Stay            | up to £20.00 |
| Bridgeway *   | Stratford District Council  | 585      | Long Stay            | up to £20.00 |
| Swans Nest Lane                                       | Stratford District Council  | 26       | Long Stay            | up to £20.00 |
| Recreation Ground                                     | Stratford District Council  | 378      | Long Stay            | up to £20.00 |
| Church Street   | Stratford District Council  | 192      | Long Stay            | up to £20.00 |
| Sheep Street Rear Access Area (Disabled Parking Only) | Stratford District Council  | 9        | Short Stay           | Free         |
| Guild Street (Disabled Parking Only)                  | Stratford District Council  | 17       | Long Stay            | Free         |

\*up to one hour free parking

### 3.2.1.6. Public Transport Provision

The bus network in Stratford-on-Avon is made up of a few inter-urban services to Leamington Spa, Redditch, Evesham, Warwick and Birmingham, along with some less frequent services that connect to local service villages as far as the Cotswolds.

The bus service network as illustrated in Figure 10 shows that there is good coverage in the urban area, however consultation feedback<sup>18</sup> suggested better bus services were needed to the east and north of the town:

- Routes to Gaydon and Lighthorne Heath and Jaguar Land Rover are only served by one return journey or more (Monday to Friday);

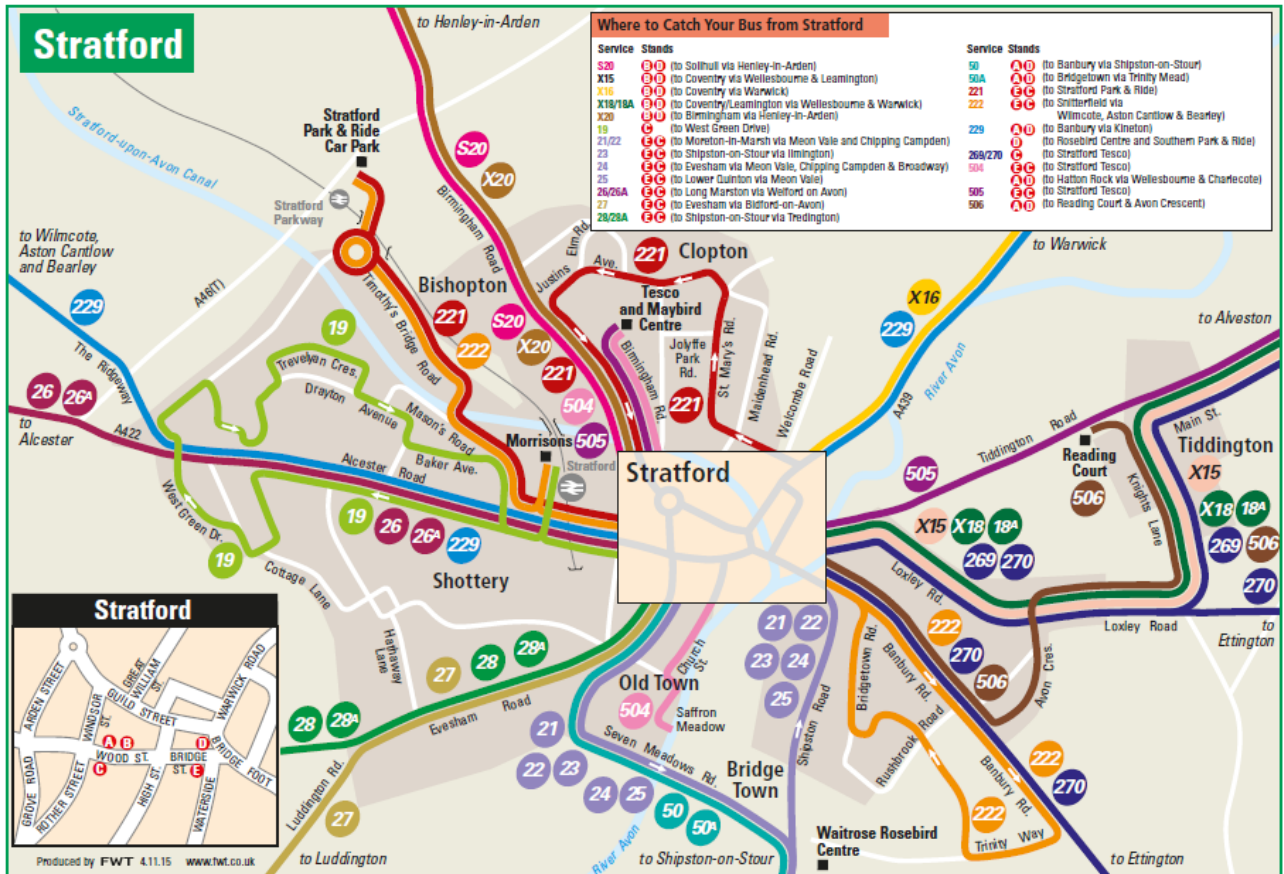
<sup>17</sup> 'Car Parks in Stratford-upon-Avon'. *Stratford-upon Avon District Council website* (2016) <https://www.stratford.gov.uk/transport/parking.cfm>, last accessed 11/02/2016.

<sup>18</sup> Stratford-upon-Avon 3<sup>rd</sup> Traffic Summit.

# Technical note

- Routes to the north serving Warwick, Leamington Spa, Kenilworth and Coventry include the X15, X16, and X18 services and are served by an hourly service or better; and
- To the north of Stratford there are roads that are only served by irregular bus services, however, the rail network serves some areas to the north, stopping at a variety of small service villages such as Lapworth, Hatton, and Claverdon, before arriving at Stratford Parkway and Stratford.

Figure 10. Stratford-on-Avon Bus Network



Source: Stratford map - October 2015 (<http://www.warwickshire.gov.uk/busroutemaps>)

### 3.2.1.7. Access to Railway Stations

Stratford-on-Avon benefits from two stations, Stratford Parkway just outside the town centre located off Bishopton lane, and Stratford-on-Avon station in the town centre, which can be accessed from the Birmingham Road and Alcester Road. There are two main operators on the line; Chiltern Railways and London Midland, with rail services to Birmingham on a daily basis. The two operators run services approximately every 20 to 30 minutes during peak hours and every hour in the off-peak.

Currently there are sufficient car parking facilities at both stations, operating on a pay and display basis.



# Technical note

## 3.2.1.8. Walking and Cycling

There are walking and cycling routes in both the town centre and surrounding area. Walks can be found on route mapping websites for pedestrians such as Walking Britain<sup>19</sup> and Walking in Warwickshire<sup>20</sup> where popular routes appear to be along the river Avon and circular routes around the town, including tourist trails. The Stratford greenway is a popular pedestrian and cyclist only footway along a former railway line, the route is from Stratford-on-Avon to Long Marston.

Stratford-on-Avon has a well-developed cycle network; cycle route 41 and cycle route 5 of the national cycle network run through Stratford-on-Avon, route 5 includes the Stratford Greenway cycle path between Long Marston and Stratford-on-Avon. Whilst route 41 approaches Stratford south of the river from Warwick arriving at Clopton bridge river crossing.

## 3.2.2. Town Centre Through Trips & Limited Cross River Capacity

There are two river crossings for vehicles in Stratford-on-Avon. Clopton Bridge is a Grade 1 listed single carriageway crossing carrying the A3400 over the River Avon in the town centre. Seven Meadows Road (A3490) crossing is situated south of the centre.

Figure 6 shows the two river crossings in Stratford-on-Avon town centre, Clopton Bridge and Seven Meadows crossing. Figure 7 shows the location of these crossings. There are no other options for vehicles to cross the River Avon in the immediate vicinity of the town.

*...most trip attractors such as schools, shops and employment are located north of the River Avon. These generate a significant demand for movement from residential areas south of the river and the rural areas to the south of the town. The location of these trip attractors also generates a significant demand for cross-town movements north of the river, most of which have to pass through the congested town centre.*

(Warwickshire LTP 2011-2026 Part A – The Strategy)

Mention the issue of difficulty for bikes getting from south of the river to the town centre.

**Figure 6. River Crossings in Central Stratford on Avon**

Clopton Bridge River Crossing



© Google 2015

Seven Meadows Road River Crossing



<sup>19</sup> [http://walkingbritain.co.uk/walks/walk\\_print/2673/](http://walkingbritain.co.uk/walks/walk_print/2673/)

<sup>20</sup> <http://walkinginwarwickshire.co.uk/stratford.php>

# Technical note

Figure 7. Central River Crossings in Stratford-on-Avon Town Centre

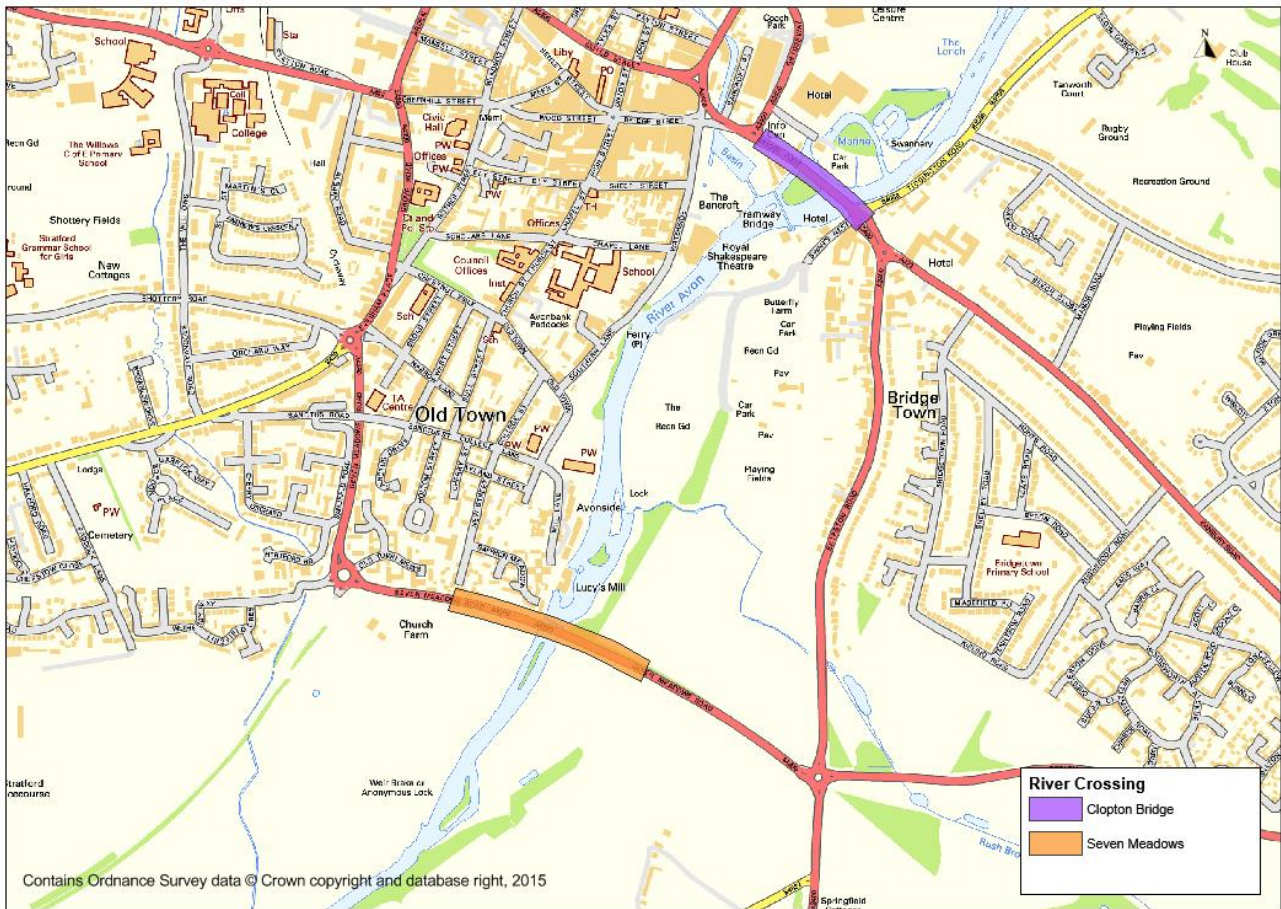
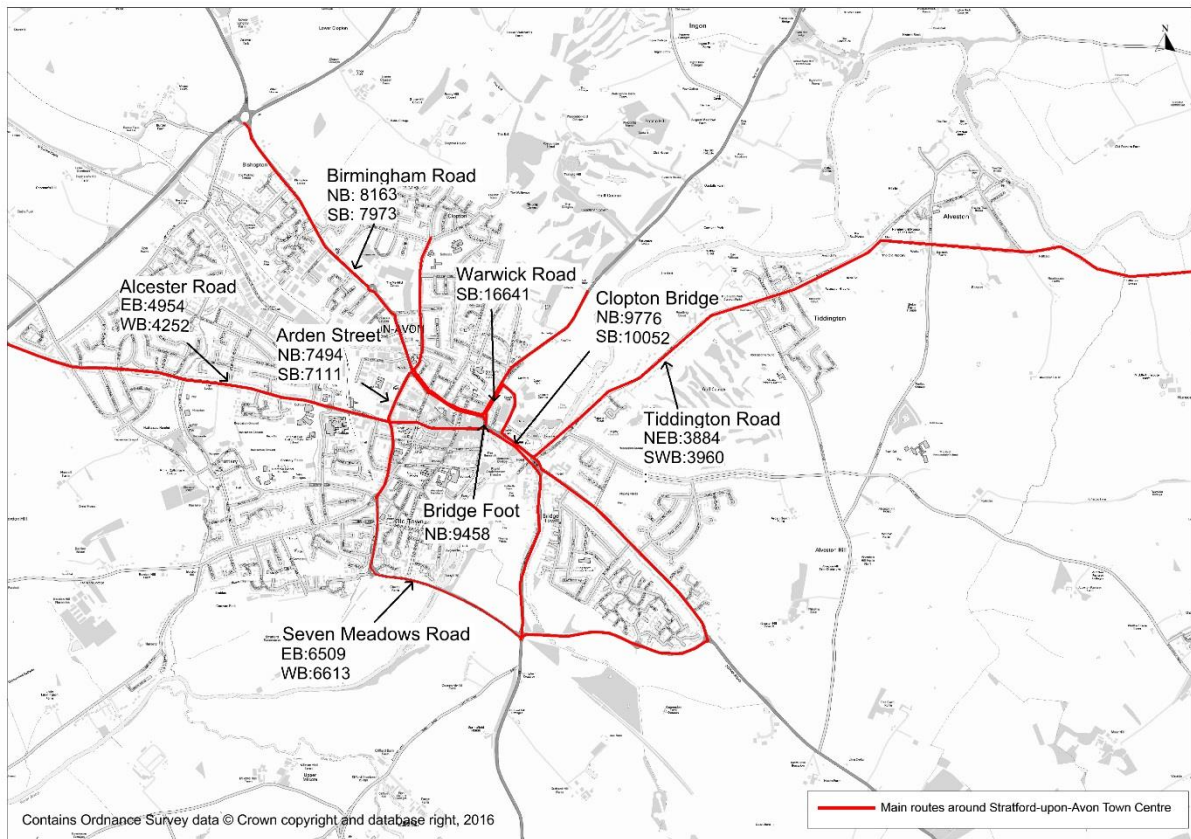


Figure 8 shows average daily traffic flows on the main routes to and from Stratford-on-Avon town centre. This shows the traffic flows Clopton Bridge are in the region of around 10,000 vehicles per day.

# Technical note

Figure 8. Average daily 12hr (0700-1900) traffic in key town centre locations



Automatic Number Plate Recognition (ANPR) surveys took place in March 2014 covering an external cordon around Stratford-on-Avon<sup>21</sup>. From this survey, it is possible to calculate the approximate percentages of vehicles which pass through the town centre without having a destination in the town centre. The main traffic movements in the AM peak are presented in Figure 9 (with the actual numbers in Table 9). The ANPR data also showed that E1-E8 in both directions shows a majority of trips in both the AM and PM peak travel to and from these two zones, (E1:A46 East and E8:A46 Alcester Road). These movements do not involve a cross river route, so are not included in Figure 9.

<sup>21</sup> Stratford-upon-Avon Model Update Local Model Validation Report, Vectos, October 2015.



# Technical note

Figure 9. External Cross-River ANPR Movements in the AM peak (0700-1000)

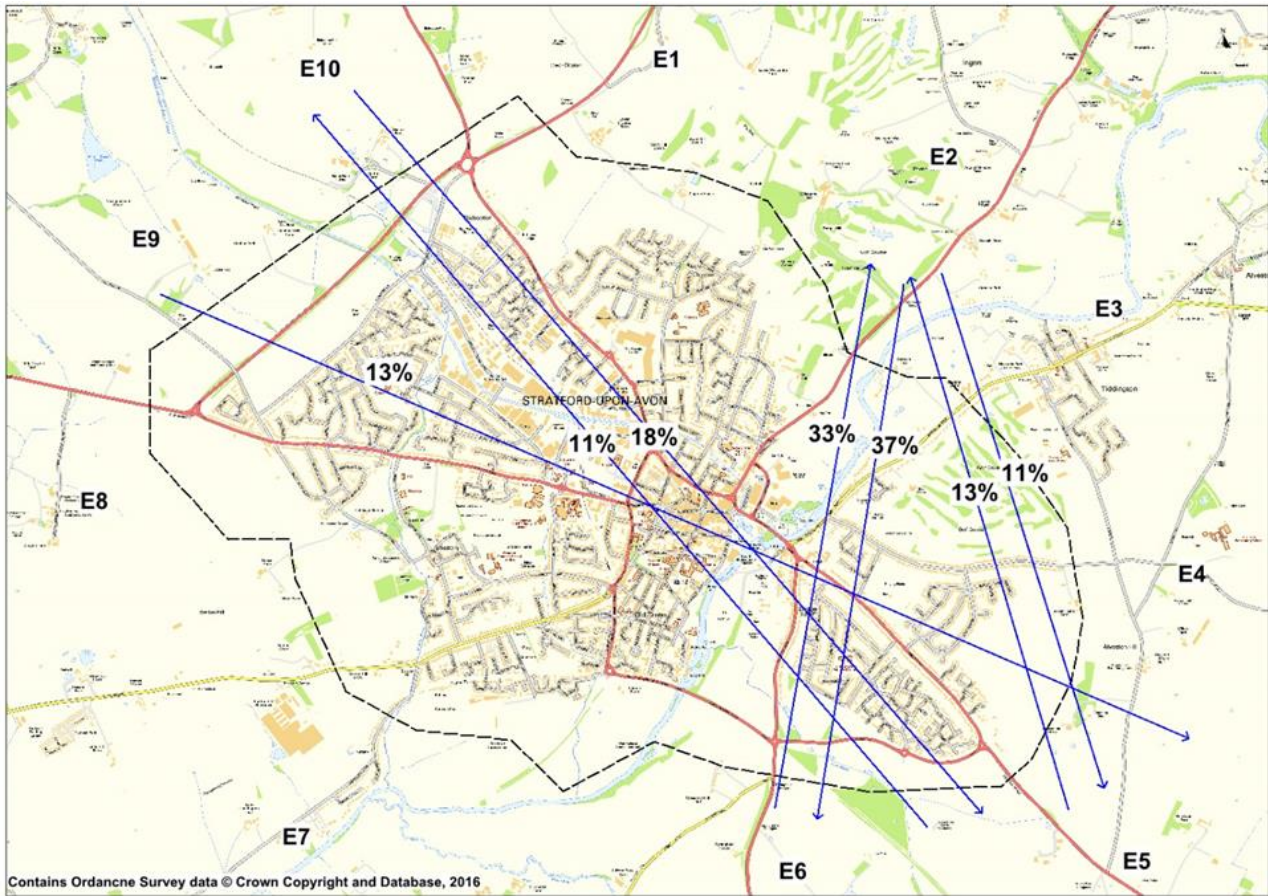


Table 9. External Cross-river number of trips in the AM peak (0700-1000)

|     | E1 | E2  | E3 | E04 | E5 | E6  | E7 | E8 | E9 | E10 | Total Movements |
|-----|----|-----|----|-----|----|-----|----|----|----|-----|-----------------|
| E2  | 11 | 126 | 72 | 7   | 60 | 210 | 43 | 18 | 0  | 15  | 562             |
| E5  | 10 | 32  | 3  | 4   | 51 | 61  | 51 | 21 | 3  | 20  | 256             |
| E6  | 29 | 327 | 79 | 42  | 71 | 188 | 76 | 54 | 10 | 106 | 982             |
| E9  | 2  | 0   | 2  | 0   | 8  | 5   | 7  | 14 | 17 | 7   | 62              |
| E10 | 39 | 35  | 45 | 1   | 22 | 70  | 22 | 51 | 7  | 105 | 397             |

Figure 9 shows the following AM peak external to external sector movements:

- E2: A439 Warwick Road: Shows that 37% of all recorded movement from E2, that does not stop, travels across the river to E6, and 11% travels across the river to E5.
- E5: Banbury Road: Shows that 13% of all recorded movement from E5, that doesn't stop, travels to E2.
- E6: Shipston Road: Shows that 33% of all recorded movement from E6, that does not stop, travels across the river to E2, and 11% travels across the river to E10.

# Technical note

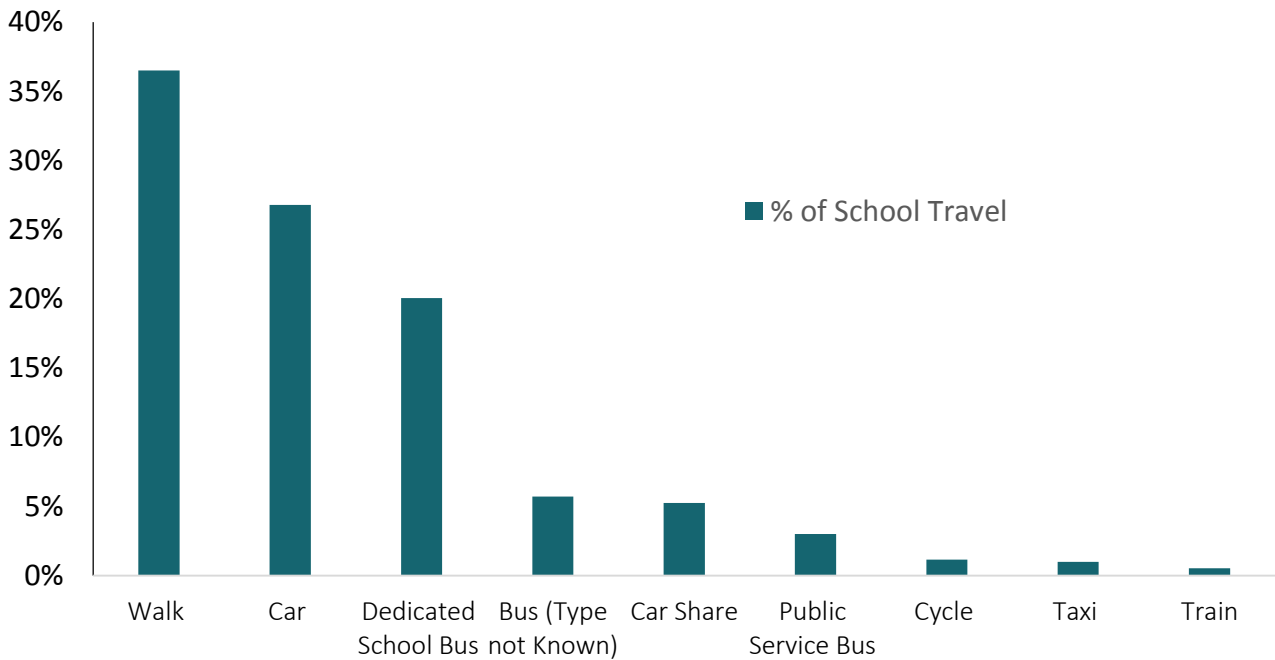
- E9: The Ridgeway: Shows that 13% of all recorded movement from E9, that does not stop, travels across the river to E5.
- E10: A3400 Birmingham Road: Shows that 18% of all recorded movement from E10 that does not stop, travels across the river to E6.

The PM peak (1600-1900) displayed similar results (but in the opposite direction), so they have not been reproduced here.

### 3.2.3. School Travel Contributing to Local Congestion

School travel survey data for Stratford-on-Avon local authority schools has been provided by the (WCC). The data presented in Figure 9 provides a comparison of the modes of transport used by pupils to access their schools.

**Figure 10. Method of Transport to School – Stratford-on-Avon Local Authority Schools**



Source: WCC, Pupil Surveys, 2010

There are a high number of pupils who walk to school in the town (approximately 35%). 29% of pupils travel by bus, compared to around 27% who travel by car, and are not car sharing, only 3% of journeys were car shared. These results indicate that modes of transport to school are varied, however despite a high number of pupils walking to school, there is still high dependency on car usage, and bus usage of varying kinds.

# Technical note

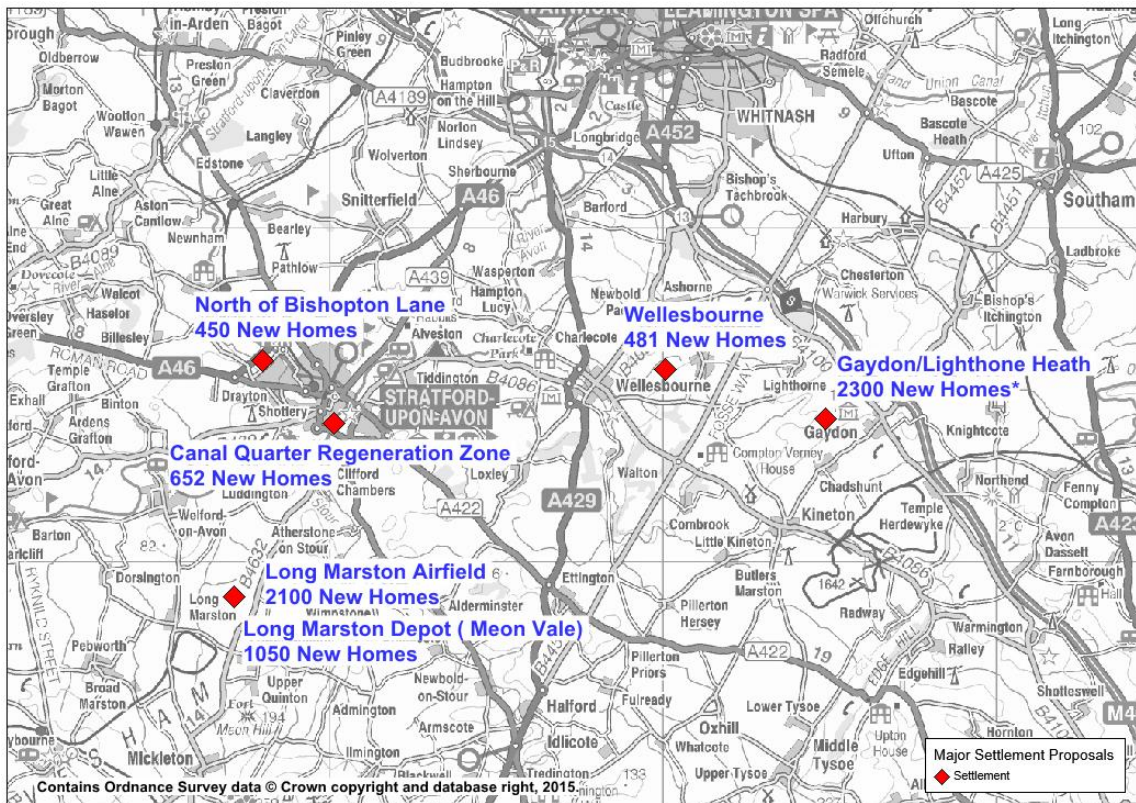
## 4. What are the future growth plans for Stratford-on-Avon?

Stratford-on-Avon District Council have set an approximate target of 14,485 new homes to be built in the period 2011 to 2031. Development plans are dispersed over the District, and include new residential and commercial developments. A significant proportion of the development is focused in and around Stratford-upon-Avon.

### 4.1. Housing Development

The Stratford-on-Avon Core Strategy has set a challenging target in terms of new homes provision over the period up to 2031, with a focus on dispersed development across the District. The most recent Draft Core Strategy housing allocation at the time of writing set out a strategic objective of at least 15,900 additional homes to be built by 2031<sup>22</sup>. Figure 11 highlights the main locations of developments set out in the Core Strategy housing trajectory. This includes development in the centre of Stratford-on-Avon and on its northern edge, and at Wellesbourne, as well as new settlements at Gaydon/Lighthorne Heath and Long Marston Airfield.

Figure 11. Major development site proposals



<sup>22</sup> Stratford-on-Avon Core Strategy: Interim Housing Sites Schedule, 31<sup>st</sup> December 2015.



# Technical note

Table 10 shows the housing trajectory for the area of Stratford-on-Avon and the wider District. Development within the town includes the Canal Quarter, South of Alcester Road, North of Bishopton Lane, and West of Shottery, as well as other unspecified (windfall) sites. The larger settlements and rural centres in Table 10 are located outside of Stratford-on-Avon.

**Table 10. Housing Trajectory**

| Location                     | Total (Net)   | Phase 1      | Phase 2      | Phase 3      | Phase 4      |
|------------------------------|---------------|--------------|--------------|--------------|--------------|
|                              |               | 2011-2016    | 2016-2021    | 2021-2026    | 2026-2031    |
| Stratford-on-Avon            | 3,537         | 638          | 1,663        | 961          | 275          |
| Main Rural Centres           | 3,998         | 856          | 2,621        | 471          | 50           |
| Local Service Villages       | 1,998         | 351          | 1,558        | 89           | 0            |
| Gaydon Lighthorne Heath      | 2,300         | 0            | 425          | 875          | 1,000        |
| Long Marston Airfield        | 2,100         | 0            | 400          | 700          | 1,000        |
| Large Rural Brownfield Sites | 1,250         | 252          | 648          | 350          | 0            |
| Other rural locations        | 736           | 165          | 451          | 60           | 60           |
| <b>District Total</b>        | <b>15,919</b> | <b>2,262</b> | <b>7,766</b> | <b>3,506</b> | <b>2,385</b> |

\* Taken from Stratford-on-Avon Core Strategy Examination, Fig.1 Housing Trajectory (December 2015)

The location of the major settlements have been mapped in Figure 11 earlier, and further detail of the other allocations can be found below:

- Approximately 4,000 further allocations in the main rural centres, including sites across Alcester, Bidford-on-Avon, Henley-in-Arden, Kineton, Shipston-on-Sour and Studley. The majority due for completion by the end of Phase 2;
- An allocation of approximately 1,030 houses in Southam (Phase 1-3); and
- 2,700 new allocations identified in Local Service Villages and other rural locations (Phase 1-4).

## 4.2. Employment Opportunity

The Stratford-on-Avon Core Strategy emphasises the importance of maintaining a balance between employment growth and housing provision. It states that Stratford-on-Avon is well positioned for economic growth, located close to the M40 corridor, with an existing strong skills base and high economic participation.

A strategic objective of at least 35 hectares of additional land for general business uses by 2031 has been set. Table 11 sets out how this objective will be met.

# Technical note

**Table 11. Employment Opportunity**

| Growth Opportunity   | Delivery Objective   | Phase   |
|--|--|---|
| Provision for 35 hectares of employment land over the plan period 2011-2031. | Provide opportunities for offices, and research and development at a site south of Alcester Road.  | Phase 1 - Phase 4   |
| Strategic investments proposed by Jaguar Land Rover and Aston Martin Lagoda. | Land allocation at the Gaydon/Lighthorne Heath site for proposed expansion. 100 hectares proposed for Jaguar Land Rover and 4.5 hectares for Aston Martin Lagoda | Phase 1 - Phase 4 and post 2031.  |
| Long Marston Airfield  | Incorporates approximately 13 Ha. for a new main employment area alongside the proposed new settlement   | Phase 1 – Phase 4<br>No more than 8 Ha by 2031, and no less than 10% should be in the form of small business workshops. |

## 4.3. Summary

Considerable growth, particularly in housing, is planned for Stratford-on-Avon District over the next 15 years. Without appropriate mitigation, the transport issues in the area and especially in Stratford on Avon town are likely to become more acute. The following section considers these implications together with the potential options for intervention.

# Technical note

## 5. What are the transport implications of the growth aspirations for Stratford & what are the options for intervention?

Traffic forecasts shows that all development scenarios irrespective of the housing allocation show considerable levels of traffic growth. Increasing traffic flows will add to the traffic and congestion in the Town Centre and at the existing river crossings.

### 5.1. What are the transport implications of the growth aspirations for Stratford?

The Stratford Transport Package<sup>23</sup> comprises a series of mitigation measures through the implementation of various junction improvements, in and around the centre of Stratford-on-Avon. This package has been identified as essential to the network in light of housing and employment growth forecasts. The junctions which would be subject to various works including capacity enhancement and introduction of signals are shown in Figure 12 below. The modelled scenarios include the enhancements proposed in the Stratford Transport Package.

**Figure 12. The Stratford Transport Package Scheme Location**



<sup>23</sup> Arup (2014) STA Options Analysis.



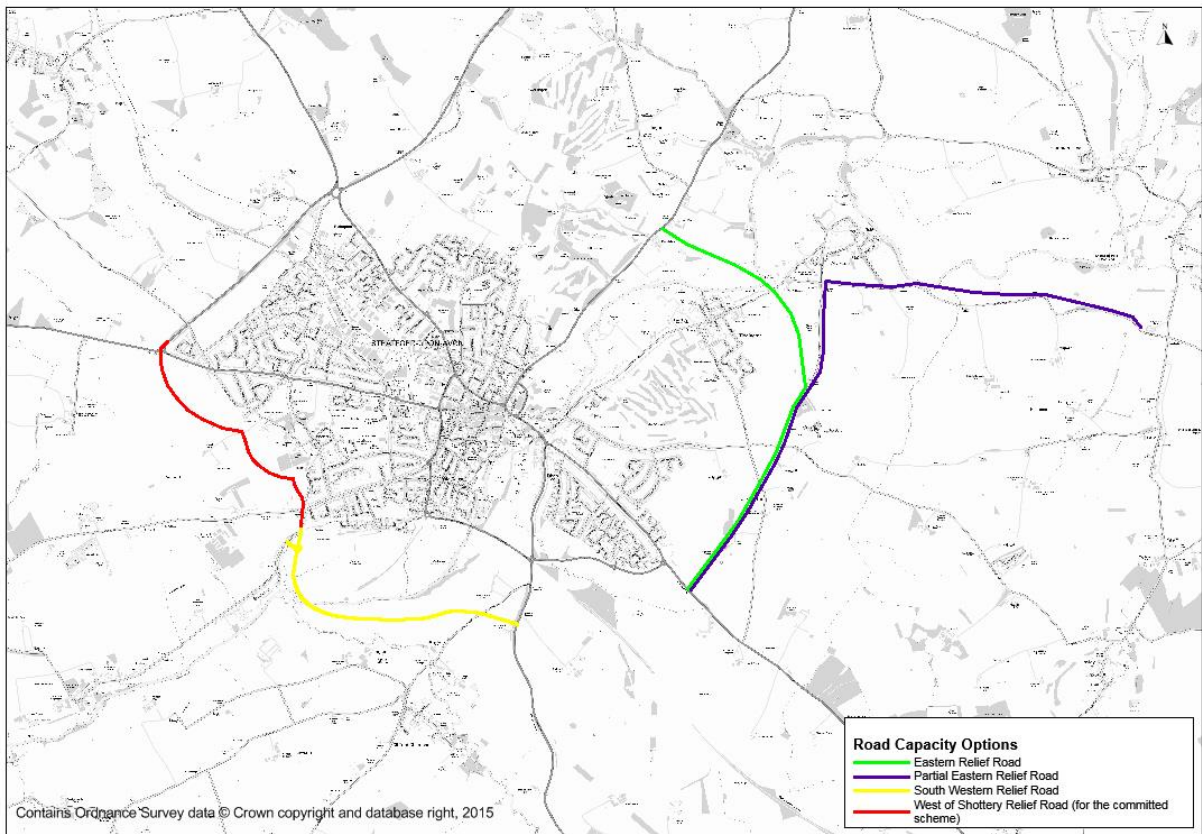
# Technical note

To understand future demand, six scenarios have been identified in a high level option appraisal report<sup>24</sup>. The report models the provision of a third river crossing which intends to provide additional road capacity within the network. These scenarios have been tested against

- The 2031 Reference case which includes all known committed infrastructure (housing and employment), inclusive of the Shottery Western Relief Road (WRR); and
- The 2031 Core Strategy model formed from the 2031 Reference Case, with additional schemes proposed in the Stratford Transport Package (STP).

Figure 13 shows the three road options identified by WCC, noting that a Western Relief Road (WRR) shown in red is already a committed scheme and will be delivered as part of a housing development in that area.

**Figure 13. Stratford-on-Avon Road Capacity Options**



The three options have broadly the same aspirations in terms of purpose and functionality. Both the western and eastern routes will act as a bypass for Stratford-on-Avon, have suitable pedestrian and cyclist routes, and will be designed to the same standard as the A3400. The additional cross river capacity provided would provide an opportunity to downgrade the status of Clopton Bridge and to help reduce the volume of through traffic passing through the town centre.

<sup>24</sup> Vectos (2016) Stratford-upon-Avon- Third River Crossing High Level Option Appraisal

# Technical note

**Table 12. Strategic Scenario Description**

| Core Scenario | Scenario  | Description   |
|---------------|---|---|
| 1             | 1. Reference Case<br>2. Core Strategy Model                   | 1. Includes all known committed infrastructure, Inclusive of the Shottery Western Relief Road (WRR)<br>2. Includes all known committed infrastructure, Inclusive of the Shottery Western Relief Road (WRR) and also containing Stratford Transport Package Proposals. |
| 2             | Western Alignment (S-WRR)                                     | The proposed western relief road in the reference case/local plan model, extended to form the complete western relief road (S-WRR) between A3400 Shipston Road and the A46/A422 at the Wildmoor Junction.   |
| 3             | Eastern Alignment (ERR)                                       | Full eastern bypass alignment, extending from Banbury Road at its southern extent to Warwick Road at its northern end.  |
| 4             | Eastern Alignment Partial (Partial ERR)                       | As per scenario 3, but ending where the ERR meets Tiddington Road. This scenario also includes the upgrade and straightening of the alignment of Wellesbourne Road to the A429.   |
| 5             | Full western and eastern routes (S-WRR + ERR)                 | Comprising Scenarios 2 and 3.   |
| 6             | Full western and partial eastern routes (S-WRR + Partial ERR) | Comprising Scenarios 2 and 4.   |

Differences between the Reference Case and Core Strategy model testing reveal different conclusions, the reference case indicates that the ERR delivers the most significant benefits, whereas the Core Strategy scenario reveals that the inclusion of the S-WRR delivers the greatest benefit.

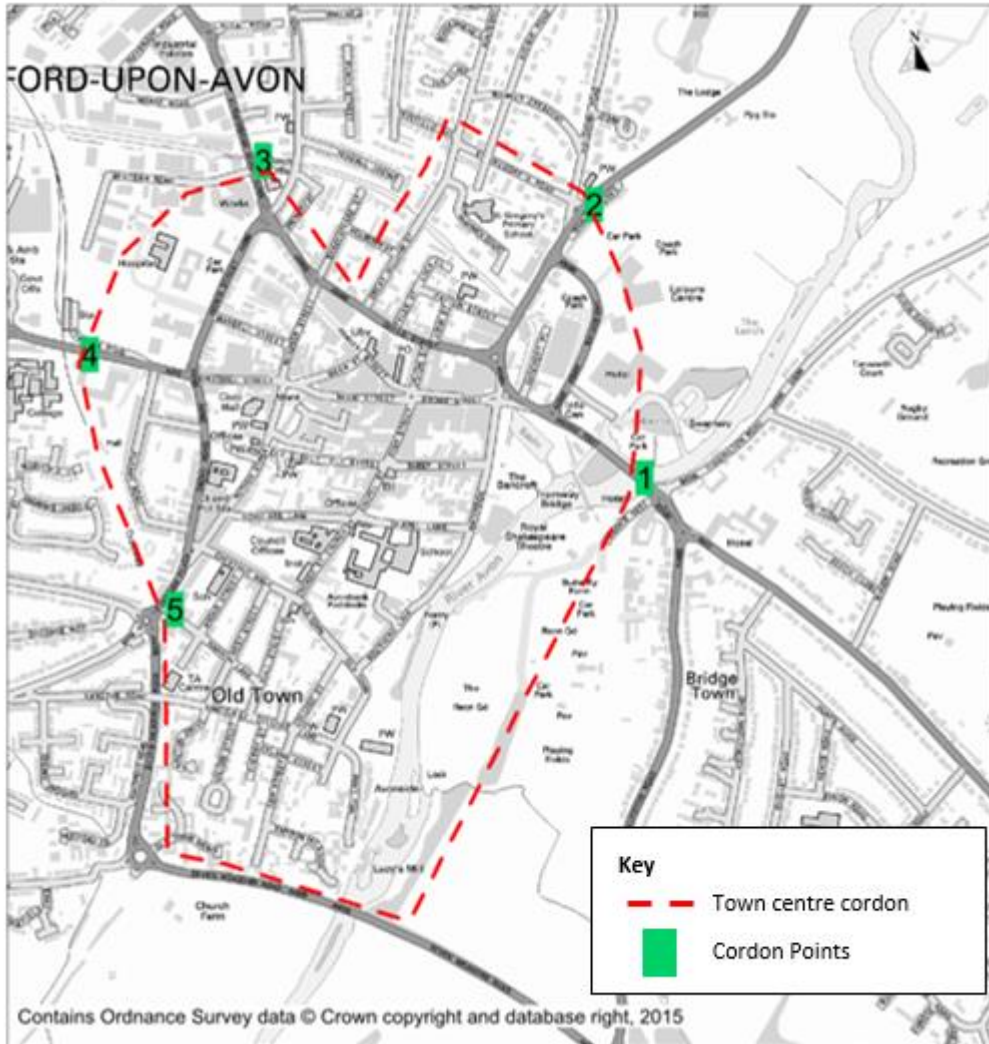
The modelling also suggests the S-WRR is critical in terms of mitigating the large residential development at Long Marston Airfield, to the south of Stratford town centre, which is included within the Local Plan.

## 5.1.1. Town Centre Analysis

An assessment of all six scenarios focussing on town centre traffic forecasts, identifying major roads in the town centre is shown in Figure 14 below.

# Technical note

Figure 14. Town centre analysis cordon<sup>25</sup>



The cordon represents the number of vehicles arriving and exiting the town centre, via major routes. The results show:

- The ERR produces the greatest reduction in town centre through traffic, with noticeable reductions in the bridge foot area of the town centre.
- The S-WRR results decreases in town centre through trips, most noticeably in the AM peak around Alcester Road and Evesham Road.
- The Partial ERR appears to increase the amount of through trips in the town centre, particularly around the Bridge Foot area.

## 5.1.2. Traffic Summit Responses

Three Traffic Summits were held, with the final two taking place in October 2014 and March 2015. The key findings in relation to public feedback on the need for improved road capacity can be seen in Figure 15 and Figure 16.

<sup>25</sup> Stratford-upon-Avon - Third River Crossing High Level Option Appraisal, Vectos (2016).

# Technical note

**Figure 15. Traffic Summit Response to the need for a Relief Road/Bypass/Third River Crossing (115 responses)**

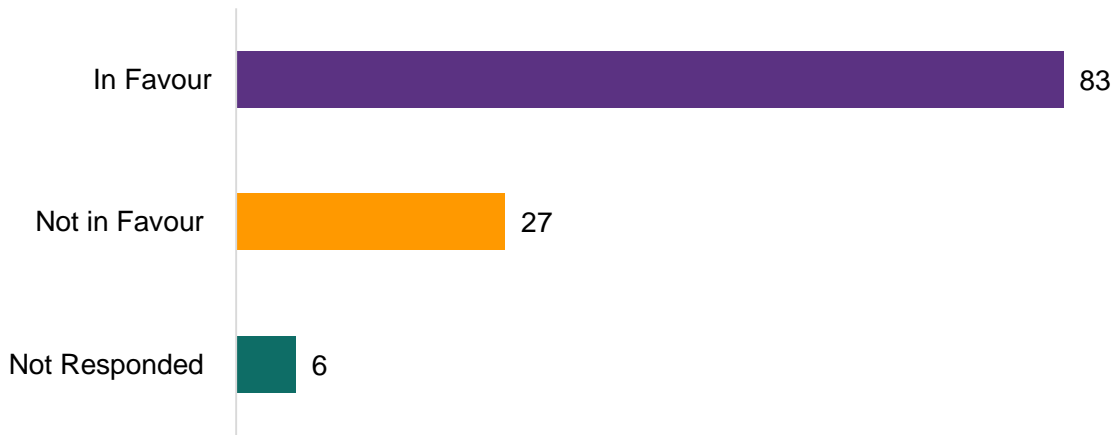
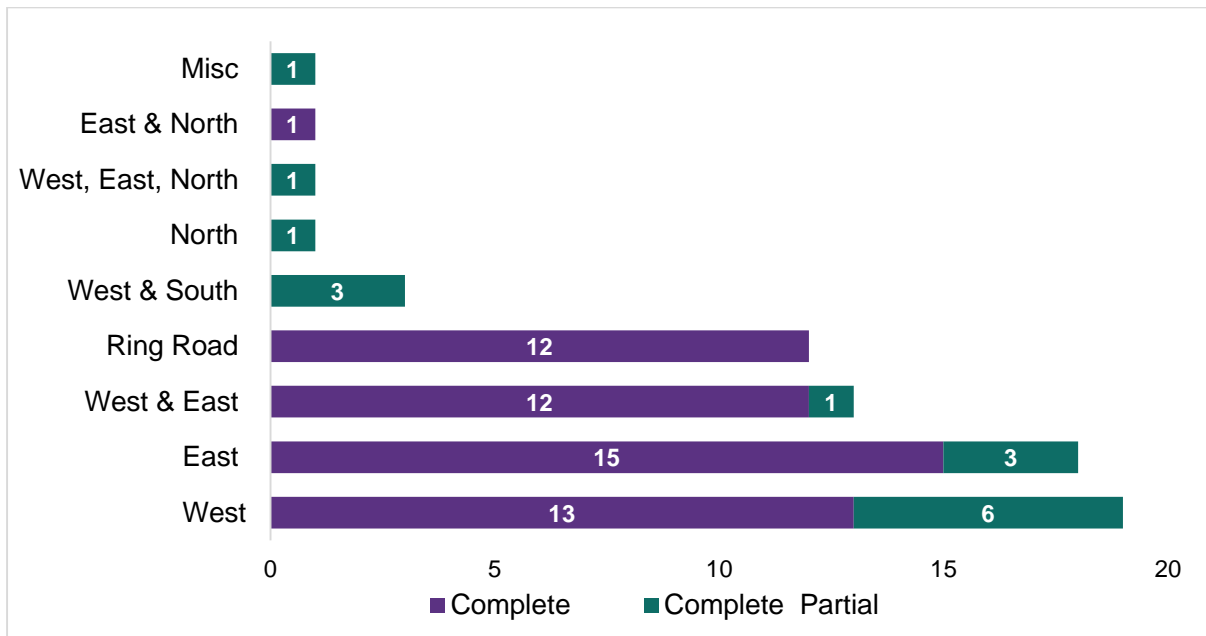


Figure 15 shows the strong level of support during the Third Transport Summit for a new route in Stratford with 72 % of respondents in favour of a new route and only 23% not in favour. This was in line with previous feedback in the First and Second Summit.

Figure 16 shows the respondents favoured location for the new route. The responses were categorised by location and the extent of the proposal. The graph shows that there was no definitive answer from the respondents, however there is a clear consensus that there needs to be additional capacity on the network in Stratford.

**Figure 16. Traffic Summit responses to the question of location of Relief Road/ Bypass/ Third River crossing (69 responses)**



# Technical note

## 6. What Should be the Objectives of Highway Capacity Improvements in Stratford-on-Avon?

The Warwickshire Local Transport Plan 3<sup>26</sup> has set out a number of strategic objectives for transport which are as follows:

1. To promote greater equality of opportunity for all citizens in order to promote a fairer, more inclusive society;
2. To seek reliable and efficient transport networks which will help promote full employment and a strong, sustainable local and sub-regional economy;
3. To reduce the impact of transport on people and the [built and natural] environment and improve the journey experience of transport users;
4. To improve the safety, security and health of people by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health;
5. To encourage integration of transport, both in terms of policy planning and the physical interchange of modes;
6. To reduce transport's emissions of carbon dioxide and other greenhouse gases, and address the need to adapt to climate change.

The challenges and evidence presented in this Technical Note have been used to develop six local transport objectives that are specific for Stratford-on-Avon. These are summarised as follows:

1. Reduce high car dependency for travel to work trips and school trips.
2. Reduce Stratford-on-Avon town centre through trips.
3. Reduce the negative environmental impacts of transport, particularly on the Stratford-on Avon AQMA.
4. Protect the historic urban core of Stratford-on-Avon and support the visitor economy.
5. Provide increased resilience to the transport network with regard to unplanned network incidents including flooding.

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<sup>26</sup> Warwickshire LTP 2011-2026 Part A – The Strategy.