Stratford-upon-Avon Town Centre Proposals: Traffic Modelling Summary

Overview

As part of the work to develop the town centre proposals, traffic modelling was carried out. This was done to understand how the options being considered would affect traffic in the town centre and surrounding areas, and whether the proposals would cause any issues which might stop the measures from being introduced.

Summary conclusions:

Three traffic modelling assessments were carried out and the key findings of this work are that the town centre proposals would:

1. Significantly reduce traffic on Bridge Street, High Street and Union Street and to a lesser extent on Wood Street.
2. Encourage more people to walk or cycle for short local journeys in preference to travelling by car.
3. Lead to more traffic and delay on some routes around the town centre, but not have a significantly negative impact on traffic.

A summary of this work is outlined below, and further information is contained within the detailed traffic modelling report: Vectos Microsim (March 2022) Levelling Up Fund Modelling Report, Stratford-upon-Avon, Warwickshire.

Step 1 – Assessment of initial options

The starting point for this work was to change the model to reflect the sort of proposals being considered for Bridge Street and High Street. At this stage Union Street was not included in the town centre proposals. This suggested significantly less traffic would use Bridge Street (about 85% less) and High Street (about 75% less) during the peak travel periods, but it did create the following issues.

1. Traffic rerouted to Union Street to avoid Bridge Street which created queues that at peak times extended from the junction of Union Street and Guild Street back onto Wood Street and High Street.
2. An increase in traffic using Grove Road and Arden Street leading to delays on this route.

Further modelling showed it would be possible to overcome these problems and bring any delays down to an acceptable level. This was achieved by making Union Street less attractive to traffic and by introducing a right turn ban from Union Street onto Guild Street. In addition, the timings of the traffic lights at the Arden Street / Birmingham Road and the Grove Road / Arden Street junctions were changed to be more reflective of the changed traffic flows. These changes did result in slightly more traffic using Bridge Street than in the

initial assessment, but it still suggested that the changes would result in significantly less traffic using Bridge Street (about 68% less) and High Street (about 79% less) during the peak travel periods.

The modelling also identified an increase in traffic using Sheep Street and Waterside of between 80 and 120 additional vehicles in each hour of the peak travel periods. This equates to no more than 2 additional vehicles per minute which from a traffic modelling perspective is not considered particularly significant.

The next stage of testing looked at how the proposals would work in 2031 when there would be more traffic as well as other changes to the road network, such as the opening of the West of Shottery Relief Road. The following options were tested:

Option	Bridge Street	High Street
1	Two-way traffic with reduced vehicle speed and flow.	Two-way traffic with reduced vehicle speed and flow.
2	Two-way traffic with reduced vehicle speed and flow.	One-way traffic, north bound only (towards Bridge Street).
4	Two-way traffic with reduced vehicle speed and flow.	Full closure.
5	Closed to all traffic except buses.	Two-way traffic with reduced vehicle speed and flow.

Option 1 is the scenario outlined above and formed the basis for all the options. In option 2, High Street became one-way and in option 4 High Street was fully closed to traffic. Option 5 tested whether Bridge Street could be closed to all traffic except buses. A further option of Bridge Street remaining open to two-way traffic with High Street closed during the off-peak could not be tested because the traffic model only covers the peak morning and afternoon travel periods.

Option 5, closing Bridge Street, was dismissed because it was seen to significantly increase journey times. Option 1 recorded the shortest delay and also had the benefit of retaining two-way access to High Street during the peak periods. It was also identified that making High Street one-way, option 2, had limited impact on the amount of traffic using High Street or Bridge Street compared to option 1, suggesting there would be little benefit to progressing this option. Consequently, it was decided to carry out a more detailed assessment of option 1. Closing High Street during the peak morning and afternoon travel periods did not create unduly excessive delays and therefore it was concluded that it would be possible to close High Street between 11am and 4pm when there would be less traffic on the roads.

The further testing showed option 1 would generally increase average journey times within the model area by 10 to 20 seconds. Delays of this length are unlikely to be noticed by most drivers, however the modelling did show some journeys would be more affected than others. The testing also suggested that the introduction of the West of Shottery Relief Road would help to ease traffic congestion on the Evesham Road / Grove Road / Arden Street

corridor and reduce the extent of journey delays associated with introducing the town centre proposals.

To understand more about any local impacts associated with the proposals an assessment was carried out that looked at journey time of some specific routes within and around the town centre. This showed that in general journeys around the town centre would take longer with the scheme introduced. The main issues identified were:

- Delays to traffic travelling from the Banbury Road / Shipston Road roundabout to the Birmingham Road / Arden Street junction in 2031.
- Queuing on the southbound approach to the Grove Road / Arden Street junction which by 2031 was seen to extend back to the Birmingham Road / Arden Street junction and cause delay on both Birmingham Road and Guild Street.

In both cases it was considered that it may be possible to reduce these impacts by changing the timing of traffic signals to better reflect the changed traffic flows, but confirming this would require further work.

Other notable changes identified included:

- Significant reductions in traffic on High Street, Bridge Street and Union Street when the proposals were introduced.
- Traffic flows on Wood Street were also seen to reduce significantly when the proposals were introduced.
- Increases in journey time on the Evesham Road / Grove Road / Arden Street and the Evesham Road / Rother Street corridors. This reflected the increase in traffic using these routes when the proposals were introduced.

In summary, the initial traffic modelling identified that the proposals could be expected to reduce traffic in the town centre on Bridge Street, High Street, Union Street and Wood Street when introduced, but that this traffic would move onto alternative routes around the town centre and that these routes would experience some additional delay. This was particularly noticeable on Grove Road. The modelling suggested that it may be possible to resolve or at least reduce these impacts.

Step 2 – Allowance for Mode Shift from Private Cars to Active Travel (cycling and walking)

The first stage of testing looked only at the effect of the proposals on traffic movements, it did not take account of the potential for the proposals to encourage people to walk or cycle for short local journeys instead of using a car. This stage of testing therefore looked at what impact predicted changes to travel behaviour might be expected to have on traffic.

Work using the Department for Transport Active Modes Appraisal Toolkit suggested it would be reasonable to assume that the town centre proposals would lead to a 20% uplift in walking and cycling with some of this increase coming from a shift away from private cars. We needed to understand how this would affect traffic volume, recognising that only short

journeys could sensibly be expected to shift from private car to walking. By looking at data about journeys made within the model we were able to reach a conclusion that the proposals would lead to a reduction in traffic in the peak morning and afternoon travel periods of around 1%.

A further round of assessments was then carried out to understand what impact reducing the volume of traffic on the network by this amount would have on traffic in the town. The earlier modelling had shown that journey delay in 2031 would be slightly greater with the proposals in place than without. This assessment showed that when the shift to active travel is included the level of journey delay is less, and that in the morning peak travel period the level of delay is lower with the town centre proposals than without.

As with the first round of testing, an assessment was then carried out to understand how applying the mode shift would affect local journey times for traffic travelling through or around the town centre. These results show that in the morning peak travel period some of the increases in journey time caused by the town centre proposals are reduced, with most of the routes assessed having journey times close to the levels seen before the scheme was implemented. The main exception to this was a route along Evesham Road / Rother Street where the introduction of the proposals led to a significant increase in journey times as well as longer queues at the junction of Rother Street and Greenhill Street.

In the afternoon peak travel period, the inclusion of the switch to cycling and walking did improve journey times on most routes, however journey times were typically still significantly higher with the scheme than would be the case without. The assessment also showed that journey times in the afternoon peak travel period were lower than in the morning peak which suggested that the level of delay could be accommodated since delays in the morning peak were similar to levels seen before the scheme was implemented.

The assessment also looked at the volume of traffic on streets within the town. Vehicle flows on Bridge Street, High Street, Union Street and Wood Street were seen to reduce when the town centre proposals were introduced, and they reduced further when mode shift was considered. Significant increases in traffic flow were observed on the major roads around the town centre, in particular on Arden Street and Guild Street, but these roads can be considered more suited to carrying traffic compared to town centre streets.

Step 3 - Review of Traffic Signal Timings

The third phase of traffic modelling considered whether it would be possible to improve the performance of the following junctions by changing the timings of the traffic lights:

- Junction 1 – Alcester Road / Arden Street / Grove Road
- Junction 2 – Birmingham Road / Guild Street / Arden Street
- Junction 3 – Greenhill Street / Rother Street / Windsor Street.

This work was carried out using software which optimises the timings of the traffic lights to best manage the traffic travelling through the junction. It showed that the introduction of the town centre proposals would have an impact on two of the three junctions, with both

the Arden Street / Alcester Road / Grove Road and Birmingham Road / Guild Street / Arden Street junctions experiencing some minor queue increases and reductions in capacity. Importantly however, these assessments present a worst-case scenario since they did not take account of mode shift, and despite this the junctions were seen to have sufficient capacity to manage the increase in traffic expected to use the junctions.

The optimised timings were then used in the model of the wider road network to understand whether this would change the traffic flows within the town. This model can replicate the traffic light control system used at some junctions in Stratford-upon-Avon which changes the signal timings in response to traffic demand. This work showed that even with the traffic lights at these three junctions being optimised, the introduction of the town centre proposals did introduce some journey delay, with the delays being higher in the morning peak travel period than the afternoon peak travel period.

The impact of optimising the timings of traffic lights was however seen to be positive on some local routes around the town centre. Journey delay on the Evesham Road / Grove Road / Arden Street corridor was significantly lower than in previous assessments, however this corridor and other routes were still predicted to experience additional journey delay caused by implementing the town centre proposals. The assessment concluded that with the traffic lights optimised any increase in delay following the inclusion of the town centre proposals would be limited.

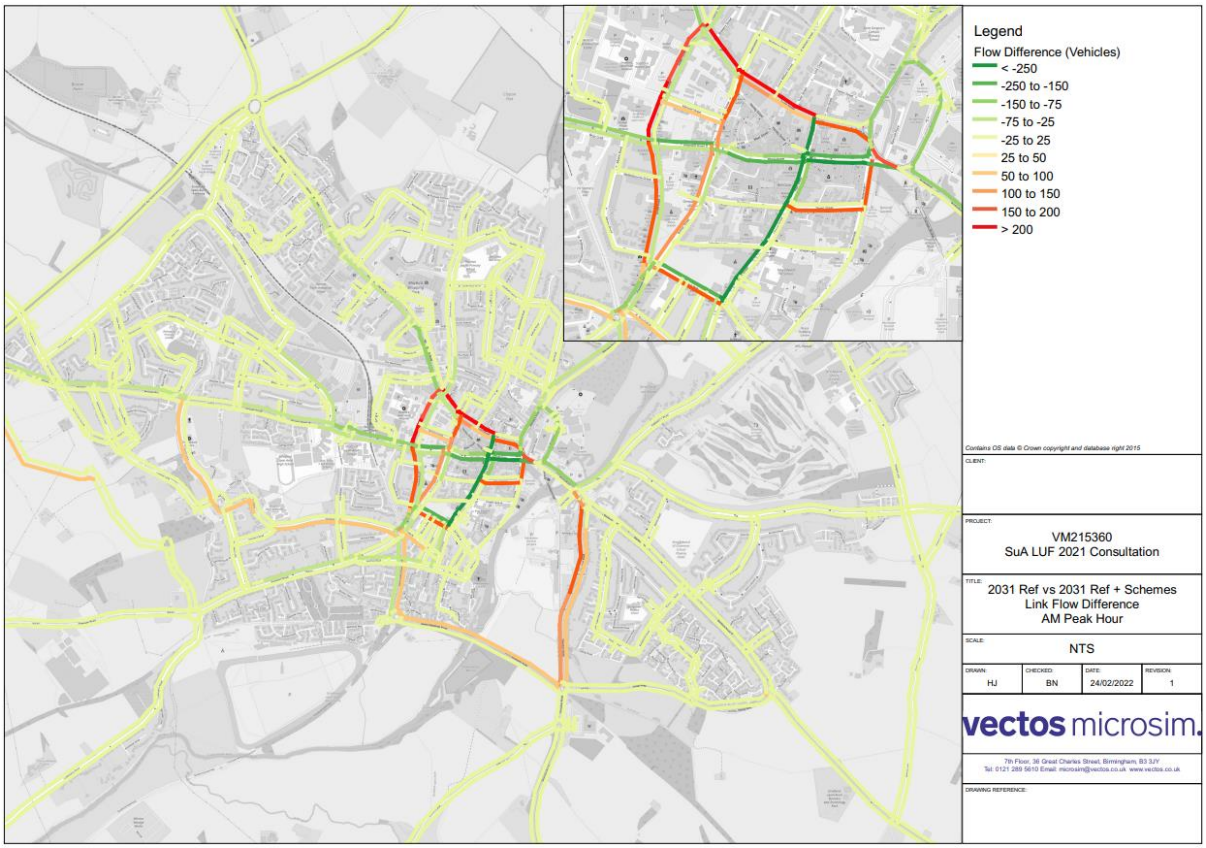
Conclusions:

Three traffic modelling assessments have been carried out to inform the development of proposals for Stratford-upon-Avon town centre which are designed to make the centre more attractive for walking and cycling. The key findings of this work are that the introduction of the town centre proposals would:

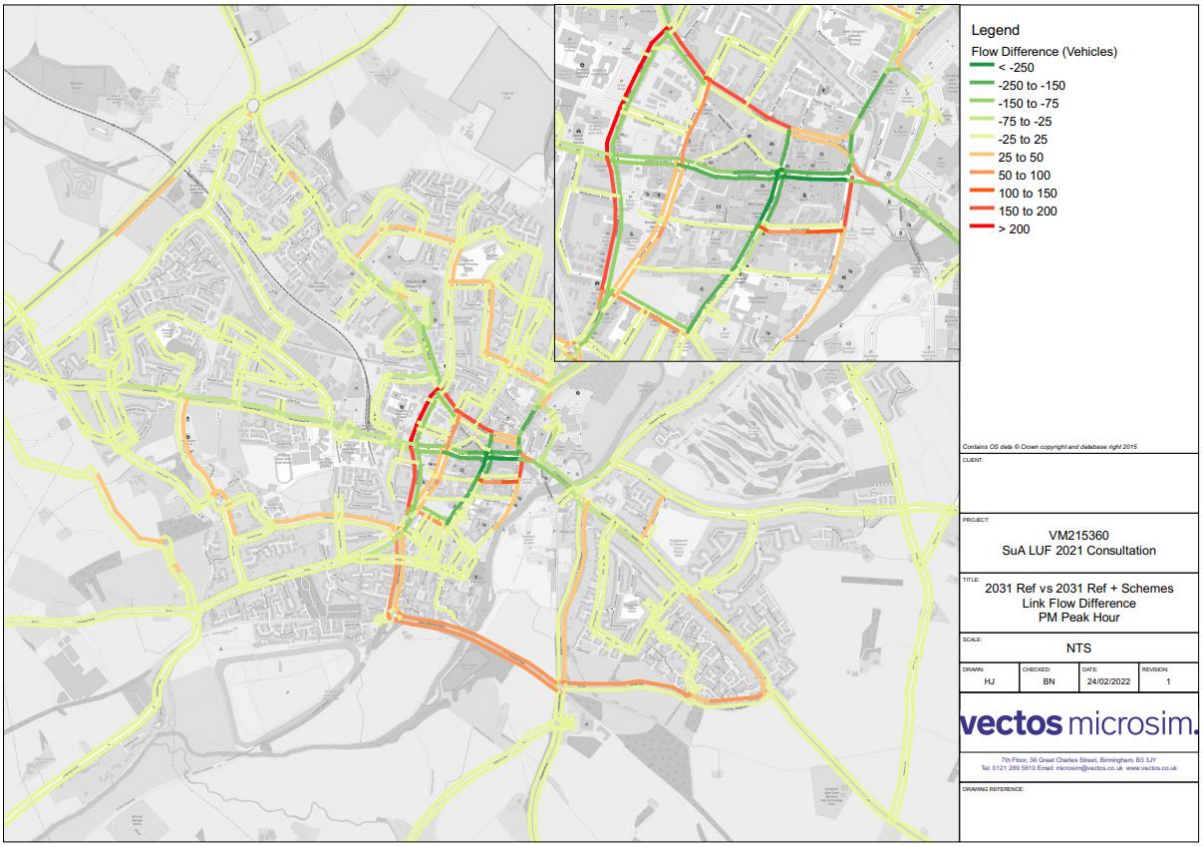
1. Significantly reduce traffic on Bridge Street, High Street and Union Street and to a lesser extent on Wood Street.
2. Encourage more people to walk or cycle for short local journeys in preference to travelling by car.
3. Lead to more traffic and delay on some routes around the town centre, but not have a significantly negative impact on traffic.

These conclusions are shown in the plans below which show the forecast changes to traffic volume and journey times in 2031 caused by introducing the proposals.

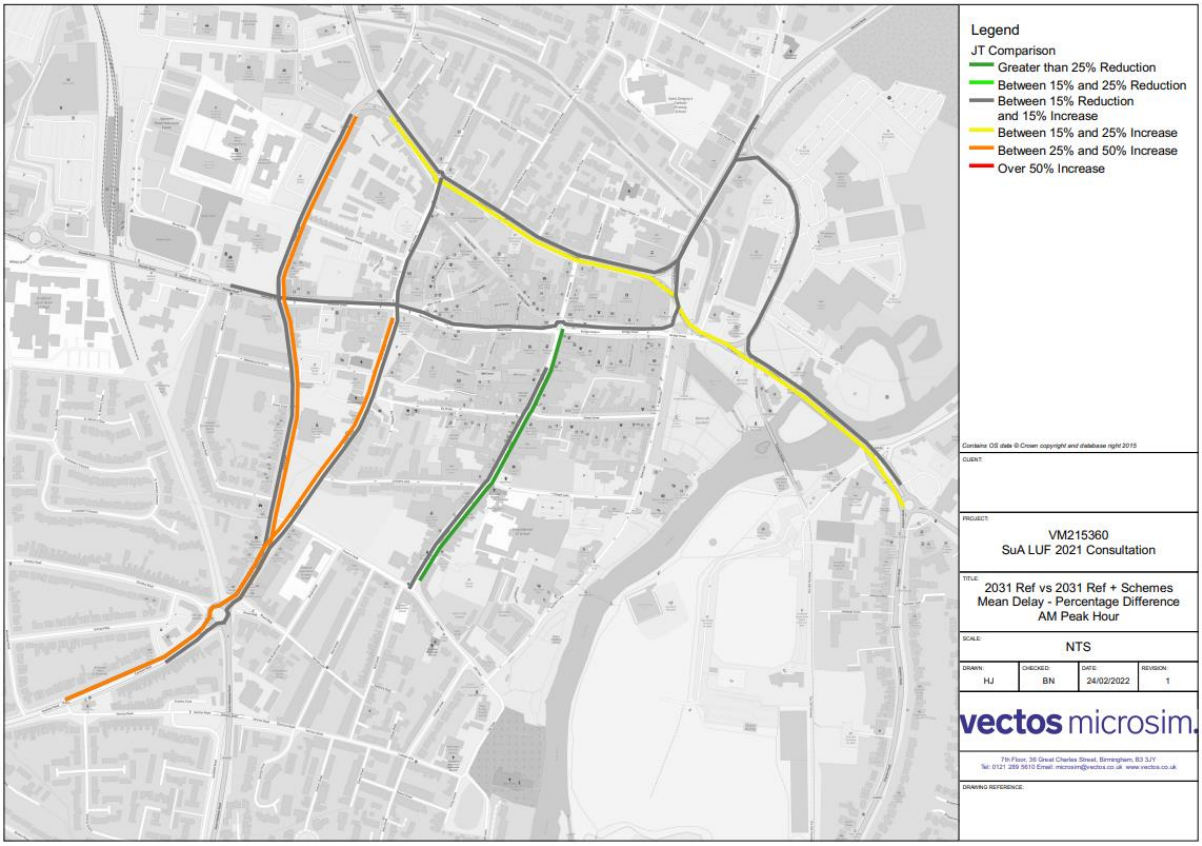
Forecast changes to traffic volume in 2031 due to the proposals – AM peak hour



Forecast changes to traffic volume in 2031 due to the proposals – PM peak hour



Forecast changes to journey times in 2031 due to the proposals – AM Peak Hour



Forecast changes to traffic volume in 2031 due to the proposals – PM peak hour