

Milton Road & Histon Road Corridors – Initial Modelling Summary Note (December 2015)

BACKGROUND

This note provides a summary of the initial modelling that has been undertaken for the Milton Road and Histon Road corridor initial designs. Further design development and refinement will take place following an initial consultation after which the traffic modelling will be revisited and amended. This modelling exercise has been based upon the initial project ideas prepared for public consultation. Whilst this summary note gives an initial indication of the potential impact on traffic, it will be updated to provide a more reliable assessment of traffic impact as revised and more detailed measures are developed in light of the consultation being undertaken.

MILTON ROAD CORRIDOR

Overview

For the modelling of Milton Road, a PARAMICS micro simulation tool was used with a 2014 base year and 2031 future year, based on a model built for Milton Road before the initiation of the City Deal project. Data for the 2031 future year was supplied from a strategic SATURN model. The SATURN model was used to test and assess the strategic traffic impacts of potential banned movements within the corridors (e.g. the closure of the Union Lane arm off Milton Road to motorised vehicles and restricted traffic movements at the entrance to Victoria Road off Histon Road) with the resulting traffic flows from the SATURN model being used in PARAMICS.

Scenarios Tested

Three scenarios were tested using the PARAMICS and SATURN models:

- 2031 Do Nothing – using traffic flows from the SATURN model supplied to model the effects of growth in the Greater Cambridge area on traffic if no interventions are planned for the corridor;
- 2031 Do Something – based on the ‘Do Something’ initial ideas; and
- 2031 Do Maximum – based on the ‘Do Maximum’ initial ideas.

Initial Modelling Results

Table 1 provides a summary of the modelled traffic flows over the three hour AM (0700-1000) and three hour PM (1600-1900) peak periods. The table shows overall traffic growth in the corridor of 12-14% from 2014 to 2031 with a reduction of 1-2% as a result of the initial ideas being considered.

Table 1 Flow Differences for 2031 (3 hour)

SCENARIO / YEAR	TIME	MATRIX TOTAL	MATRIX CHANGE FROM 2014	% CHANGE
2014 Base	AM	33,806	-	-
	PM	34,693	-	-
2031 Do Nothing	AM	37,873	4,067	12.0%
	PM	39,568	4,875	14.1%
2031 Do Something	AM	37,184	3,378	10.0%
	PM	39,296	4,603	13.3%
2031 Do Max	AM	37,208	3,402	10.1%
	PM	39,306	4,613	13.3%

Table 2 and Table 3 provide a summary of the average modelled journey times on Milton Road between the A14 and Mitcham’s Corner in 2031 based on the initial project ideas, for both AM and PM peak hours. The modelled flows give an early indication of the effects of the initial project ideas which will be revised and refined as the ideas are further developed following consultation.

Table 2 AM Peak – Bus and Non-Bus Journey Times

AM PEAK (SECS)	NORTHBOUND FROM MITCHAM’S CORNER TO A14		SOUTHBOUND FROM A14 TO MITCHAM’S CORNER	
	Non-Bus	Bus	Non-Bus	Bus
2014 Base	475	531	604	549
2031 Do Nothing	1091	1022	1196	778
2031 Do Something	506	494	907	654
2031 Do Maximum	480	475	696	514

For the AM peak, the initial modelling suggests delays will continue to grow for both non-bus and bus modes. Under the Do something and Do maximum scenarios there is the potential for bus and non-bus journey time savings along the corridor with bus journey times likely to be quicker than the non-bus modes along the corridor for all scenarios.

Table 3 PM Peak - Bus and Non-bus Journey Times

PM PEAK (SECS)	NORTHBOUND FROM MITCHAM’S CORNER TO A14		SOUTHBOUND FROM A14 TO MITCHAM’S CORNER	
	Non-Bus	Bus	Non-Bus	Bus
2014 Base	728	617	549	630
2031 Do Nothing	556	574	1404	733
2031 Do Something	403	418	726	607
2031 Do Maximum	391	390	747	609

In the PM peak, the initial modelling suggests journey time savings along the corridor for all modes, with bus journey times being quicker than non-bus, particularly in the southbound direction. At this stage it also suggests northbound journey time savings in future years under all scenarios because of the way the traffic signals are set up in the base model compared to the future year model. Therefore this aspect of the current modelling outputs needs to be treated with caution.

These are initial outputs from the models based on early conceptual designs; they provide an early indication of journey time savings that might be expected as a result of implementing either a “do something” or “do maximum” range of measures. There are factors yet to be taken into account in the modelling including the way the traffic signals are set up (e.g. fixed time versus vehicle actuated), which would significantly affect the way traffic flows through the length of the corridor in the future. Any potential impacts on side road queueing will also need to be further considered. Balancing traffic delays on all approaches to a junction through the use of traffic signals will have an impact on the journey times on the corridor and side roads. These issues will become clearer as more detailed proposals are developed and the model will be refined to reflect the emerging details.

HISTON ROAD CORRIDOR

Overview

A PARAMICS model for the whole of the Histon Road corridor has yet to be developed and at this stage only individual junctions have been modelled using both a PARAMICS micro simulation tool

and a LINSIG assessment model (another professionally recognised tool used for junction assessment). Work is now underway to build a corridor wide PARAMICS model for Histon Road which will be used to assess more detailed proposals as they are developed following consultation.

A SATURN model was used to test and assess the impact on the wider road network of the initial ideas to restrict certain movements at the junction of Victoria Road / Huntingdon Road / Histon Road. The resulting traffic flows were then used in the individual junction models.

PARAMICS

The junction of Histon Road / Victoria Road / Huntingdon Road / Mount Pleasant / Castle Street has been modelled using PARAMICS for the AM and PM peaks with a 2015 base year and 2031 future year scenarios as follows:

- 2031 Do Nothing – uses SATURN model traffic flows based on no interventions on the corridor;
- 2031 Do Something (restricted access and turns) – using the ‘Do-Maximum’ option initial ideas including the restricted access and turns at Victoria Road.

The model indicates that the Do Something (restricted access and turns) scenario could remove between 17-18% of traffic from the Victoria Road junction in 2031 over the 3 hour modelled periods, either with or without any other intervention along the corridor.

The modelling suggests that traffic affected by the restricted movements could be expected to re-route away from Huntingdon Road onto Histon Road/King’s Hedges Road or Gilbert Road as an alternative route. Traffic could also increase on other routes such as Castle Street, Oxford Road/Windsor Road, Roseford Road and Storey’s Way. Depending on the level of change in traffic flows, mitigation measures on affected routes would be considered as the project is developed further.

Table 4 gives an indication of the performance of the junction using the average speed of traffic through the junction. This shows that the restricted access and turns at Victoria Road could have a positive impact on overall traffic speeds through the junction under 2031 traffic conditions, with average speeds increasing from 2mph to 11mph in the AM peak hour and from 3mph to 16 mph in the PM peak hour.

Table 4 Model Network Performance (average speeds)

	2031 AM PEAK (08.00-09.00)		2031 PM PEAK (17.00-18.00)	
	Do Nothing	Do Max	Do Nothing	Do Max
Average Speed (mph)	2	11	3	16

The interaction between other junctions on Histon Road is not modelled at this initial stage and this could have an impact both on the way that traffic arrives at this junction and the results provided above. The way the traffic signals are set up at this junction will also need further consideration in terms of whether queues are balanced around the approaches using vehicle actuation. This initial assessment of the restricted access and turns at Victoria Road suggests there could be significant benefits in terms of reducing queues and journey times but the level of benefit will need further

investigation as more detailed proposals are developed, alongside the wider implications of increased traffic flows elsewhere to accommodate the displaced traffic flows.

LINSIG

LINSIG models have been prepared for the Histon Road / Kings Hedges Road and Histon Road / Gilbert Road junctions. For the 2015 base year models, recently recorded traffic survey data has been used. The traffic flows for the 2031 models have been taken from the SATURN model.

Junction of Kings Hedges Road / Histon Road

No initial ideas for improvement have been put forward for this junction at this time. However, an assessment of the 2031 scenario with the restricted movements at Victoria Road was undertaken and this showed the junction working within capacity under 2031 traffic conditions.

Junction of Gilbert Road / Histon Road

The assessment suggests that the Histon Road (north) and Gilbert Road approaches operate over desirable capacity in the 2031-Do Nothing, AM peak scenario. The 2031 Do Something (restricted access and turns) scenario combined with the initial corridor ideas also suggests that the junction operates over desirable capacity in the AM peak. In the PM peak it suggests the Histon Road (south) and Gilbert Road approaches operating close to capacity. This is as a result of traffic re-routing from Victoria Road to other part of the corridor to access their destinations.

Further modelling work will need to be undertaken to assess the potential increase in traffic flow at this junction that results from the other initial project ideas.

As expected, the junction is relatively unimpeded for buses under the 2031 scenarios by virtue of the suggested bus lane from the north.

MITCHAM'S CORNER

An initial model has been created for Mitcham's Corner using PARAMICS to test the City Council concept idea of severing the gyratory system. Two design models have been prepared using either a roundabout or priority junction layout at the junctions of Chesterton Road with Croft Holme Lane and Victoria Avenue. Existing retained traffic signals around the junction have been set up as fixed cycle which does not react to changing traffic conditions on the approaches. A 2031 future year scenario has not been tested at this stage, but a comparison of performance based on the 2014 traffic flows for each junction layout option has been carried out. This suggests that there could be additional delay arising from the concept design, and that average traffic speeds could reduce. This is shown in Table 5.

Table 5 Model Network Performance (average speed) – Mitcham's Corner Gyrotory

	AM AVERAGE SPEED (MPH)	PM AVERAGE SPEED (MPH)
2014 Existing	26	23
2014 Roundabout	14	17
2014 Priority junction	12	9

Whilst this provides an indication of scheme performance, the traffic flows in this area would be likely to change as a result of other ideas put forward on Histon Road and Milton Road. Following the consultation, further design and modelling work will be undertaken for the Mitcham's Corner junction.

EMERGING ISSUES & POINTS TO NOTE

Work is progressing on the development of a PARAMICS model that covers the Histon Road corridor from south of the A14 to Huntingdon Road. This will be used to test the refined designs arising from consultation. This is being done to ensure the interaction of traffic on the corridor at the junctions is assessed and will provide consistency for the outline business case for both corridors.

All traffic signal junctions on Milton Road have been set up on a fixed cycle to reflect what was established as part of the original PARAMICS base model. Where appropriate, the traffic signals have been set up to include additional time for a pedal cycle early release from the stop line. However, no vehicle actuation has been included in the models to date and it is expected that this could help to balance queuing on the corridor and the side roads, potentially resulting in longer journey times for non-bus traffic. As the initial scheme ideas are further developed following the consultation, this aspect will be considered further.