

## Appendix D. Mill Lane junction assessment

This Appendix sets out work that has been undertaken to assess the capacity of the Mill Lane junction.

Scenario 12 was modelled as part of previous studies and represents an alternative initial phase, with the only highway change being conversion of the A4010/Mill Lane T-junction to a mini-roundabout. As described in the previous report, the geometry considered has been based on an existing mini-roundabout at Great Meadow Way/Woodmans Croft in Aylesbury, with a similar road profile to this location.

Scenario 12 demand includes development parcels 4 and 5 at 50% build-out and 7 at 100% build-out. In this scenario, development traffic does not have access to Longwick Road and therefore all traffic generated by these plots uses Mill Lane to access the A4010 when travelling south or the B4009 when travelling north. This equates to 595 houses accessing the network via Mill Lane.

### Scenario 12 roundabout arrangement

Junction design could be undertaken to consider options using a greater extent of the highway boundary or third-party land which may be able to find a workable solution for the traffic demand flows of 595 houses.

An alternative mini-roundabout geometry has been modelled as part of this study, it shows that if feasible from an engineering perspective, the junction performance would be improved. The geometry assumed as part of this study is summarised on the table below:

#### Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
1 - A4010 N	3.50	3.50	3.50	0.0	10.00	12.00	0.0	
2 - Mill Lane	3.50	3.50	3.50	0.0	10.00	12.00	0.0	
3 - A4010 S	3.50	3.50	3.50	0.0	10.00	12.00	0.0	

In comparison with the mini-roundabout geometry used in previous studies is shown below:

#### Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
1 - A4010 N	3.68	3.59	3.72	5.9	10.08	8.01	0.0	
2 - A4010 S	3.08	3.08	3.84	9.7	10.28	8.55	0.0	
3 - Mill Lane	3.64	3.37	4.47	6.9	20.00	20.00	0.0	

Table 1, on the next page, shows a comparison for both geometries model results:

Table 1. Scenario 12 - Mini-roundabout geometry comparison - Model results

	AM Peak		PM Peak	
	RFC	Queue (PCU)	RFC	Queue (PCU)
<b>With proposed geometry at previous study (Scenario 12)</b>				
1 – A4010 N	0.81	4.0	0.63	1.7
2 – A4010 S	0.78	3.6	1.20	91.6
3 – Mill Lane	0.23	0.3	0.16	0.2
<b>With alternative geometry assessed at this study (Scenario 12)</b>				
1 – A4010 N	0.83	4.4	0.64	1.8
2 – A4010 S	0.64	1.8	0.98	17.6
3 – Mill Lane	0.40	0.7	0.33	0.5

## Scenario 12 flows with a T-junction arrangement

As work to date has shown that the junction has more spare capacity when it is a priority junction, Scenario 12 flows have been remodelled to understand the existing junction capacity to accommodate development traffic from this scenario if it were not replaced by a mini-roundabout.

Using scenario 12 demand (595 homes) and a modified scenario 12 network (Do Minimum network besides the Mill Lane upgrade and the existing T-junction rather than a new Mini-roundabout) the modelling results show the junction would performance within capacity.

Table 2. Existing T-Junction Mill Lane - Results from Modified scenario 12 (595 houses)

2033	Scenario 12 (Existing T-Junction)	AM Peak		PM Peak	
Arm	Name	RFC	Queue (Veh)	RFC	Queue (Veh)
B-AC	Mill Lane - A4010 South/A4010 North	0.86	4.9	0.62	1.5
C-AB	A4010 North – A4010 South/Mill Lane	0.02	0.0	0.05	0.1

These results suggest that the existing T-junction at Mill Lane would operate better than a mini-roundabout, as outlined above, this is caused by the high flows on the A4010 which don't have to give way or slow down for the priority junction. The lower flows on Mill Lane have to give way but there are sufficient gaps in the traffic on the A4010 for there not to be too much queue building up.

Additionally, the existing T-junction results show the worst RFC would be experienced during the AM peak, whilst if a roundabout is in place the worse RFC would be during the PM peak. The reason for the increase in RFC during the PM peak with a miniroundabout is due to a rise in ahead traffic from south to north, which would not affect the T-junction as much because this traffic would not have to give way.

## Conclusions

This assessment determines the existing T-junction would have more capacity than an isolated miniroundabout, without the rest of the A4010 calming measures package in place. It demonstrates that up to 595 houses could be accommodated with access off of Mill Lane with the T-junction in place. The mini roundabout arrangement would not provide sufficient capacity at this junction if it were brought forward before the relief road is connected through to Lower Icknield Way, reducing traffic on the A4010 and allowing further capacity for Mill Lane traffic.

It should be noted that measures are required to reduce traffic speeds on the A41010 in the future year to make this route less attractive and to result in reassignment of traffic onto the new relief road.

This assessment has also proved the mini-roundabout performance is sensitive to geometry changes. Therefore, the proposed mini-roundabout geometry is should be investigated further in order to optimize the junction performance when the whole A4010 package is in place.