Toll Bar A16: Gateway to Growth

Forecasting Report

This forecasting report considers three variations of the Toll Bar junction in order to assess hot the scheme detailed in the bid will perform.

Existing situation

Measurements for the junction were taken and fed into an Arcady (Junctions 8) model. The measurements are detailed below.

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)
A16 Peaks Parkway	4	7.5	11.3	27	45	27
B1219 Station Road East	3.5	4.7	5.7	24	45	27
A16 Louth Road	3	7.5	5	27.5	45	27
B1219 Station Road West	2.5	6.1	24.3	23.5	45	26

Our most up-to-date turning count survey results (from 12th September 2013) were then assessed for peak periods and converted to PCU's for inputting into the model. This yielded the following results in the AM and PM peak periods.

	AM			
	Queue (PCU)	Delay (s)	RFC	LOS
	Toll Bar Roundabout - 2013_Base			
A16 Peaks Parkway North	1.77	6.38	0.64	A
B1219 Station Road East	2.00	14.42	0.68	B
A16 Louth Road	5.53	24.13	0.86	C
B1219 Station Road West	1.01	7.43	0.51	A

	PM			
	Queue (PCU)	Delay (s)	RFC	LOS
	Toll Bar Roundabout - 2013_Base			
A16 Peaks Parkway North	14.62	37.36	0.98	E
B1219 Station Road East	11.86	90.53	0.99	F
A16 Louth Road	3.92	19.36	0.81	C
B1219 Station Road West	4.36	17.91	0.83	C

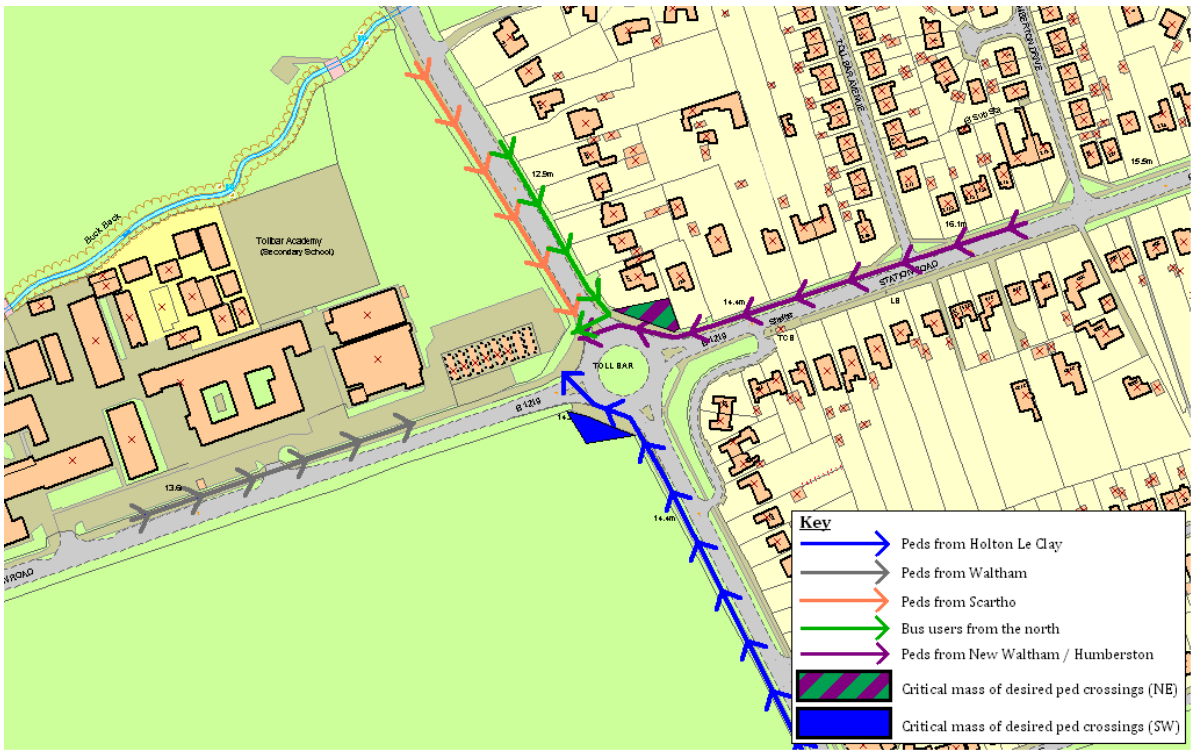
This demonstrates that the junction is currently operating above operational capacity, which in this modelling suite is assumed to be a Ration of Flow to Capacity (RFC) of 0.85. This figure is slightly exceeded in the AM peak, but more so in the PM peak period.

It is important to acknowledge that pedestrian crossings do have a further negative influence on this junction in the AM peak, which cannot be modelled in this convention. When a critical mass of people arrive at crossing points, they are forced in front of moving traffic, which will then stop and make queues longer than implied in the modelling results. The results were therefore verified against queue length data, which showed the following comparison.

	Toll Bar Roundabout - 2013_Base			
	AM		PM	
	Modelled Queue	Observed Queue (max)	Modelled Queue	Observed Queue (max)
A16 Peaks Parkway North	1.77	12	14.62	14
B1219 Station Road East	2	3	11.86	16
A16 Louth Road	5.53	5	3.92	4
B1219 Station Road West	1.01	4	4.36	3

Although results show many correlations between 'modelled' and 'actual' results, this also confirms the seemingly unquantifiable additional impact on junction performance of pedestrian crossings impacting on traffic.

The following map shows the key routes to access the school, which also indicates the most popular pedestrian crossing movements in the AM peak. This implies that the differences between the 'modelled' and 'observed' queue lengths are explainable as a result of pedestrian crossings; significant numbers of pedestrian (ped) crossings occur on A16 Peaks Parkway North and B1219 Station Road West in order to access Toll Bar Academy.

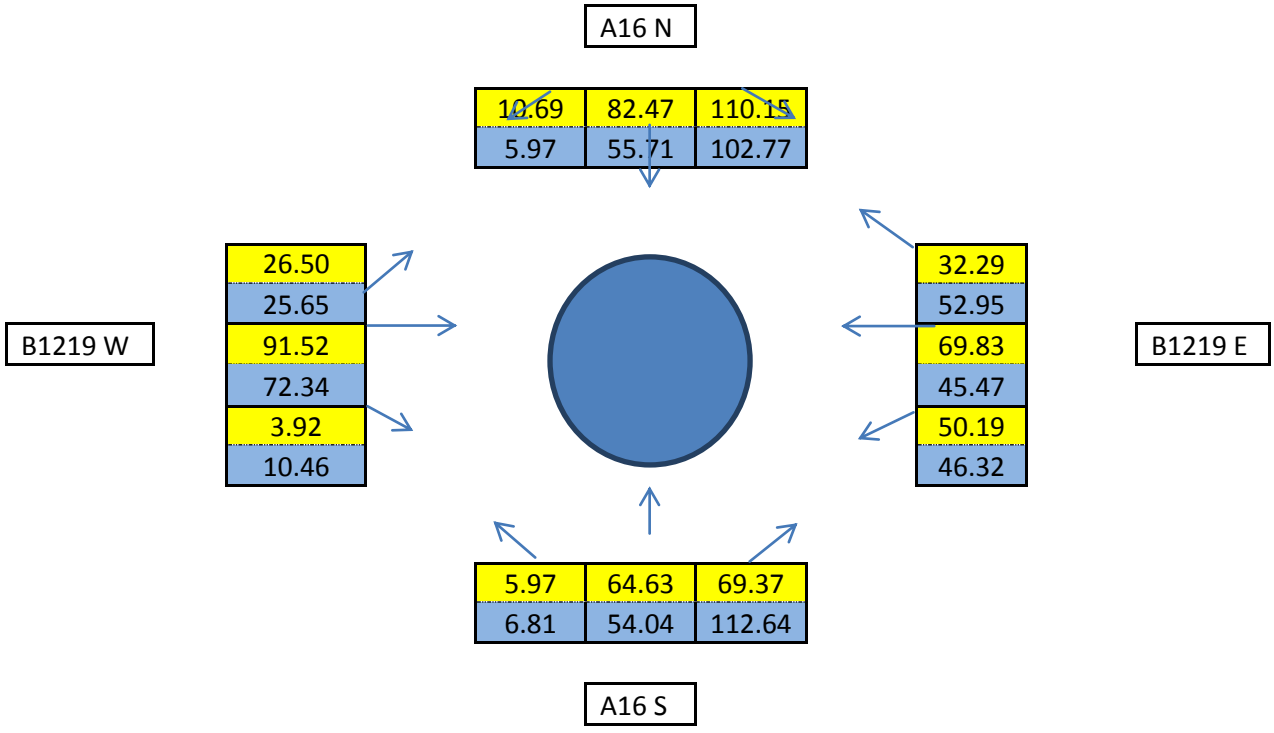


We can summarise the above by stating that Toll Bar Roundabout currently operates above recommended capacity in both the AM and PM peaks; and that the AM peak period situation is worsened by significant numbers of pedestrian crossings which are given a degree of priority as a result of critical mass build up, which proceed to cross the junction dangerously.

'Do Nothing' Approach

The 'do nothing' scenario assumes that housing growth is imminent (traffic has recently been frequently cited as a reason for housing development planning refusal) and is included in modelling results, but does not include any background growth via TEMPRO due to the expected opening year being within 3 years.

Traffic growth has been assumed as generated as 120 new housing units in to the north of the roundabout, 410 to the east, 100 to the south and 50 to the west. This produces the following additional demand, with impacts on the junction being derived from turn percentages form recent Traffic Assessments (TA's) from Planning Applications:



These results were added to the existing demand matrix, and produced the following results in Arcady. The results clearly show the junction operating significantly over capacity with the addition of development traffic, and is still likely to be an underestimation of queue length on A16 North and B1219 West in the AM peak due to pedestrian crossings as discussed above. The PM peak period shows heavily saturated flows.

	AM			
	Queue (PCU)	Delay (s)	RFC	LOS
	Toll Bar Roundabout - 2023_Dev New			
A16 Peaks Parkway North	3.54	11.80	0.79	B
B1219 Station Road East	27.43	125.51	1.10	F
A16 Louth Road	90.02	363.63	1.18	F
B1219 Station Road West	2.12	12.78	0.69	B

	PM			
	Queue (PCU)	Delay (s)	RFC	LOS
	Toll Bar Roundabout - 2023_Dev New			
A16 Peaks Parkway North	49.23	103.76	1.08	F
B1219 Station Road East	111.61	680.81	1.48	F
A16 Louth Road	40.95	150.00	1.08	F
B1219 Station Road West	23.16	91.30	1.01	F

'Do Something' Option

The 'Do Something' option considers the impact of removing the roundabout provision and replacing with a signalised junction. The same flows as above have been entered and provide much more positive results. This has been assessed in LinSig as per the attached LinSig output report 'Option E11 New Demand 20131024'. This report provides a full breakdown of results, primarily highlighting that even with the housing development the junction operates within capacity in both the AM and PM peak periods, while also providing a safe crossing point for pedestrians crossing the A16 North and B1219 West.

LinSig shows the junction to operate with a practical reserve capacity (PRC) of 29.2% in the AM peak, and 2.0% PRC in the PM peak period. Further to this, an economic assessment has been produced (see appendix entry 'Economic Assessment V2'), with the scheme achieving a BCR of 5.04. It should be stated that this is based only on peak period traffic delay comparison, and is an under-estimation of the benefits of this scheme. This assessment does not consider several elements which are likely to occur as a result of scheme implementations, including:

- Increase in uptake of sustainable modes due to safe crossing provision
- Safety improvements leading to fewer accidents
- Improved 'perceived safety'
- Economic benefits of increased access to Grimsby town centre, Grimsby Dock LDO site and connectivity to the wider trans-European network from the south

The suggested layout brings operational capacity to a higher level that is currently available at this location, with the potential to further increase in the future with widening of approaches and increases in lane widths. The junction could be increased in capacity further with the purchase of land to the south west of the current junction, which would enable more options in regards to growth.