Transport for Greater Manchester

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Client:	Stockport Metropolitan Borough Council
Project:	Berrycroft Lane / Barrack Hill
Subject:	Addition of Right Turn Arrow - Traffic Impact Assessment
Doc:	*Berrycroft_Traffic_Impact_Report_JW_021122*
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1. Introduction

1.1. This report relates to the proposed implementation of a right turn arrow for vehicles moving from Berrycroft Lane to Barrack Hill, Stockport.

1.2. For this project, an early right turn arrow has been considered as it represents a cheaper option than a late arrow and doesn't require the repositioning of any signal poles.

1.3. Informed by traffic flow data, this report considers the likely operational efficiency of the junction in the weekday morning and weekday evening peak periods of the assessment year.

2. Traffic Flows

2.1. The traffic flows have been initially derived from surveys commissioned by HFAS (Highways Forecasting and Analytical Services) on Wednesday 14th September 2022.

2.2. The table below describes traffic flow data in each of the two busiest hour-long peak periods, also giving the busiest movement in each period, and the total associated right-turn flow from Berrycroft Lane to Barrack Hill. These two periods

will be used as they represent the worst-case scenario in terms of peak traffic flow at this junction.

Modelling Period	Total Traffic Flow (all movements, PCUs)	Busiest Movement (From / To)	Total Traffic Flow (Berrycroft Ln to Barrack Hill, PCUs)
AM Traffic Peak (8:30 – 9:30)	1701	School Grove / Berrycroft Ln	209
PM Traffic Peak (17:15 – 18:15)	2011	Berrycroft Ln / School Grove	246

2.3. In the AM and PM peak periods, vehicles moving from Berrycroft Lane to Barrack Hill account for 12.29% and 12.23% of all traffic flow, respectively. This demonstrates the significance of this movement and potential justification for the addition of the early right turn indicative arrow.

3. Pedestrian Demand

3.1. There is no available pedestrian data to calculate a predicted pedestrian demand for either of the peak periods.

3.2. The pedestrian stage has been assumed to appear every signal cycle in both peak periods. This represents the worst-case in terms of impact on junction capacity.

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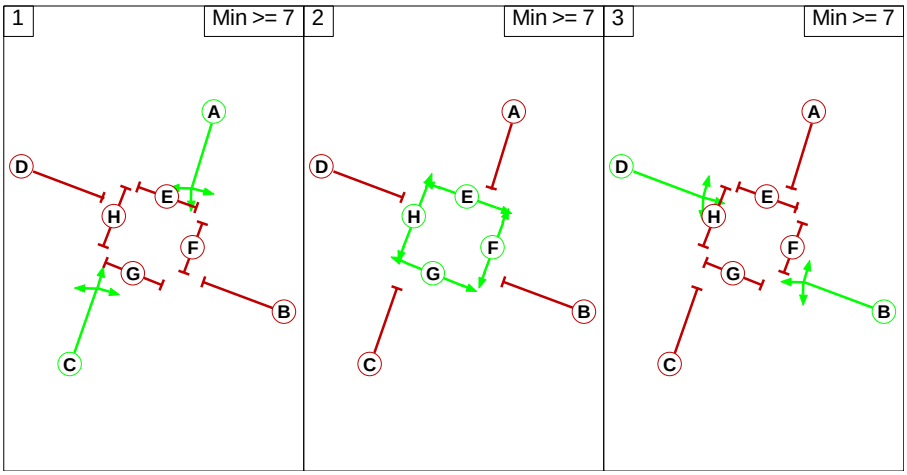
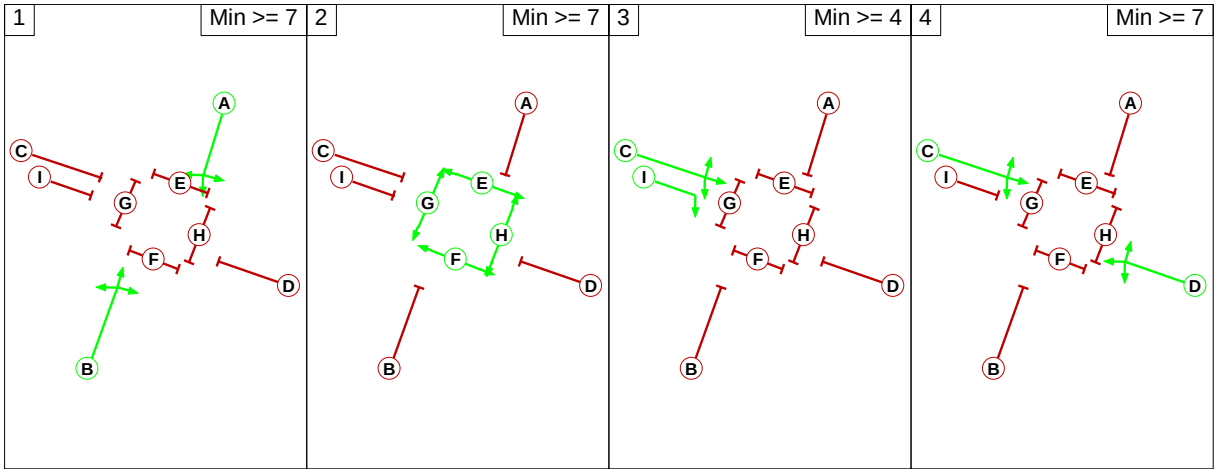
4. Signal Stage Sequences

4.1. Existing Junction Staging:



Phases A, B, C, and D represent vehicles movements. Phases E, F, H, and G represent controlled pedestrian crossings.

4.2. Proposed Junction Staging:



Phases A, B, C, and D represent vehicle movements. Phases E, F, H, and G represent controlled pedestrian crossings. Phase I represents the early right turn indicative arrow.

5. Modelling Details

5.1. The junction has been modelled using LinSig (version 3.2.40), for the weekday morning and weekday evening peak periods of the assessment year.

5.2. One scenario has been considered for each peak period, representing the operation of the proposed junction in the 'worst-case' maximum pedestrian demand (ie. the pedestrian phases appear in every cycle: Peds 1/1). This decision was informed by the absence of a predicted pedestrian demand, discussed in **section 3.1**.

5.3. A signal cycle time of 120 seconds has been assumed in all scenarios, as per existing junction operation.

6. Results of Modelling

6.1. The tables below indicate the predicted degree of saturation, queue length and delay, for the modelled scenarios. Links with a degree of saturation equal to or greater than 90% have been highlighted in red.

6.2. The degree of saturation is a measure of how close to capacity a link is predicted to operate, with 90% taken to be the maximum practical level.

6.3. Queues are average maximums and will be exceeded for half the signal cycles. Where a junction is at practical capacity, queues could extend to twice the quoted value.

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6.4. AM Peak Period (08:30-09:30)

Link Description	EXISTING JUNCTION Ped 1/1, 120 second cycle			PROPOSED JUNCTION Ped 1/1, 120 second cycle		
	Degree of saturation (%)	Delay (s/pcu)	Queue length (metres)	Degree of saturation (%)	Delay (s/pcu)	Queue length (metres)
George Lane (all movements)	53.5	37.6	59.2	53.5	37.6	59.2
School Brow (all movements)	53.6	37.6	48.9	66.8	47.2	58.1
Barrack Hill (all movements)	66.7	40.5	78.8	66.7	40.5	78.8
Berrycroft Lane (ahead and left turn movements)	64.3	36.5	48.3	61.4	36.2	48.3
Berrycroft Lane (right turn movement)	64.9	50.1		67.2	42.8	
Practical Reserve Capacity (%)	34.9			33.9		
Total Delay (pcu-hrs)	18.8			19.3		

6.5. PM Peak Period (17:15-18:15)

Link Description	EXISTING JUNCTION Ped 1/1, 120 second cycle			PROPOSED JUNCTION Ped 1/1, 120 second cycle		
	Degree of saturation (%)	Delay (s/pcu)	Queue length (metres)	Degree of saturation (%)	Delay (s/pcu)	Queue length (metres)
George Lane (all movements)	66.9	44.7	55.8	66.9	44.7	55.8
School Brow (all movements)	49.9	39.2	47.7	65.3	51.1	56.4
Barrack Hill (all movements)	87.4	54.6	126.5	87.4	54.6	126.5
Berrycroft Lane (ahead and left turn movements)	89.0	53.6	119.0	89.0	53.6	119.0
Berrycroft Lane (right turn movement)	89.0	64.7		89.0	57.3	
Practical Reserve Capacity (%)	1.1			1.1		
Total Delay (pcu-hrs)	28.7			29.3		

7. Conclusion

7.1. The results of the modelling indicate that the addition of the right turn indicative arrow on Berrycroft Lane would reduce the delay experienced for right turning vehicles in the AM and PM peak periods by 7.3s and 7.4s per vehicle, respectively.

7.2. The implementation of the arrow would also reduce the potential for conflict between right-turning vehicles and opposing traffic from School Brow, improving the safety of the manoeuvre.

7.3. The results of the modelling indicate the junction is still likely to operate within practical capacity levels in both peak periods.

7.4. These results suggest that there are some drawbacks to the proposal, including:

- Queues down School Brow increasing in the AM and PM peaks by 9.2m and 8.7m respectively.
- Junction capacity reducing in the AM Peak, though not by a great amount.

Though these consequences that are inevitable given the addition of the right turn indicative arrow they should be balanced against the improvements to driver safety that the proposal brings.

7.5. There are additional benefits afforded by adaptive signal control, such as SCOOT or MOVA, that have not been considered by this fixed-time modelling.