

M20 Junction 4 Revised Capacity Assessment Report

1. Introduction

This report is prepared to summarise the results of additional junction capacity assessments prepared for M20 Junction 4 to be used to support the Tonbridge & Malling Borough Council (TMBC) Local Plan development strategy.

2. Background

A strategic VISUM highway assignment model was developed for the A20 corridor, including M20 Junction 4, to model the effects of the emerging Local Plan development strategy. Capacity assessments were completed at key junctions to assess and compare the future 'do minimum' and 'do something' scenarios. The end of the Local Plan period 2031 was used as the future assessment year. The 'do minimum' included growth, permitted and committed development and the 'do something' also included the Local Plan allocations and infrastructure proposals.

The findings were reported in the Forecast Junction Assessments report prepared by consultants Amey as evidence for the Local Plan. The results in respect of M20 Junction 4 showed significant capacity issues in the PM peak with a predicted reserve capacity of -79% in the 'do minimum' scenario and -100% in the 'do something' scenario. Of particular concern was the M20 west off-slip where queue lengths of 167 were predicted in the 'do minimum' PM peak and 248 in the 'do something' PM peak. The queue lengths were predicted to exceed the physical queuing capacity on the link.

3. Revised Assessment

The Forecast Junction Assessments report was issued to Highways England who understandably raised concerns. Adjustments were made to both the development strategy and the Linsig capacity model. TMBC proposed a reduced allocation on the land North of Kings Hill from 1,468 to 900 residential units and the Linsig model was refined to reflect comments made by Highways England; this included alterations to the intergreen timings, the phase delays and the green times on the circulatory carriageway in order to optimise the signals. Additional capacity assessments were completed with these adjustments in place.

The results are shown in Tables 1.1 and 1.2 below:

Table 1.1: Capacity Assessment Outputs - AM Peak

Arm	2031 Do Min		2031 DS RKH	
	DoS (%)	Max Q (PCU)	DoS (%)	Max Q (PCU)
A228 (N)	80.1	13	83.1	14
Northern Circulatory	76.1	7	75.6	8
M20 (E)	65.7	3	62.0	2
Eastern Circulatory	69.4	5	70.6	4
A228 (S)	76.2	9	84.1	11
Southern Circulatory	40.2	6	46.9	5
M20 (W)	78.2	5	77.8	6
Western Circulatory	34.9	3	35.1	2
PRC	3.1%		4.6%	

Table 1.2: Capacity Assessment Outputs - PM Peak

Arm	2031 Do Min		2031 DS RKH	
	DoS (%)	Max Q (PCU)	DoS (%)	Max Q (PCU)
A228 (N)	76.3	8	79.8	10
Northern Circulatory	49.8	2	57.0	7
M20 (E)	75.4	7	84.1	7
Eastern Circulatory	46.5	9	49.2	2
A228 (S)	82.5	14	81.4	13
Southern Circulatory	75.4	8	54.4	4
M20 (W)	80.5	8	85.3	11
Western Circulatory	80.2	9	76.9	10
PRC	9.1%		5.6%	

Note: RKH is reduced allocation at Land North of Kings Hill, DoS is degree of saturation, Max Q is Mean Maximum Queue, PCU is passenger car units and PRC is practical reserve capacity.

It can be seen from these results that the junction is forecast to operate within capacity in both peak periods.

4. Queueing Capacity

In order to address concerns raised regarding queueing capacity, a comparison was made between the predicted queue lengths and the available queueing capacity. Tables 2.1 and 2.2 below show the physical queue capacity on each approach and within each lane of the internal circulatory arms. This can be compared to the Mean Maximum Queue lengths predicted and the proportion of the queueing capacity utilised is provided in brackets :

Table 2.1: Modelled Queues vs Capacity – AM Peak

Junction Arm/Lane	Q Capacity (PCU)	DS RKH Max Q (PCU)
M20 West (eastbound) - Left	85	6 (7%)
M20 West (eastbound) - Ahead/Right	49	3 (6%)
M20 East (westbound) - Ahead/Right	53	2 (4%)
Circulatory 1 (North) – Lane 1 (nearside)	15	8 (53%)
Circulatory 1 (North) – Lane 2	15	7 (47%)
Circulatory 1 (North) – Lane 3	8	3 (38%)
Circulatory 1 (North) – Lane 4 (offside)	7	3 (43%)
Circulatory 2 (East) – Lane 1 (nearside)	17	4 (24%)
Circulatory 2 (East) – Lane 2	17	3 (18%)
Circulatory 2 (East) – Lane 3 (offside)	11	3 (27%)
Circulatory 3 (South) – Lane 1 (nearside)	9	5 (55%)
Circulatory 3 (South) – Lane 2	9	5 (55%)
Circulatory 3 (South) – Lane 3	12	1 (8%)
Circulatory 3 (South) – Lane 4 (offside)	12	1 (8%)
Circulatory 4 (West) – Lane 1 (nearside)	14	2 (14%)

Circulatory 4 (West) – Lane 2	14	2 (14%)
Circulatory 4 (West) – Lane 3	12	1 (8%)
Circulatory 4 (West) – Lane 4 (offside)	12	1 (8%)

Table 2.2: Modelled Queues vs Capacity – PM Peak

Junction Arm/Lane	Q Capacity (PCU)	DS RKH Max Q (PCU)
M20 West (eastbound) - Left	85	11 (13%)
M20 West (eastbound) - Ahead/Right	49	1 (2%)
M20 East (westbound) - Ahead/Right	53	7 (13%)
Circulatory 1 (North) – Lane 1 (nearside)	15	7 (47%)
Circulatory 1 (North) – Lane 2	15	7 (47%)
Circulatory 1 (North) – Lane 3	8	1 (13%)
Circulatory 1 (North) – Lane 4 (offside)	7	1 (14%)
Circulatory 2 (East) – Lane 1 (nearside)	17	2 (12%)
Circulatory 2 (East) – Lane 2	17	2 (12%)
Circulatory 2 (East) – Lane 3 (offside)	11	2 (18%)
Circulatory 3 (South) – Lane 1 (nearside)	9	4 (44%)
Circulatory 3 (South) – Lane 2	9	4 (44%)
Circulatory 3 (South) – Lane 3	12	1 (8%)
Circulatory 3 (South) – Lane 4 (offside)	12	1 (8%)
Circulatory 4 (West) – Lane 1 (nearside)	14	10 (69%)
Circulatory 4 (West) – Lane 2	14	9 (65%)
Circulatory 4 (West) – Lane 3	12	2 (14%)

Circulatory 4 (West) – Lane 4 (offside)	12	2 (14%)
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It can be seen from Tables 2.1 and 2.2 that there is adequate capacity to accommodate the predicted queues and spare capacity is available.

5. Conclusion

Revised Capacity Assessments have been prepared to model the effects of a reduced allocation on the Land North of Kings Hill and the Linsig model has been refined to overcome concerns relating to capacity at M20 junction 4.

The results indicate that with the modifications, the junction is predicted to operate within capacity in the 2031 future year in the 'do something' scenario which includes the Local Plan Development Strategy. Additionally analysis of queue lengths indicate that the predicted queues can be comfortably accommodated within the capacity of each approach and in the circulatory links.

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