

APPENDIX 4.2

New Urban Road Capacity Check

This appendix shows the assessment of a new urban road inland of the defined bottleneck to determine whether various types and cross-sections of urban road would adequately cope with the predicted flows along this bypass route. The route would have a junction where it leaves the existing A2 Shore Road at its northern end, a junction at the university entrance and a junction where it rejoins the A2 Shore Road.

It is intended that the new road would have no direct access and generally no bus stops. It would therefore be a category UAP1 high quality road.

For the purposes of this assessment, it has been assumed that a single cross-section would be employed along the length of the scheme. Therefore the assessment is based on the predicted peak hour flows for the busier link from Shore Road to the university junction. Within the assessment therefore, the major link from the north end junction to the university junction would have additional capacity in hand.

By comparison of predicted flows with the statistical flows for category UAP1 high quality road, the findings are as follows.

As a single carriageway

It would **be adequate** for the anticipated flows with a **14m carriageway**

It would **be adequate** for the anticipated flows with a **17m carriageway**.

NB. The only point to the latter test is to illustrate that with a central hatched lane, the resulting wider carriageway would have a higher capacity. In practice, the extra 3m could be used for central hatching or wider traffic lanes plus narrower central hatched area. Even so, a 14m carriageway would have a reasonable margin and that width could, for example, be divided into 4 narrower lanes at 3.25m plus a 1m hatched area along the centre line.

As a dual carriageway

It would **be more than adequate** for the anticipated flows with **dual 7m carriageways** though with a higher margin than the single carriageway. Clearly a dual 7.3m carriageway would also be adequate, by a slightly greater margin.

New Urban Road Capacity Check

A - Single 14m carriageway inland route

Basis of check

TA 79/99 Amendment No. 1 - TRAFFIC CAPACITY OF URBAN ROADS

Road characteristics–

The road would be a single carriageway 14m wide between junctions, divided into 4 equal lanes, with 3m shared cycleway/footways or verges.

The length of road in question is 2.25km.

There would be junctions at each end plus one at the university.

The road would have a 40mph speed limit.

There would be no direct access.

There could be formal at-grade pedestrian crossings.

Only express buses would use the road, others would use existing Shore Road.

Assessment against Table 1 Types of Urban Road

The road could be classed as **UAP1** a high standard road.

Assessment against Table 2 Capacity of Urban Roads

This gives the maximum sustainable flow in one hour in one direction under favourable road and traffic conditions, with a 60/40 split on directional flows.

The maximum direction flow given are for a UAP1 at 14m **2900vph**

2010 anticipated am peak hour flows 1700vph in busier direction

2025 anticipated am peak hour flows 1850vph in busier direction

(NB The link between the A2 Shore Road north and the University would have flows as above, the short link back to the A2 Shore Road would have similar flows.)

By comparison with the statistical flows for category UAP1, the new inland road would be adequate for the anticipated flows with a 14m carriageway.

New Urban Road Capacity Check

B - Single 17m carriageway inland route

Basis of check

TA 79/99 Amendment No. 1 - TRAFFIC CAPACITY OF URBAN ROADS

Road characteristics–

The road would be a single carriageway 17m wide between junctions, divided into 4no. 3.5m lanes plus a central 3m lane, with 3m shared cycleway/footways.

The length of road in question is 2.25km.

There would be junctions at each end plus one at the university.

The road would have a 40mph speed limit.

There would be no direct access.

There could be formal at-grade pedestrian crossings.

Only express buses would use the road, others would use existing Shore Road.

Assessment against Table 1 Types of Urban Road

The road could be classed as **UAP1** a high standard road.

Assessment against Table 2 Capacity of Urban Roads

This gives the maximum sustainable flow in one hour in one direction under favourable road and traffic conditions, with a 60/40 split on directional flows.

The flows given are for a UAP1 at 17m **3200vph**

2010 anticipated am peak hour flows 1700vph in busier direction

2025 anticipated am peak hour flows 1850vph in busier direction

(NB The link between the A2 Shore Road north and the University would have flows as above, the short link back to the A2 Shore Road would have similar flows.)

By comparison with the statistical flows for category UAP1, the new inland road would be adequate for the anticipated flows with a 17m carriageway.

(NB. The only point to this is to illustrate that with an additional central hatched lane the resulting wider carriageway would have a higher capacity. In practice, the extra 3m could be used for central hatching or wider traffic lanes plus narrower central hatched area.)

New Urban Road Capacity Check

C - Dual 7m carriageways inland route

Basis of check

TA 79/99 Amendment No. 1 - TRAFFIC CAPACITY OF URBAN ROADS

Road characteristics–

The road would be a 2-lane dual carriageway 2 x 7m wide with 3.5m lanes, with 3m central reserve and 3m shared cycleway/footways or verges.

The length of road in question is 2.25km.

There would be junctions at each end plus one at the university.

The road would have a 40mph or 50mph speed limit.

There would be no direct access.

There could be formal at-grade pedestrian crossings.

Only express buses would use the road, others would use existing Shore Road.

Assessment against Table 1 Types of Urban Road

The road could be classed as **UAP1** a high standard road.

Assessment against Table 2 Capacity of Urban Roads

This gives the maximum sustainable flow in one hour in one direction under favourable road and traffic conditions.

The flows given are for a UAP12 at 2no. 7m **3450vph**

2010 anticipated am peak hour flows 1700vph in busier direction

2025 anticipated am peak hour flows 1850vph in busier direction

(NB The link between the A2 Shore Road north and the University would have flows as above, the short link back to the A2 Shore Road would have similar flows.)

By comparison with the statistical flows for category UAP1, the new inland road would be adequate for the anticipated flows with dual 7m carriageways.

(NB. The only point to this is to illustrate that a dual carriageway would have a higher capacity than a single carriageway.)

New Urban Road Capacity Check

D - Dual 7.3m carriageways inland route

Basis of check

TA 79/99 Amendment No. 1 - TRAFFIC CAPACITY OF URBAN ROADS

Road characteristics–

The road would be a 2-lane dual carriageway 2 x 7.3m wide with 3.65m lanes, with 3m central reserve and 3m shared cycleway/footways or verges.

The length of road in question is 2.25km.

There would be junctions at each end plus one at the university.

The road would have a 40mph or 50mph speed limit.

There would be no direct access.

There could be formal at-grade pedestrian crossings.

Only express buses would use the road, others would use existing Shore Road.

Assessment against Table 1 Types of Urban Road

The road could be classed as **UAP1** a high standard road.

Assessment against Table 2 Capacity of Urban Roads

This gives the maximum sustainable flow in one hour in one direction under favourable road and traffic conditions.

The flows given are for a UAP1 at 7.3m **3600vph**

2010 anticipated am peak hour flows 1700vph in busier direction

2025 anticipated am peak hour flows 1850vph in busier direction

(NB The link between the A2 Shore Road north and the University would have flows as above, the short link back to the A2 Shore Road would have similar flows.)

By comparison with the statistical flows for category UAP1, the new inland road would be adequate for the anticipated flows with a dual 7.3m carriageway.

(NB. The only point to this is to illustrate that a dual carriageway with 'standard' lane widths would have a higher capacity than the dual carriageway with slightly narrower lanes.)

Feature	ROAD TYPE				
	Urban Motorway	Urban All-purpose			
	UM	UAP1	UAP2	UAP3	UAP4
General Description	Through route with grade separated junctions, hardshoulders or hardstrips, and motorway restrictions.	High standard single/dual carriageway road carrying predominantly through traffic with limited access.	Good standard single/dual carriageway road with frontage access and more than two side roads per km.	Variable standard road carrying mixed traffic with frontage access, side roads, bus stops and at-grade pedestrian crossings.	Busy high street carrying predominantly local traffic with frontage activity including loading and unloading.
Speed Limit	60mph or less	40 to 60 mph for dual, & generally 40mph for single carriageway	Generally 40 mph	30 mph to 40 mph	30mph
Side Roads	None	0 to 2 per km	more than 2 per km	more than 2 per km	more than 2 per km
Access to roadside development	None. Grade separated for major only.	limited access	access to residential properties	frontage access	unlimited access to houses, shops & businesses
Parking and loading	none	restricted	restricted	unrestricted	unrestricted
Pedestrian crossings	grade separated	mostly grade separated	some at-grade	some at-grade	frequent at-grade
Bus stops	none	in lay-bys	at kerbside	at kerbside	at kerbside

Table 1 Types of Urban roads and the features that distinguish them

		Two-way Single Carriageway- Busiest direction flow (Assumes a 60/40 directional split)								Dual Carriageway				
		Total number of Lanes								Number of Lanes in each direction				
		2				2-3	3	3-4	4	4+	2		3	4
Carriageway width		6.1m	6.75m	7.3m	9.0m	10.0m	12.3m	13.5m	14.6m	18.0m	6.75m	7.3m	11.0m	14.6m
Road type	UM	Not applicable										4000	5600	7200
	UAP1	1020	1320	1590	1860	2010	2550	2800	3050	3300	3350	3600	5200	*
	UAP2	1020	1260	1470	1550	1650	1700	1900	2100	2700	2950	3200	4800	*
	UAP3	900	1110	1300	1530	1620	*	*	*	*	2300	2600	3300	*
	UAP4	750	900	1140	1320	1410	*	*	*	*	*	*	*	*

**Table 2 Capacities of Urban Roads
One-way hourly flows in each direction**

Notes

1. Capacities are in vehicles per hour.
2. $HGV \leq 15\%$
3. (*) Capacities are excluded where the road width is not appropriate for the road type and where there are too few examples to give reliable figures.