
**VOLUME 5 ASSESSMENT AND
PREPARATION OF ROAD
SCHEMES**

**SECTION 1 PREPARATION AND
IMPLEMENTATION**

PART 3

TA 79/99 AMENDMENT NO 1

TRAFFIC CAPACITY OF URBAN ROADS

SUMMARY

Advice Note TA 79/99, published February 1999, was wrongly placed in Section 2 of DMRB Volume 5. All users should arrange for the document TA 79/99 to be inserted in Volume 5, Section 1, Part 3 of DMRB.

References within the document to Section 2, Part 2 should also be corrected accordingly.

INSTRUCTIONS FOR USE

1. Remove Advice Note TA 79/99 from Volume 3 of the DMRB.
2. Amend the volume references on all pages of TA 79/99 to read Volume 5, Section 1, Part 3 of DMRB.
3. Remove existing title page and insert amended title page and Note to Users in front of Contents sheet of TA 79/99.
4. Enter the details of the amendment on the Registration of Amendment sheet, sign and date to confirm that the amendment has been incorporated.

Note: A quarterly index with a full set of Volume Contents Pages is available separately from The Stationery Office Ltd.



THE HIGHWAYS AGENCY



THE SCOTTISH OFFICE DEVELOPMENT DEPARTMENT



THE WELSH OFFICE
Y SWYDDFA GYMREIG



THE DEPARTMENT OF THE ENVIRONMENT FOR
NORTHERN IRELAND

Traffic Capacity of Urban Roads

Summary: Advice Note TA 79/99, published February 1999, was wrongly placed in
Section 2 of DMRB Volume 5.

Note to Users

1. Advice Note TA 79/99 published by the Highways Agency in February 1999 was placed erroneously in DMRB 5.2.2.
2. All users should arrange for the document TA 79/99 to be inserted in Volume 5, Section 1, Part 3 of DMRB. References within the document to Section 2, Part 2 should also be corrected accordingly.

WITHDRAWN

REGISTRATION OF AMENDMENTS

| Amend No | Page No | Signature & Date of incorporation of amendments | Amend No | Page No | Signature & Date of incorporation of amendments |
|-------------|---------|---|-------------|---------|---|
| | | | | | |

REGISTRATION OF AMENDMENTS

| Amend No | Page No | Signature & Date of incorporation of amendments | Amend No | Page No | Signature & Date of incorporation of amendments |
|-------------|---------|---|-------------|---------|---|
| | | | | | |

**VOLUME 5 ASSESSMENT AND
PREPARATION OF ROAD
SCHEMES**

**SECTION 2 PREPARATION AND
IMPLEMENTATION**

PART 2

TA 79/99

TRAFFIC CAPACITY OF URBAN ROADS

Contents

Chapter

1. Introduction
2. General Principles
3. Determination of Urban Road Capacity
4. Assessment Procedure
5. Enquiries

1. INTRODUCTION

General

1.1 Traffic flows on urban trunk roads in Greater and Outer London has been analysed to assess the capacities that can be achieved for different road types and widths. From this information the main features that affect capacity have been defined and the results presented in tabular form.

1.2 This document supersedes section 5 and Appendix 2 of TD 20/85 "Traffic Flows and Carriageway Width Assessment". TD 20/85 is now entirely superseded by both this document and TA 46/97. TD 20/85 is hereby withdrawn.

1.3 For **rural** roads reference should be made to TA 46/97 "Traffic Flow Ranges for Use in the Assessment of New Rural Roads".

Scope

1.4 This Advice Note gives the maximum hourly vehicle capacity for various types of Urban Trunk Road. All capacities quoted are for traffic compositions including up to 15% heavy vehicles; corrections are provided for higher proportions.

1.5 The capacities may be used as starting points in the design and assessment of new urban trunk road links. They may also be used as a guide to the capacity of existing urban roads, and for assessing the likely effect on capacity of proposed changes to specific road features including carriageway width.

1.6 It should be borne in mind that the assessment of carriageway width is not based solely on peak hour travel demand. Cost and environmental impact should also be taken into account. A judgement may therefore have to be made between adopting reduced width of carriageway, weighed against any adverse effects incurred by providing for a higher level of demand.

Implementation

1.7 This Advice Note should be used forthwith for all schemes for the construction of urban trunk roads including improvements, with the approval of the Overseeing Organisation. The exceptions are schemes currently being prepared where this would result in significant additional expense or delay progress.

Definitions

1.8 **Urban Motorway**
A motorway with a speed limit of 60 mph or less within a built up area.

1.9 **Urban All-Purpose Road (UAP)**
An all-purpose road within a built up area, either a single carriageway with a speed limit of 40 mph or less or a dual carriageway with a speed limit of 60 mph or less.

1.10 **Capacity**
For the purposes of this Advice Note, capacity is defined as the maximum sustainable flow of traffic passing in 1 hour, under favourable road and traffic conditions.

2. GENERAL PRINCIPLES

Application of Capacity values

2.1 The guidance in this document should be used flexibly. In some circumstances, the use of a reduced width of carriageway will result in significant savings or environmental benefits, which outweigh the disbenefits of congestion during peak periods.

2.2 The capacity of urban roads can be affected by a wide range of factors that may not always be accurately predicted by the road features identified. For this reason capacity flows may be up to 10% more or less than the values given in this document.

Features Affecting Capacity

2.3 The potential capacity of a link will not be reached if either the capacity of junctions along the link or the capacity of the adjoining network is lower than the link in question. The flow on an urban road may also be affected by turning movements restricting the mainline capacity. Such constraints should be identified at an early stage.

2.4 Urban roads normally have higher flows in the morning and evening peaks than at other times of day. Improving features that affect the capacity would help prevent congestion during these periods.

2.5 The flows given in the tables are the maximum that typical urban roads can carry consistently in an hour. The principal factors that may affect flow levels on urban roads are given in Table 1.

For motorways the prime determinant is the carriageway width, but for all-purpose roads flow is also affected by the speed limit, the frequency of side roads, the degree of parking and loading, the frequency of at grade pedestrian crossings, bus stops, and accesses.

2.6 The capacity of the lower width roads will be significantly reduced by parking and temporary width restrictions caused by such activities as maintenance and Statutory Undertakers' Works. The lowest widths are unlikely to be suitable for bus routes or for significant volumes of heavy goods vehicles.

2.7 Roads in Category UAP3 and UAP4 may carry high proportions of local traffic, resulting in an increase in turning movements at junctions and accesses.

2.8 Capacity will also be affected by prevailing weather and night conditions. The capacities shown are for "favourable" daylight conditions.

| 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

3. DETERMINATION OF URBAN ROAD CAPACITY

3.1 Table 1 sets out the types of Urban Roads and the features that distinguish between them and affect their traffic capacity. Tables 2 & 3 give the flow capacity for each road type described in Table 1.

3.2 Table 4 gives the adjustments when the proportion of heavy vehicles in a one way flow exceeds 15%. A heavy vehicle is defined in this context as OGV1, OGV2 or Buses and Coaches as given in the COBA Manual (DMRB 13.1 Part 4, Chapter 8).

3.3 The flows for road type UM in Table 2 apply to urban motorways where junctions are closely spaced giving weaving lengths of less than 1 kilometre. Urban motorways with layout and junction spacing similar to rural motorways can carry higher flows and TA46/97 "Traffic Flow Ranges for Use in the Assessment of New Rural Roads" will be more applicable.

3.4 Flows for single carriageways are based upon a 60/40 directional split in the flow. The one-way flows shown in Table 2 represent the busiest flow 60% figure.

3.5 The capacities shown apply to gradients of up to 5-6%. Special consideration should be made for steeper gradients, which would reduce capacity.

3.6 On-road parking reduces the effective road width and disrupts flow, e.g. where parking restrictions are not applied on road type UAP2 the flows are likely to be similar to UAP3 where unrestricted parking applies, see Table 1, Similarly effective parking restrictions can lead to higher flows.

| | | 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

- Capacities are in vehicles per hour.
- HGV ≤ 15%
- (*) 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.

| Carriageway width | | 6.1m | 6.75m | 7.3m | 9.0m | 10.0m | 11.0m |
|-------------------|------|---------|-------|------|-----------|-------|---------|
| | | 2 lanes | | | 2-3 lanes | | 3 lanes |
| Road type | UAP1 | | 2950 | 3250 | 3950 | 4450 | 4800 |
| | UAP2 | 1800 | 2000 | 2200 | 2850 | 3250 | 3550 |

Table 3 Capacities of Urban One-Way roads, hourly flows

Notes

- Capacities are in vehicles per hour.
- Capacities for one way road types UAP1 at 6.1m width, UAP3 and UAP4 are not shown as there are too few examples to give reliable capacities.
- Capacities for one-way roads (e.g. UAP2 at 7.3m and 11.0m carriageway widths) are generally less than capacities of dual carriageways in one direction shown in Table 2. The reason is that one-way roads are often of short lengths and form part of a gyratory system between junctions, necessitating high proportion of vehicle weaving and stopping, thereby decreasing the capacities.

| Heavy Vehicle Content | Total reduction in flow level (vehs/hr) | | |
|-----------------------|---|--|--|
| | UM and UAP dual carriageway road | Single carriageway UAP road having width of 10m or wider | Single carriageway UAP road having width less than 10m |
| | per lane | per carriageway | per carriageway |
| 15 - 20% | 100 | 100 | 150 |
| 20 - 25% | 150 | 150 | 225 |

Table 4 Reduction in flow due to Heavy Vehicle Content

4. ASSESSMENT PROCEDURE

4.1 The capacities given in Tables 2 - 4 provide a guide for the assessment of an appropriate carriageway width and standard. They may be applied to both the design of new urban roads and to the improvement of existing roads. The capacities are intended to help designers make a judgement as to which carriageway standard is likely to provide an acceptable level of service within an urban context when operating close to capacity. The capacities apply to links and take no account of the effects of junctions.

4.2 For improvement options to existing roads the designer should make an appraisal of each of the road features and thereby determine the most appropriate road type given in Table 1. An assessment may then be made of the expected capacity using Tables 2 – 4. It should be calibrated with observed traffic flows to validate the appraisal, taking account of any network constraints that may limit a desirable flow. The effect of link capacity on changes to specific features should then be examined.

4.3 Observations of existing traffic flows should be undertaken by manual classified counts and account taken of hourly, daily and seasonal variations. Reference to continuous automatic traffic count data if available would assist in identifying periods of maximum flow levels and whether traffic levels are operating close to capacity.

4.4 For the design of new urban roads, the carriageway standard options presented herein provide a guide to the desirable standard of carriageway provision given the features of the road and expected traffic levels. They should not be used alone as a design tool, because factors other than peak hour flows should also be considered. They should be regarded as a starting point for more detailed analysis of traffic, economic and environmental aspects.

4.5 For the estimation of future traffic demand levels for urban roads where changes to travel patterns over a wide area are likely to occur, reference should be made to “Traffic Appraisal in Urban Areas” (DMRB Volume 12 Section 2 Part 1).

5. ENQUIRIES

All technical enquiries or comments on this document should be sent in writing as appropriate to:

Traffic, Safety and Environment Divisional Director
Highways Agency
St Christopher House
Southwark Street
London
SE1 0TE

G CLARKE
Traffic Safety and Environmental
Divisional Director

The Deputy Chief Engineer
The Scottish Office Development Department
National Roads Directorate
Victoria Quay
Edinburgh EH6 6QQ

J HOWISON
Deputy Chief Engineer

Head of Roads Major Projects Division
Welsh Office
Highways Directorate
Cathays Park
Cardiff
CF1 3NQ

B H HAWKER
Head of Roads
Major Projects Division

Assistant Technical Director
Department of the Environment for
Northern Ireland
Roads Service
Clarence Court
10-18 Adelaide Street
Belfast BT2 8GB

DO'HAGAN
Assistant Technical Director