

BRIEFING MEMO

AC TRANSIT DISTRICT
Board of Directors
Executive Summary

GM Memo No. 05-062
Meeting Date: March 2, 2005

Committees:

- | | | | |
|----------------------------|-------------------------------------|------------------------------|--------------------------|
| Planning Committee | <input checked="" type="checkbox"/> | Finance Committee | <input type="checkbox"/> |
| External Affairs Committee | <input type="checkbox"/> | Operations Committee | <input type="checkbox"/> |
| Board of Directors | <input type="checkbox"/> | Financing Corporation | <input type="checkbox"/> |

SUBJECT:

Receive report on Part 1 of the Transit Capacity and Quality of Service Manual.

RECOMMENDED ACTION:

- Information Only Briefing Item Recommended Motion

Fiscal Impact:

None, background only.

Background/Discussion:

In February, District staff presented a timeline to provide Chapter by Chapter assessments of the new Second Edition of the Transit Capacity and Quality of Service Manual (2003), TCRP Report 100. Even though staff anticipated beginning the review with Part 3: Service Quality, this report begins with a review of Part 1: Introductions and Concepts.

BOARD ACTION: **Approved as Recommended** [] **Other** []
 Approved with Modification(s) []

[To be filled in by District Secretary after Board/Committee Meeting]

The above order was passed on _____, 2005.

Rose Martinez, District Secretary
By _____

This assessment covers the introduction and overview of service quality and capacity concepts, central issues in any transit service design. Quality of Service deals with basic issues of service frequency, coverage and speed. Capacity by mode deals with issues of the passenger carrying capacity of each mode, whereas the ability to handle passenger loads varies substantially.

Quality of Service – The Manual rates six levels of service, ranked from A through F, a scale which is similar to the Highway Capacity Manual. A is the highest level of service, and F is the lowest. The Fixed Route Service Measures are:

	Transit Stop	Route Segment	System
Availability	Frequency	Hours of Service	Service Coverage
Comfort & Passenger Convenience	Load	Reliability	Transit-Auto Travel Time

Part 1 also outlines the relationships between capacity, speed, and patronage. Examples of these relationships include:

- *Increased Stop Spacing*, which decreases travel time and could increase patronage and reliability, but could also reduce convenience.
- *Low Floor Buses*, which have much faster loading and are convenient to curb loading, but which have fewer seats.
- *Traffic Signal Priority*, which results in faster transit trip times and fewer delays.
- *Proof of Payment Fare Collection*, which makes boarding faster and results in faster trip times and fewer delays.
- *Increased Service Frequencies*, which provide better service to passengers and could result in faster trip times for both passengers and vehicles. However, there can also be diminishing returns as transit trips approach the capacity of the roadway or the guideway, leading to bunching and reliability issues.

The Manual analyzes ridership increases based on service frequency improvements, and notes that the best gains occur when service is increased from 30 minutes to a more frequent level, and in middle and upper income areas, and where distances traveled are short enough to encourage walking.

The Manual also identifies elasticities related to reliability, coverage and fare changes. Fare changes have been the most widely documented, with an average fare elasticity of about 0.40. Changes relating to reliability and coverage are not as well documented, nor as universal in outcome as fare changes.

As an example, service coverage expansions can result in elasticities of anywhere from 0.60 to 1.0 – meaning that the service extensions can generate anywhere from 60 to 100 percent of the ridership per unit that the existing system generates. The effects of reliability degradations are even more anecdotal, but all indicating that bad service negatively affects passenger loads.

At AC Transit, the Service Development Department carefully weighs the relationship between speed, frequency and service cost. In general, staff tries to increase speed to encourage additional patronage, which in turn justifies more frequency that can be partially paid for through faster cycle times.

Capacity – Capacity is also affected by the actions of speed and reliability. The Manual notes that speed, capacity and patronage are all linked. In further reports to the Board, staff will expand on these capacity concepts. Of particular note from the Manual's overview section is the comment that the capacity of a facility is a given in vehicle terms, but is flexible in passengers carried. For example, a freeway lane has a fixed *vehicle capacity* of about 2,300 vehicles per hour. However, its *passenger* capacity can range from 2,300 passengers per hour (if every vehicle is an automobile with one passenger) or many more passengers, assuming vehicles with higher passenger capacity. In this example, 65 buses could carry all 2,300 passengers.

Transit capacity is also detailed and the factors that influence transit capacity are listed. These factors include:

- ◆ Vehicle characteristics: the type and size of the vehicle and its speed and dwell characteristics
- ◆ Right of way issues influencing vehicle speed and delay
- ◆ Stop characteristics influencing dwell times and passenger loading time
- ◆ Street and operating characteristics associated with various modes

As would be expected, the higher capital cost systems have developed into higher capacity systems because they are able to process more passengers more quickly in larger and faster vehicles than the lower capital costs systems. The greatest capacity is achieved with a heavy rail system, followed by light rail, commuter rail, and bus rapid transit systems. Urban bus systems are evaluated as the lowest capacity transit mode.

The next assessment of the Transit Capacity and Quality of Service Manual will explore Part 3: Quality of Service.

GM Memo No. 05-062

Subject: Part 1 of the Transit Capacity and Quality of Service Manual

Date: March 2, 2005

Page 4 of 4

Prior Relevant Board Actions/Policies:

GM 04-361: Overview of TCRP Manual

GM 05-022: Review Timeline for Review of TCRP Manual

Attachments: None

Approved by: Rick Fernandez, General Manager
Nancy Skowbo, Deputy General Manager, Service Development

Prepared by: Anthony Bruzzone, Manager Service and Operations Planning

Date Prepared: February 25, 2005