

STAFF REPORT

SUBJECT: 101 in Motion Project

MEETING DATE: October 21, 2004

AGENDA ITEM: 14

RECOMMENDATION:

- A. Receive status report on 101 in Motion project.
- B. Receive presentation on how roadway capacity and traffic Levels of Service are defined.

SUMMARY

The 8-9 alternative solution packages presented to the board last month are being presented by staff and members of the consultant team to city councils and a number of community groups. After the Steering Committee has considered public input, they will approve the final 8-9 solution packages which will then be subjected to a more detailed evaluation against a set of performance criteria. This report also includes information requested by the board explaining how freeway capacity is determined and how it relates to Level of Service, traffic speeds and operations.

DISCUSSION:

Status report on 101 In Motion project

During this phase of the 101 in Motion project, a set of 8 alternative solution packages are being discussed with the local elected bodies and the public. As you recall from the September meeting an array of alternatives were developed jointly by the Technical Advisory Group and the Stakeholder Advisory Committee. These eight alternatives included: adding standard lanes throughout the corridor, adding a standard lane south of Milpas and auxiliary lanes to the existing 6 lane section, creating a reversible toll lane south of Milpas, paving the shoulders for either a High Occupancy Vehicle (HOV) lane or busway, expanded bus services, dedicated busway, commuter rail combined with an HOV lane, commuter rail combined with interchange and ramp improvements and auxiliary lanes. All of the packages include some level or operational improvements

such as ramp metering, and demand management features such as variable parking rates, flex work, reduction in bus/van pool fares, and individualized marketing.

An expanded outreach to stakeholders and the public will help ensure that an appropriate level of public input is received prior to selecting the final 8-9 alternative packages for further evaluation. It is expected that the Steering Committee will review the public input received at its November 3 meeting and that the committee will approve the 8-9 packages to be evaluated.

Currently the outreach program is proceeding well. The list of organizations that have been given presentations already include: the cities of Santa Barbara and Carpinteria, Goleta Chamber of Commerce, COAST and Montecito Association board among others. Approximately 15 other groups have been contacted to get on their meeting calendar. In addition an e-newsletter has been sent to the 101 In Motion mailing list, and a fact sheet describing the alternative packages along with a feedback form have been posted on the project website.

The schedule for project will need to be extended by about six weeks to allow enough time to complete the community outreach activities during the months of October into early November. An effort will be made to recapture some of this extra time without impacting the effectiveness and quality of the remaining project effort. Overall the schedule for *101 In Motion* (IM) Project is being extended by six weeks to permit ample public outreach before selection of the 8-9 alternative packages for screening by the SC. As indicated previously the public outreach expenditures to date are exceeding the budgeted amount due to added workshops and other elements. In an effort to keep further contract costs from exceeding the budget, some tasks that were originally assigned to the consulting team have been undertaken by staff. In addition, the outreach consulting team is being reorganized to help reduce costs while ensuring that goals for the public outreach effort are met. An approach to completing the project within budget by refocusing the outreach efforts and/or by augmenting the budget is under review by SBCAG staff.

Presentation on how roadway capacity and traffic Levels of Service are defined

At the September board meeting various board members asked about how traffic levels of service are defined. Staff has prepared a brief presentation on this subject to familiarize the board with this rather technical subject.

What is Capacity?

It is standard industry practice to assign a calculated estimate of the volume of traffic a lane can accommodate for purposes of roadway planning. This nominal capacity represents the limit at which additional increments of traffic will begin to disrupt traffic flow and reduce speeds. However, the actual number of cars on a roadway can be greater than this nominal capacity based on driver behavior, a variety of roadway configurations, geometry, and operating conditions. Capacity, as defined by the Highway Capacity Manual, does not represent an “absolute” cap on vehicle throughput. In fact, traffic volumes in excess of the HCM’s nominal (“ideal” lane capacity of 2,350-2,400 passenger cars per lane per mile have been observed on many freeways around the country.

For Highway 101, SBCAG uses a freeway lane nominal capacity of 1,900 vehicles per lane per hour which is calculated based on an evaluation fleet composition, physical roadway and system characteristics and driver population. This volume represents the near- or at-capacity condition when traffic flow and travel speed becomes sensitive to additional traffic or flow disruptions/turbulence. The attached bar chart (Exhibit 2) shows Year 2000 directional peak hour traffic volumes at each segment of 101 through the South Coast. The red horizontal line reflects the nominal capacity of 1900 vehicles per hour per lane. The chart shows that traffic volumes exceed the nominal capacity in some locations along both the 4-and 6-lane segments of 101. These over-capacity locations are where travel speeds are reduced often to stop and go traffic conditions. Thus, it is possible for actual traffic volumes to exceed the estimated, or nominal, capacity of the freeway, however, under degraded traffic conditions.

Factors that affect highway capacity include:

1) Driving Characteristics: The time gap between front bumper of 1st vehicle to front bumper of the following vehicle has diminished as drivers are willing to drive faster under denser traffic conditions than in the past. In fact, holding all else equal – there has been a 33 percent increase in freeway capacity over the last 20 years as a result of changing driving characteristics alone. People drive faster and in closer proximity to each other than ever before.

2) Fleet composition: Presence of large trucks (e.g., 5+axle single trailers – multi-trailer trucks), buses, mobile homes and recreational vehicles reduce highway capacity given the greater road space these vehicles require in addition to the greater spacing afforded to them by drivers of smaller passenger vehicles. The grade at Ortega Hill on Highway 101 typically results in slower traffic due to combination of a hill, short on ramp, and slower speeds of larger vehicles.

3) Physical roadway and system characteristics: Width of travel lanes, interchange spacing, shoulders, length of on-ramps, grades and left hand on and off ramps all impact the behavior of the driver who varies speed in accordance with perceived safety. Significant sections of Highway 101 in the Montecito and Carpinteria areas have short spacing of interchanges, short on-ramps, narrow shoulders, and more limited sight distances, all of which reduce roadway capacity.

4) Driver population: Non-recurrent users of the freeway (e.g., visiting tourists) have been observed to reduce capacity by as much as 15 percent on a given stretch of freeway that affords motorists with scenic vistas or other visual distractions.

How Does Capacity Relate to Vehicle Speed?

Empirical research indicates that vehicle speeds now do not significantly diminish until vehicle flow is near or at-capacity conditions. We are driving faster, in closer proximity to one another. But as the density of traffic increases approaching the capacity, the potential for a significant breakdown in traffic flow and reduction in speeds becomes greater with situations like the sudden lane changes, presence of roadside distractions, a platoon (group) of vehicles entering the freeway from an on ramp at the same time, among other factors.

What is Level of Service (LOS)?

Roadway LOS is a **qualitative** measure describing operational conditions within a traffic stream as perceived by motorists and passengers. An LOS definition generally describes these conditions in terms of such factors as speed, and travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. As such, freeway LOS is determined by vehicle density – expressed as passenger cars per lane per mile. As noted in the attached exhibit, LOS grades range from “A” to “F” with “F” representing the highest traffic density and stop and go traffic conditions.

How Does LOS Relate to Capacity?

For each of the LOS grades described in the LOS for Freeways figure, there are volume-to-capacity ratio ranges (a quantitative measure) that correspond to each grade (a qualitative measure) as follows:

<u>Qualitative</u> Measure		A	B	C	D	E	F
<u>Quantitative</u> Measure	Maximum v/c	30	.50	.71	.89	1.00	1.01+

These volume-to-capacity ranges and corresponding LOS grades establishes an approximate relationship between LOS and capacity.

Why Did SBCAG Choose LOS D as the Regional LOS Standard?

Section 65089(b) (1) (B) of the California Government Code requires Congestion Management Agencies (CMA) such as SBCAG to establish traffic LOS standards for the designated Congestion Management Program roadway system. This section states:

In no case shall the LOS standards established be below LOS E, or the current level, whichever is farthest from LOS A, except where a segment or intersection had been designated as deficient and a deficiency plan has been adopted pursuant to Section 65089.4

Based on this provision and existing congestion levels at the time the Congestion Management Program was established (1992), SBCAG’s Technical Transportation Advisory Committee (TTAC) collaboratively selected the CMP standard of LOS D. Facilities (intersections or highway segments) monitored as operating below this standard (i.e. operating at- or near-capacity (LOS E) or over-capacity (LOS F) would trigger the need for development of a CMP deficiency plan for the location in question.

This LOS standard recognizes that the infrastructure in place is being heavily used (approaching capacity) and that planning to reduce travel demand, divert it to other choices, or increase roadway supply needs to start to avoid serious congestion.

On a system-wide basis, this threshold for Highway 101 in the south coast was exceeded in 1999. However, individual segments of Highway 101, such as the area between Ortega Hill and Sheffield, and between Milpas and Hot Springs/Cabrillo exceeded LOS D years earlier.

How Does LOS Relate to Vehicle Speed?

As indicated in the LOS for Freeways figure, vehicle speeds are fairly insensitive to LOS with average speeds remaining near free flow speed for LOS A through D conditions. As volumes approach capacity (LOS E), speeds drop but still remain at 50-55 mph. It is

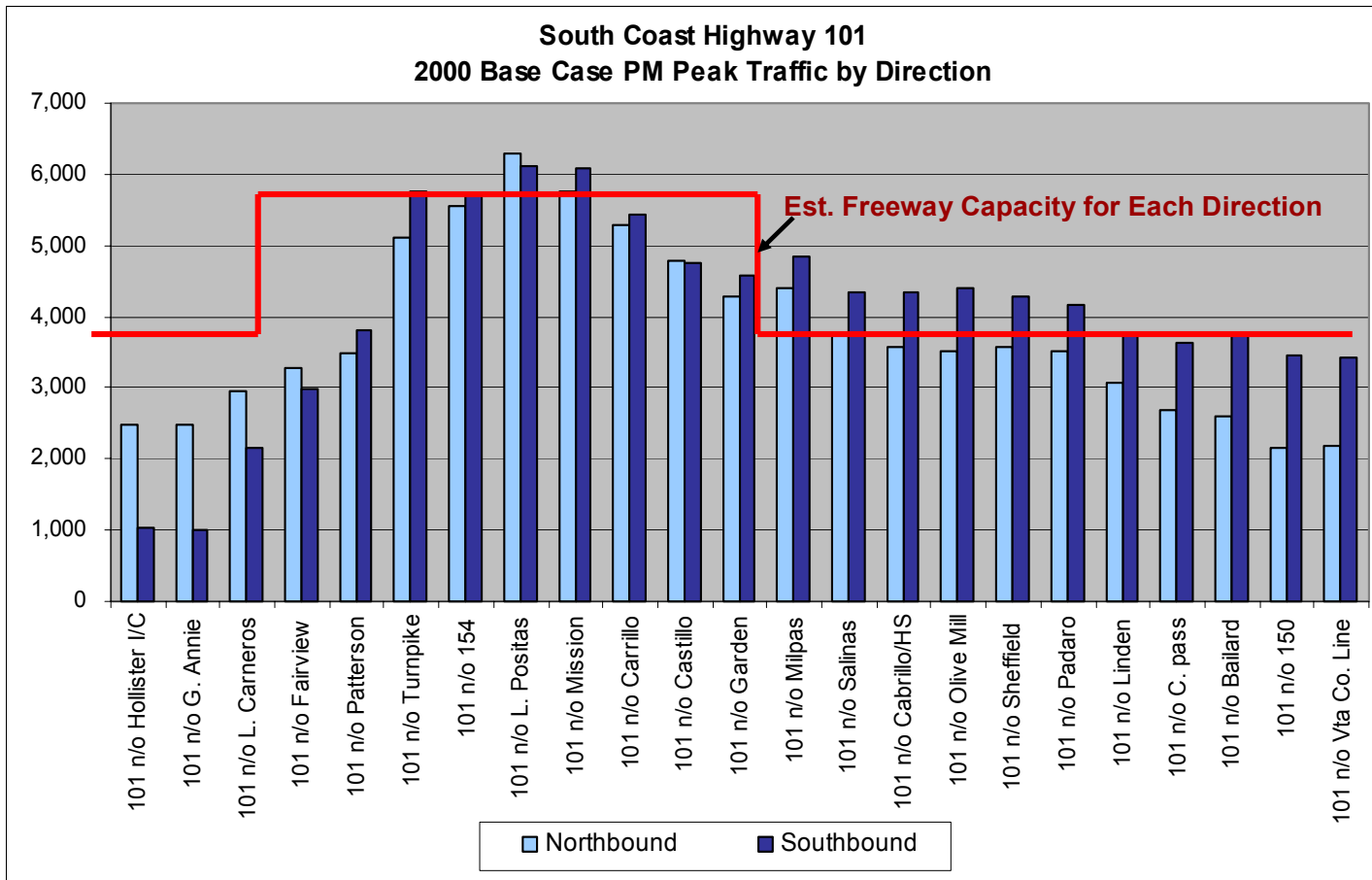
not until capacity is exceeded (i.e., volume-to-capacity ratio exceeding 1.00) that vehicle speeds significantly and abruptly decrease.

The HCM does not attempt to characterize vehicle speeds when volume exceeds capacity other than as “unstable”. Generally speaking, average freeway speeds equal to or less than 35 mph would indicate unstable or LOS F conditions. To verify/validate the LOS E and F results documented as part of the Highway 101 Deficiency Plan (SBCAG, June 2002), vehicle speed field measurement surveys were conducted using instrumented vehicles (tachometer runs). These surveys confirm that LOS F conditions do occur within both the AM and PM peak hour as indicated by the percentage of time driving equal to or less than 35 mph (See attached figure).

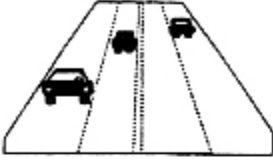
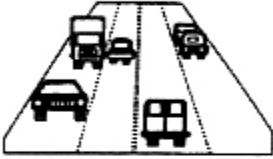




COMMITTEE REVIEW:

None

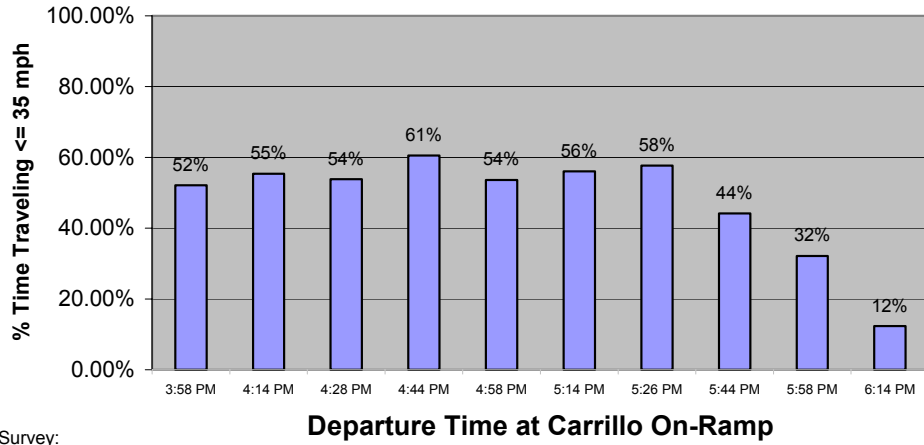
STAFF CONTACT: Jim Kemp, Michael Powers, Jim Damkowitz



LEVELS OF SERVICE (LOS) FOR FREEWAY SEGMENTS

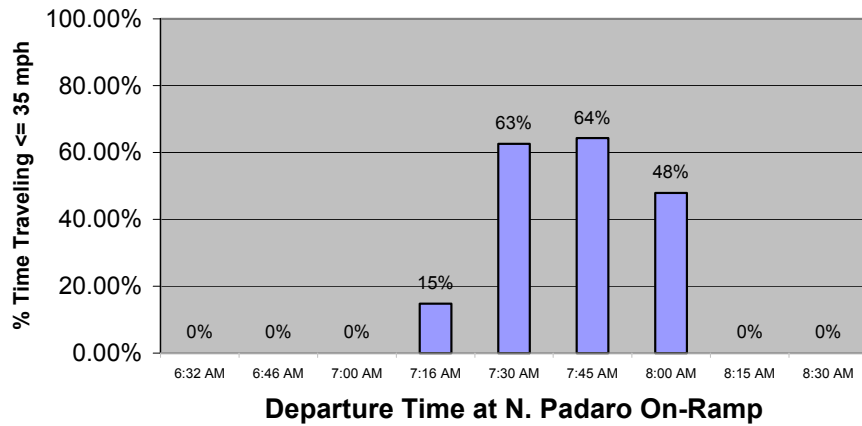
Level of Service	Flow Conditions	Technical Descriptions			
		Operating Speed	Density	Delay	
A		Represents free flow. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	65	0 - 11	None
B		Within the range of free flow. The ability to maneuver is only slightly restricted, and the level of physical and psychological comfort provided to drivers is still high.	65	12 - 18	None
C		Provides for flow with speeds still at or near the free flow speed. Freedom to maneuver is noticeably restricted and lane changes require more vigilance.	64	19 - 26	None
D		Speeds begin to decline slightly with increasing flows. Freedom to maneuver is more noticeably restricted.	60	27 - 35	Minimal
E		Represents operating conditions at or near capacity. Little room to maneuver at speeds that still exceed 50 mph. Maneuverability is extremely limited and the level of physical and psychological comfort afforded the driver is very poor.	52	36 - 45	Minimal
F		Defined as forced or breakdown flow. Vehicles operate in a stop and go cyclic fashion.	< 35	46 +	Considerable

**Route 101 PM Southbound Travel Delay
Carrillo - N. Padaro Lane**



Survey:

**14.D Route 101 AM Northbound Travel Delay
N. Padaro Lane - Carrillo Blvd**



Survey: 12/12/00