

**DIRECT ACCESS RAMPS / LOCAL
CIRCULATION SYSTEM IMPACT STUDY
TECHNICAL REPORT NO. 3
TRAFFIC ANALYSIS
METHODOLOGIES AND STANDARDS**

Interstate 5 North Coast Corridor Project

SAN DIEGO COUNTY, CALIFORNIA
DISTRICT 11-SD-5 (PM R28.4/R55.4)
EA 235800 (P ID 11-000-0159)

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**DIRECT ACCESS RAMPS/ LOCAL
CIRCULATION SYSTEM IMPACT STUDY**

I-5 NORTH COAST HOV/ MANAGED LANES PROJECT

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Draft For Review and Comment

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Technical Report No. 3

Traffic Analysis Methodologies and Standards

1.0 Introduction

The I-5 Direct Access Ramps/Local Circulation System Impact Study will identify and analyze local traffic impacts associated with implementation of the direct access ramps (DAR) at a variety of locations along the North I-5 Freeway. While the exact locations are still under review, direct access ramps have been proposed for study at the following locations:

- Oceanside Boulevard
- Cannon Road
- Manchester Avenue
- Lusk Boulevard
- Voigt Drive

This technical report (No. 3) has been prepared to accomplish the following purposes:

1. Provide and document a recommended set of threshold criteria for the identification of significant traffic impacts.
2. Document the recommended analysis approach for purposes of identifying the local circulation system traffic impacts with implementations of the direct access ramps.

2.0 Congestion Management Program (CMP) Methodologies and Standards

As stated in the Work Program developed for the I-5 Direct Access Ramp Local Circulation System Impact Study, a key objective is to develop a uniform set of methodologies and standards to be utilized in the traffic impact assessment. To achieve this goal the project team is recommending the use of the procedures detailed in Appendix D (Traffic Impact Studies Guidelines) of the 2002 Congestion Management Program Update, dated January, 2003. The guidelines were prepared under the direction of the San Diego Traffic Engineers' Council (SANTEC) and the Institute of Transportation Engineers (ITE – California Border Section).

As stated in the guidelines, the purpose of a traffic impact study is to forecast, describe and analyze the traffic and transit effects a development will have on the existing and future circulation infrastructure. In this particular application the subject of the study is not a traditional development project but rather the potential implementation of multiple direct access ramps (DAR) along the north coast section of the I-5 corridor. The

construction of direct access ramp facilities will have the effect of altering future traffic patterns in the immediate vicinity of the proposed interchange locations, thus creating the potential for traffic impacts. The following sections summarize key aspects of the recommended traffic methodologies and threshold standards to be utilized in this study. As indicated above, the recommended approach is consistent with the traffic impact study guidelines provided in Appendix D of the SANDAG CMP.

3.0 Traffic Impact Assessment Methodologies

The methodology guidelines recommended for application to this project have been developed to specifically address the impacts associated the implementation of the direct access ramps and follow the outline developed by the CMP guidelines.

Need for a Study

The geographic area examined in the traffic impact assessment will include all local roadway segments and intersections where the proposed project will add 50 or more peak-hour trips in either direction to the existing roadway traffic. The Area of Influence has been previously defined following this general guideline and input from the key local jurisdiction staff representing each of the affected communities. (See Technical Report No. 1; Definition of Area of Influence)

Scenarios to be Studied

The traffic impact assessment will include a detailed analysis of existing conditions, as well as analysis of long-range traffic impacts under forecasted Year 2030 conditions. The Year 2030 analysis will be conducted based on the change in traffic volumes resulting from the implementation of the direct access ramps as compared to a “no project” condition.

Analysis Methodology and Software Package

The local area traffic impact assessment of the direct access ramps and associated operational assessments will be conducted using the SYNCHRO (v6.0) network simulation model. SYNCHRO is particularly useful in modeling the flow of traffic through a network of intersections, while accounting for the impacts of adjacent intersection operations. This is particularly beneficial in analyzing closely spaced signalized intersections where traffic flow is significantly affected by signal coordination and/or vehicle spillback from the adjacent intersections. Since these characteristics are prevalent at the I-5 interchange intersections as well as the adjacent nearby surface street intersections, the SYNCHRO software will be appropriate for this study.

A SYNCHRO network model will be developed for each of the direct access ramp locations and adjacent study areas. Model inputs will include specifications and dimensions of the roadway links comprising the network, intersection geometrics, peak hour traffic volumes and flow characteristics, and signal control parameters. The

SYNCHRO model will be replicated for each study alternative, with appropriate modifications to reflect any changes in traffic volumes, roadway geometrics, and traffic control parameters.

Measures of effectiveness will be derived from the SYNCHRO software by measuring and averaging travel characteristics of individual simulated vehicles as they travel through the roadway network.

One such measure of effectiveness that will be a focus of the analyses will be the change in total intersection control delay. The average intersection control delay by approach will be used to determine an equivalent average control delay by intersection by calculating a weighted average delay of all links approaching the intersection. This will produce a calculated result comparable to the average control delay used to define intersection Level of Service in the Highway Capacity Manual (HCM 2000).

Forecast Traffic Volumes

The year 2030 has been established as the forecast year consistent with the overall I-5 North Coast Project. The SANDAG Series 10 Transportation Model will be used to develop traffic forecasts for the study. The project team will work closely with SANDAG, Caltrans, and the consulting team conducting the Managed Lanes/Value Pricing Study to ensure a consistent and accurate set of forecast traffic volumes.

4.0 Impact Significance Threshold Standards

The recommended Level of Service (LOS) standard for this project is “LOS D.” If a facility is projected to exceed LOS D under the build (with direct access ramps) condition, the threshold guidelines presented in **Table 4.1** will be applied. For example, if the implementation of a direct access ramps at a particular location causes the values in this table to be exceeded, a significant project impact would be identified and feasible mitigation measures would be investigated/evaluated.

Example mitigation measures to be considered will include enhanced intersection geometric and/or signal phasing modifications. The *CMP Toolbox of Mitigation Strategies* and any adopted deficiency plans in the study area will also be consulted, as appropriate.

**Table 4.1
Measure of Significant Project Traffic Impacts**

Level of Service with Project*	Allowable Change due to Project Impact**					
	Freeways		Roadway Segments		Intersections	Ramp*** Metering
	V/C	Speed (mph)	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
D, E, & F (or ramp meter delays above 15 min.)	0.01	1	0.02	1	2	2

Notes:

* All level of service measurements are based upon HCM procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table D-2 or a similar LOS chart for each jurisdiction). The acceptable LOS for freeways, roadways, and intersections is generally “D” (“C” for undeveloped or not densely developed locations per jurisdiction definitions). For metered freeway ramps, LOS does not apply. However, ramp meter delays above 15 minutes are considered excessive.

** If a proposed project’s traffic causes the values shown in the table to be exceeded, the impacts are determined to be significant. These impact changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible mitigation (within the Traffic Impact Study report) that will maintain the traffic facility at an acceptable LOS. If the LOS with the proposed project becomes unacceptable (see above * note), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, the project applicant shall be responsible for mitigating significant impact changes.

KEY: V/C = Volume to Capacity ratio
 Speed = Speed measured in miles per hour
 Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters
 LOS = Level of Service

