

APPENDIX F

Signal Warrant Analyses

The following discussion details the signal warrant analyses for San Jacinto Avenue at Redlands Avenue and at D Street, Bonnie Drive/southbound I-215 ramps, SR-74/northbound I-215 off-ramp, and SR-74/Sherman Road intersections as per the *California Manual on Uniform Traffic Control Devices (MUTCD)*, Chapter 4C - Traffic Control Signal Needs Studies. All five intersections satisfy Warrant 3, peak-hour, which is applied where traffic conditions are such that for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. The warrant conditions are described in the *MUTCD* as follows:

Standard:

The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following categories are met:

Category 1: If all of the following conditions exist for the same one hour (any four consecutive 15-minute periods) of an average day:

- 1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: four vehicle-hours for a one-lane approach; of five vehicle-hours for a two-lane approach, and*
- 2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and*
- 3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.*

Category 2: The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume-minor-street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve for the existing combination of approach lanes.

San Jacinto Avenue at Redlands Avenue

Based on 2012 future conditions without the project, westbound San Jacinto Avenue approach at Redlands Avenue would carry approximately 840 vehicles and experience over 57 vehicle-hours of delay during the PM analysis hour. The total entering volume during this same hour would equal to approximately 2,700 vehicles. Therefore, the intersection would meet Category 1 conditions 1, 2, and 3, and warrant a traffic signal.

San Jacinto Avenue at D Street

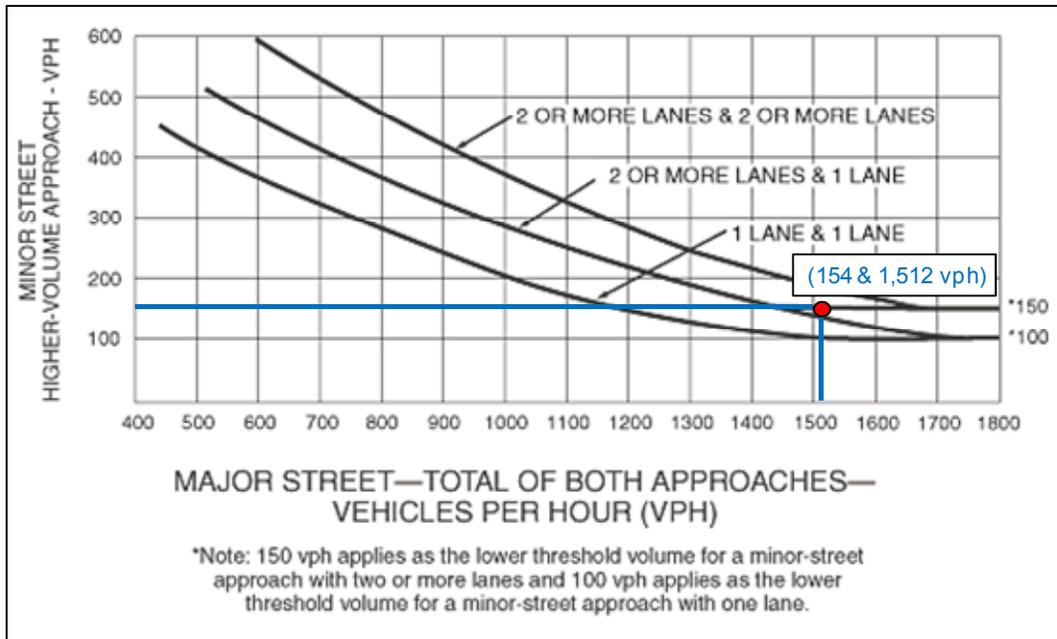
Based on 2012 future conditions without the project, San Jacinto Avenue's eastbound approach at D Street would carry approximately 365 vehicles and experience over six vehicle-hours of delay during the PM analysis hour. Approximately 1,735 vehicles would be serviced through the intersection during this same hour. Therefore, the intersection would meet Category 1 conditions 1, 2, and 3, and warrant a traffic signal.

Bonnie Drive at Southbound I-215 Ramps

Based on 2012 future conditions without the project, Bonnie Drive's eastbound approach at southbound I-215 ramps would carry approximately 250 vehicles and experience roughly eleven vehicle-hours of delay during the PM analysis hour. The total entering volume during this same hour would equal to approximately 1,580 vehicles. Therefore, the intersection would meet Category 1 conditions 1, 2, and 3, and warrant the installation of a new traffic signal.

Northbound I-215 Off-Ramp at SR-74

This intersection does not meet the criteria for Category 1 as the stopped-time delay experienced on I-215 off-ramp is less than the required four vehicle-hours to warrant a signal. However, when the 2012 PM analysis-hour traffic volume without the project on SR-74 (major street) is plotted against the volume on the off-ramp (minor street), the resulting point lies above the applicable curve for the combination of approach lanes (two or more lanes and one lane) (see figure below). Therefore, Category 2 conditions are met, and the installation of a new traffic signal is warranted.



SR-74 at Sherman Road

Based on 2012 future conditions without the project, Sherman Road’s northbound approach at SR-74 would carry approximately 180 vehicles and experience approximately six vehicle-hours of delay during the PM analysis hour. The total entering volume during this same hour would equal to approximately 2,390 vehicles. Therefore, the intersection would meet Category 1 conditions 1, 2, and 3, and warrant the installation of a new traffic signal.