

**DEPARTMENT OF TRANSPORTATION**

DIVISION OF TRAFFIC OPERATIONS

P.O. BOX 942873, MS-36

SACRAMENTO, CA 94273-0001

PHONE (916) 654-2366

FAX (916) 653-6080

TTY 711

www.dot.ca.gov/trafficops

*Making Conservation  
a California Way of Life.*

November 8, 2018

Mr. Maiser Khaled, Director  
Technical Services  
Federal Highway Administration – California Division  
650 Capitol Mall, Suite 4-100  
Sacramento, CA 95814-4708

Dear Mr. Khaled:

The California Department of Transportation (Caltrans) submits the 2017 California High-Occupancy Vehicle (HOV) Facilities Degradation Report and Action Plan (2017 Degradation Report and Action Plan) as required by 23 U.S.C. § 166.

Caltrans appreciates the collaboration and partnership from the Federal Highway Administration as an active member of the Managed Lane Steering Committee (Steering Committee). The Steering Committee develops and supports the implementation of strategies to optimize the performance of the HOV facilities. Caltrans is committed to implementing the strategies presented by the Steering Committee and make progress toward bringing degraded HOV facilities into compliance with federal performance standard. Caltrans has already initiated various minor and major infrastructure projects to improve the performance of HOV facilities. Some projects were underway in 2017, while others will begin construction within the next one to three years. Caltrans will assess the feasibility of implementing additional strategies presented by the Steering Committee and make good faith efforts to improve the performance of degraded HOV facilities.

If you have any questions regarding the 2017 Degradation Report and Action Plan, please contact Joe Rouse, Chief, Office of System Operations, at (916) 654-6448, or by e-mail at <joe.rouse@dot.ca.gov>.

Sincerely,

A handwritten signature in blue ink that reads "Jasvinderjit S. Bhullar".

JASVINDERJIT S. BHULLAR, Chief  
Division of Traffic Operations

Mr. Maiser Khaled  
November 8, 2018  
Page 2

Enclosure

2017 California High-Occupancy Vehicle Facilities Degradation Report and Action Plan

- c: Laurie Berman, Director, California Department of Transportation
- Ryan Chamberlain, Chief Deputy Director, California Department of Transportation
- Steve Takigawa, Deputy Director, Maintenance and Operations, California Department of Transportation
- Monica Kress, Deputy Division Chief, Division of Traffic Operations, California Department of Transportation
- Joe Rouse, Chief, Office of System Operations, Division of Traffic Operations, California Department of Transportation
- Don Howe, Senior Transportation Engineer, Division of Traffic Operations, California Department of Transportation

**CALIFORNIA DEPARTMENT OF TRANSPORTATION**



**2017 CALIFORNIA HIGH-OCCUPANCY VEHICLE FACILITIES  
DEGRADATION REPORT AND ACTION PLAN**

**Prepared by**

**Division of Traffic Operations  
Office of System Operations**

**Submitted to**

**Federal Highway Administration  
California Division**

**November 2018**



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## 1. INTRODUCTION

As required by 23 U.S.C. § 166, the California Department of Transportation (Caltrans) prepared the 2017 California High-Occupancy Vehicle Facilities Degradation Report and Action Plan to report the performance of the high-occupancy vehicle (HOV) facilities in California. Caltrans also prepared an action plan that identified remediation strategies to bring degraded HOV lanes into compliance with federal performance standard.

An HOV facility is a preferential facility designated for exclusive use by vehicles with two or more occupants for all or part of a day. Federal law authorizes states to allow inherently low-emission vehicles (ILEVs), certain gasoline/electric plug-in hybrid vehicles, and toll-paying vehicles to access HOV facilities without meeting occupancy requirements. States that allow these exempted vehicles to access HOV facilities must monitor and report the performance of those HOV facilities.

California allows certain ILEVs and plug-in hybrid vehicles displaying valid clean air vehicle decals to access HOV facilities without meeting occupancy requirements.<sup>1</sup> The California Department of Motor Vehicles (DMV) administers the clean air vehicle decal program. As of December 31, 2017, the DMV issued 166,873 white decals for ILEVs and 136,753 green decals for plug-in hybrid vehicles. The statewide distribution of decal registrations, by county, is available in the Appendix, Table A-1. California also allows toll-paying vehicles not meeting occupancy requirements to access certain HOV facilities known as high-occupancy/toll (HOT) or express lane facilities.<sup>2</sup> The California Highway Patrol (CHP) enforces HOV facilities restrictions.

In accordance with the federal law, Caltrans established a performance monitoring, evaluation, and reporting program for the HOV facilities. In 2017, monitoring data indicated that the HOV facilities carried at least 324 million vehicle-miles traveled (VMT) during the morning 8:00 a.m. to 9:00 a.m. peak commute hour, and 394 million VMT during the evening 5:00 p.m. to 6:00 p.m. peak commute hour. These high HOV traffic demands and the regulatory threshold for degradation present challenges for California to achieve the federal performance standard. Caltrans will continue making good faith efforts to improve the performance of degraded HOV facilities. In addition to existing remediation actions that are currently in progress or scheduled for implementation, Caltrans is collaborating with the Federal Highway Administration (FHWA) and partner state and regional transportation agencies to identify additional strategies. In the future, Caltrans may consider requesting a waiver for certain HOV facilities from compliance with degradation requirements. For the 2017 reporting year, Caltrans is not requesting a waiver.

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<sup>1</sup> Refer to Vehicle Code sections 5205.5 and 21655.9

<sup>2</sup> Refer to Streets and Highways Code sections 149.1 and 149.4 through 149.10

## 2. DEGRADATION DETERMINATION METHODOLOGY

Federal law considers an HOV facility as degraded if the average traffic speed during the morning or evening weekday peak commute hour is less than 45 miles per hour (mph) for more than 10 percent of the time over a consecutive 180-day period. Previous degradation reports have consistently identified more lane-miles of degraded HOV facilities in the second half of the calendar year than the first half. While Caltrans continues to monitor the HOV facilities for the entire year, Caltrans and FHWA agreed that degradation report and action plan would focus on the second 180-day period of the year, from July 1 to December 31.

Caltrans uses the Performance Measurement System (PeMS) software tool to monitor and analyze the operational performance of the state highways. PeMS serves as a central repository to collect, store, and analyze traffic data from sources such as vehicle detectors and traffic census stations. PeMS reports operational information such as traffic speeds and volumes. Caltrans analyzes weekday data, including holidays that fall on weekdays, but not weekend data because the federal standard only applies to weekdays. The data analysis is as follows:

- Each HOV facility is divided into segments approximately five miles in length.
- The peak hour data is collected from 8:00 a.m. to 9:00 a.m. and from 5:00 p.m. to 6:00 p.m. These peak-hour periods were selected based on an analysis of the typical statewide peak traffic delay.
- Average speed for each segment is calculated by dividing the total vehicle-miles traveled by the total vehicle-hours traveled (miles traveled / hours traveled = mph).
- Weekdays for each segment are identified as degraded when either the morning or evening peak hour average speed is less than 45 mph.
- A segment is considered degraded when more than 10 percent of its weekdays out of the total monitored weekdays in the analysis period were degraded.

Many variables can affect traffic flow in the HOV facilities. While the federal standard distinguishes HOV facilities' performance as degraded or not degraded, Caltrans further classifies degradation into three categories to extrapolate potential causes and formulate remediation strategies. The criteria for each category of degradation status are as follows:

0. No Data (data collection infrastructure not available to track traffic speeds).
1. Not Degraded—degradation occurs less than 10 percent of the time, or two or less weekdays per month.
2. Slightly Degraded—degradation occurs from 10 to 49 percent of the time, or three to nine weekdays per month.
3. Very Degraded—degradation occurs from 50 to 74 percent of the time, or ten to 15 weekdays per month.
4. Extremely Degraded—degradation occurs 75 percent or more of the time, or 16 or more weekdays per month.

(These criteria are referred to in footnote #4 on pages 21-66.)





### 3. STATEWIDE DEGRADATION SUMMARY AND ACTION PLAN

In 2017, Caltrans operated 1,778 lane-miles of HOV facilities on the state highway system. Monitoring data was available for 1,322 lane-miles of HOV facilities. Degradation data was not available for the remaining 456 lane-miles due to vehicle detectors upgrades and repairs; or for HOV facilities that do not require reporting degradation. The State Route 91 express lanes facility in Orange County does not require reporting degradation in compliance with 23 U.S.C. § 166 because it was originally authorized under 23 U.S.C. § 129.

Table 1 summarizes the statewide HOV facilities degradation monitoring in 2017. Figure 1 shows the lane-miles of degraded HOV facilities by district. Figure 2 shows statewide degradation further categorized as slightly degraded, very degraded, and extremely degraded. Thirty-five percent of the degraded HOV facilities statewide were slightly degraded (332 of 951 total degraded lane-miles). Twenty-three percent were very degraded (220 of 951 total degraded lane-miles). Forty-two percent were extremely degraded (400 of 951 total degraded lane-miles).

For each district, degraded HOV facilities are reported in a table and map. Degraded HOV facilities listed in the table may include some non-degraded segments in them.

Degraded	951 Lane-Miles
Not Degraded	371 Lane-Miles
Sub-Total Lane-Miles Monitored	1,322 Lane-Miles
<hr/>	
Lane-Miles with No Data Available or Not Required to Report	456 Lane-Miles
Total Statewide HOV Lane-Miles	1,778 Lane-Miles

FIGURE 1

STATEWIDE DEGRADATION SUMMARY BY DISTRICT

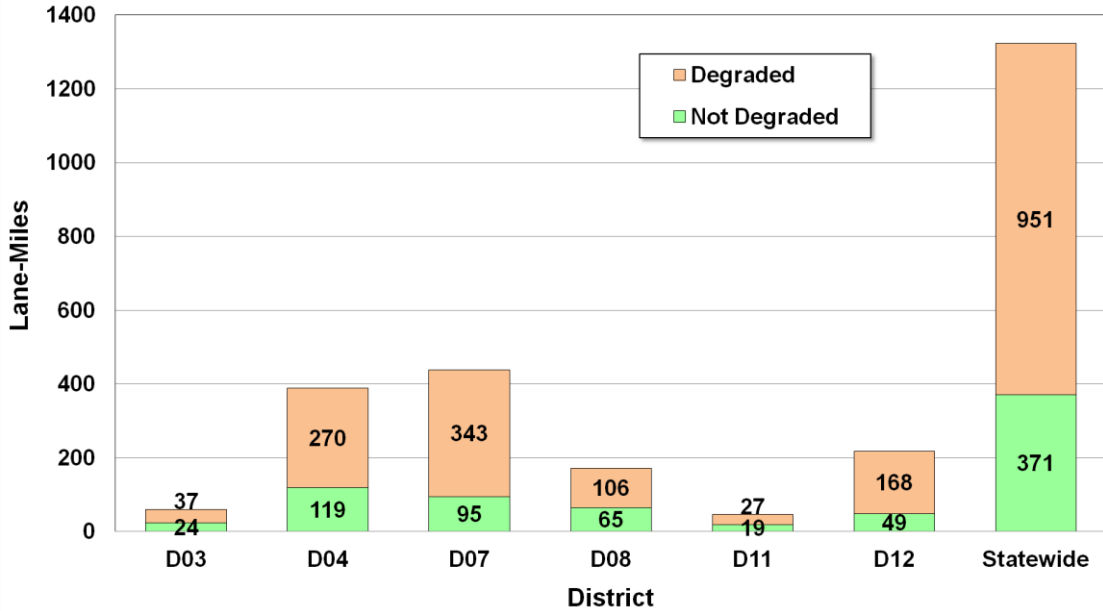
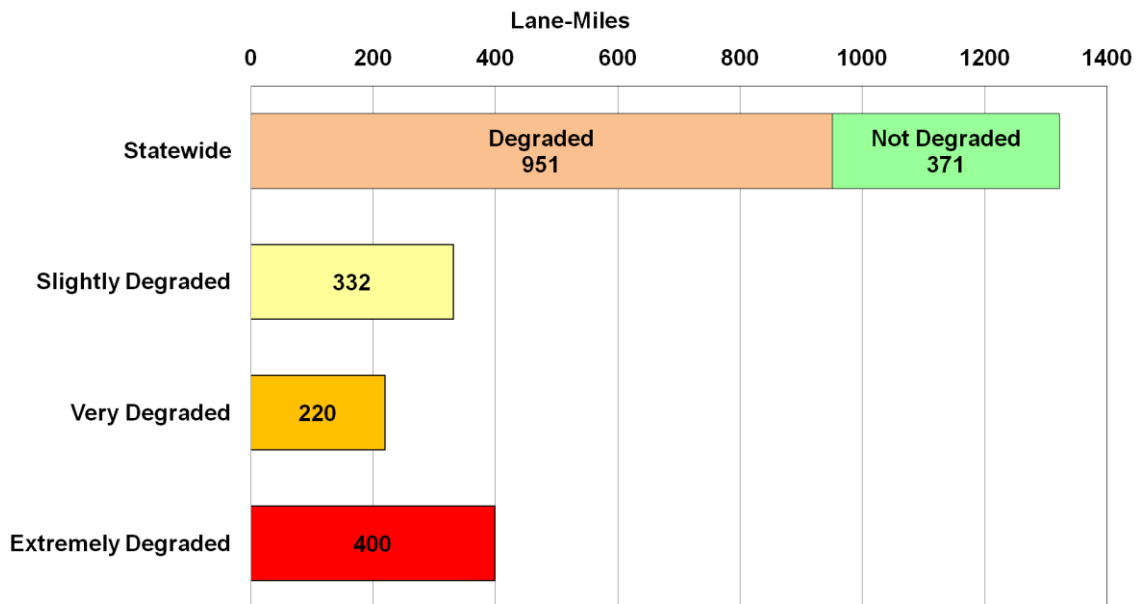


FIGURE 2

STATEWIDE DEGRADATION SUMMARY BY CATEGORY



NOTE: 1,322 lane-miles monitored total (numbers may not add up due to rounding).

The Caltrans 2017 Traffic Operations Strategic Plan<sup>3</sup> sets a 2020 target to reduce the number degraded HOV lane-miles identified in the previous 2016 degradation report by four percent. To meet this target and make progress toward bringing degraded HOV facilities into compliance with federal performance standard, Caltrans collaborated with the FHWA, the CHP, and other stakeholders to establish a Managed Lane Steering Committee (Steering Committee). The Steering Committee develops and supports the implementation of strategies to optimize the performance of the HOV facilities. Table 2 presents an initial list of strategies identified by the Steering Committee to remediate degradation. The Steering Committee will continue assessing and updating the list to incorporate new lessons-learned and advancements in the state-of-practice for traffic demand management. These task numbers are also noted in the individual action plans for each degraded HOV facility, wherever they are proposed.

Caltrans is committed to implement the strategies presented by the Steering Committee. For each degraded HOV facility, Caltrans will correlate existing actions that have been implemented to the list of strategies and assess the feasibility of other strategies on the list for initiation. As a part of this effort, Caltrans will review local traffic data and field conditions to identify potential causes of degradation and determine viable strategies to remediate those causes. Analysis suggested that factors contributing to degradation include:

- Recurrent congestion on the freeway.
- Disruptions to the traffic flow from vehicles entering or exiting the HOV facility.
- Congestion at the end of the HOV facility backing up traffic into the HOV facility.

Caltrans has already initiated various minor and major infrastructure projects to improve the performance of HOV facilities. Some projects were underway in 2017, while others will begin construction within the next one to three years. Caltrans will assess the effectiveness of these improvements at reducing HOV facilities degradation upon completion of the projects and after traffic patterns have normalized. Caltrans is also implementing active traffic management and traffic demand management strategies to mitigate congestion on freeways in some districts. These strategies include on-ramp and freeway connector ramp metering, adaptive ramp metering, integrated corridor management, and speed harmonization to optimize traffic flow on the freeway and local arterials and minimize stop-and-go conditions.

Caltrans may consider increasing minimum occupancy for certain HOV facilities to mitigate degradation. Prior to making such operational change, Caltrans would need to thoroughly examine the effects of the change may have on the HOV facility and entire freeway facility. Comprehensive operational analyses would need to be conducted to determine the full effects of increasing occupancy. The analysis would consider the geographic, geometric, and traffic demand characteristics of both the individual freeway facility and the region. To minimize traffic impacts, increasing occupancy requirements could be accomplished in conjunction with conversion of the HOV facilities to HOT/express lanes to efficiently manage traffic demands. HOT and express lanes allow additional flexibility in traffic demand management of the lanes by actively controlling the access of eligible vehicles. Caltrans will initiate development of a statewide policy, with specific criteria to increase minimum occupancy for HOV facilities to mitigate degradation.

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<sup>3</sup> <http://www.dot.ca.gov/trafficops/docs/Traffic-Ops-2017-Strategic-Plan.pdf>



At this time, Caltrans is not considering prohibiting exempted clean air vehicles (CAV) from HOV facilities. There is currently no established finding that exempted vehicles are the cause of degradation. Traffic count data (District Occupancy Counts) indicated that exempted vehicles contribute a relatively small percentage of the peak hour HOV volume. For example, while Los Angeles County has the highest number of registered clean air vehicles with HOV exemption decal, exempted vehicles averaged less than one percent of the peak hour HOV volume within the county. The HOV facilities along State Route 99 in Sacramento County is identified as degraded each year, but exempted vehicles typically represent only two percent of the peak hour HOV volume. Caltrans will continue conducting traffic counts to determine the distributions of vehicle occupancy and classifications, including exempted vehicles.

Vehicle occupancy counts also help to identify locations with high numbers of ineligible vehicles in the HOV facilities. Caltrans will share this information with the CHP so they can prioritize their enforcement efforts and effectively deploy their officers. One such location is the Interstate 80 corridor in District 4, between the Carquinez Bridge and the San Francisco-Oakland Bay Bridge. The Metropolitan Transportation Commission (MTC) recently agreed to fund the CHP for three years, beginning in July 2018, for enhanced HOV enforcement along this corridor. Caltrans will support this effort by updating the HOV violation fine amount on existing signs along the freeway to the current value. Caltrans and the MTC will collect traffic data to analyze the performance of the HOV facilities and across the entire freeway facility during the enhanced HOV enforcement time period. Additionally, the Golden Gate Division of the CHP in District 4 has also begun increasing HOV enforcement on freeways within their jurisdiction. As a result of these enhanced HOV enforcement efforts, the CHP are recording an increase in the numbers of citation issued for HOV violation.

Caltrans has ongoing projects in all districts to improve the overall health of Transportation System Management (TMS) detection, and, quality of data to collect degradation information.

<b>TABLE 2</b>	
<b>HOV OPERATIONAL IMPROVEMENT STRATEGIES</b>	
<b>Purpose</b>	<b>TASK # with HOV Degradation Remediation Strategy</b>
<b>Enforcement</b>	<b>E1</b> - Enhanced, dedicated, and targeted HOV enforcement including the establishment of enforcement zones.
	<b>E2</b> - Increase public awareness. Update HOV violation fine amount on the existing signs to the current value. Stripe the number of minimum occupancy in the middle of the pavement HOV diamond symbol.
<b>Operational Improvement</b>	<b>O1A</b> - Addition of general-purpose auxiliary lanes.
	<b>O1B</b> - Addition of HOV auxiliary (weave) lanes.
	<b>O2</b> - Implement corridor-wide adaptive ramp metering.
	<b>O3</b> - Convert HOV lanes to HOT/express lanes with consideration to increase the minimum occupancy.
	<b>O4</b> - Revise pricing strategy on HOT/express lanes to address degradation.
	<b>O5</b> - Implement or expand commuter assistance programs such as vanpools and Park-and-Ride facilities.
	<b>O6</b> - Toll exempted clean air vehicles. Tiered or reduced toll rates.
	<b>O7</b> - Change hours-of-operation for part-time HOV lanes.
	<b>O8</b> - Install flexible delineators or buffer separation for HOV lanes if space allows.
<b>O9</b> - Implementation of Integrated Corridor Management, or other traffic management techniques such as speed harmonization and lane control signals to optimize system performance	



Operational Improvement	<b>O10</b> - Improvement in Traffic Incident Management including the deployment or expansion of Freeway Service Patrol.
	<b>O11</b> - Close gaps in the HOV lane network.
	<b>O12</b> - Meter HOV lanes on ramps.
	<b>O13</b> - Study and analyze the appropriate access strategies, including increasing the length of access area or frequency of access, continuous access, or modification/elimination of bottlenecks such as ingress/egress locations.
	<b>O14</b> - Standardize HOV signing and markings statewide. Addition or enhanced signing and markings at the beginning and along the HOV lanes.
Improve Degradation Monitoring	<b>M1</b> - Expand the HOV degradation analysis and report to peak periods.
	<b>M2</b> - Exclude peak periods with non-recurrent congestion from the HOV degradation report.
	<b>M3</b> - Update or repair vehicle detector systems to improve coverage and monitoring.
Capacity Improvement	<b>C1</b> - Addition of a second HOV lane.
	<b>C2</b> - Interchange improvements including, but not limited to, construction of direct HOV connectors, ramp widenings, or truck climbing lanes.
	<b>C3</b> - Reversible lanes; contra-flow.

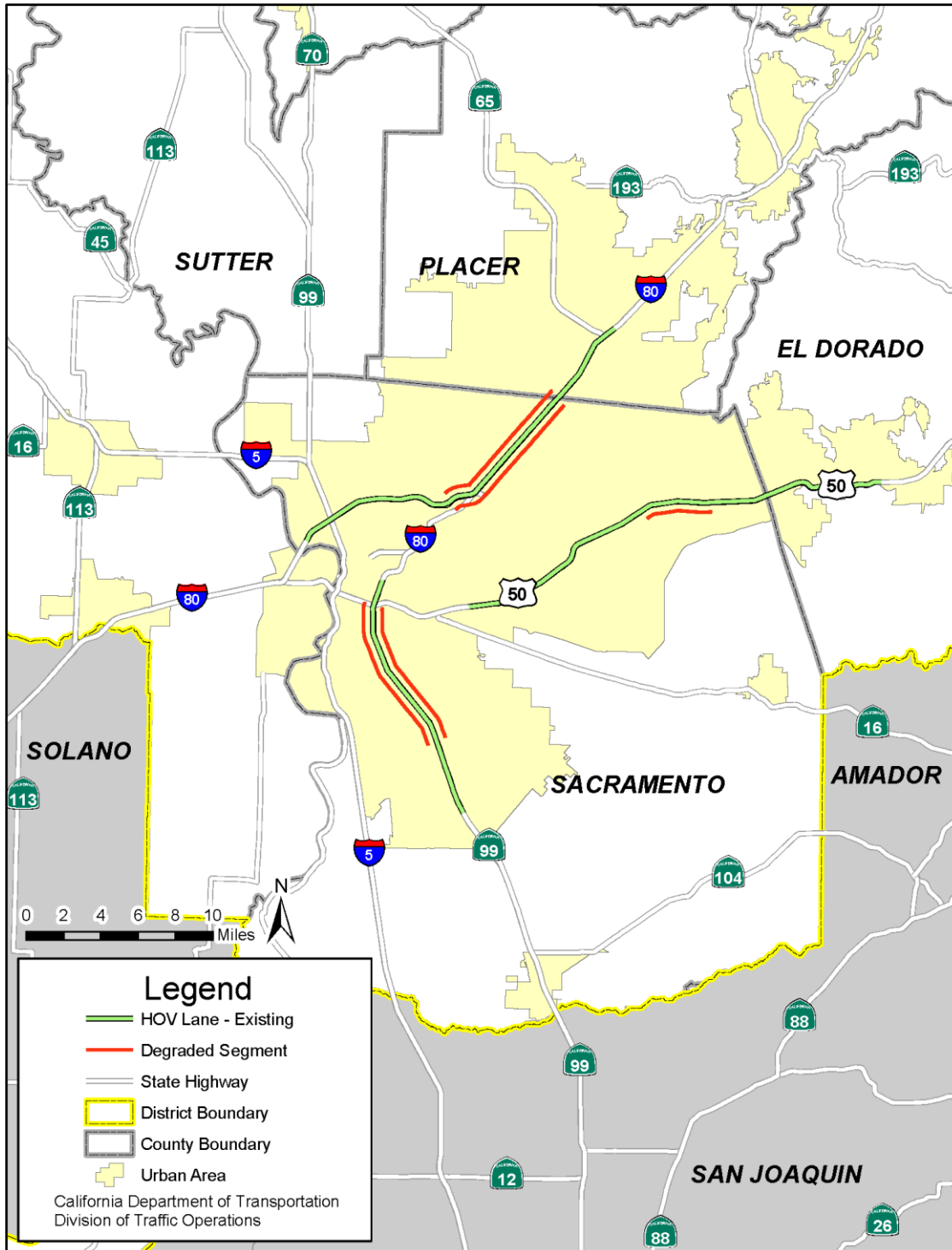


4.1. DISTRICT 3 DEGRADATION SUMMARY AND ACTION PLAN

<b>TABLE 3</b>						
<b>DISTRICT 3 LIST OF DEGRADED HOV FACILITIES</b>						
<b>Route</b>	<b>Direction</b>	<b>Begin County</b>	<b>Begin Post Mile</b>	<b>End County</b>	<b>End Post Mile</b>	<b>Minimum Occupancy</b>
50	EB	SAC	16.312	SAC	20.123	2
80	EB	SAC	M9.399	PLA	0.000	2
80	WB	PLA	0.000	SAC	M9.400	2
99	NB	SAC	16.031	SAC	R24.300	2
99	SB	SAC	R24.300	SAC	16.034	2

FIGURE 3

DISTRICT 3 MAP OF DEGRADED HOV FACILITIES







Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
50	EB	SAC	16.312	SAC	20.123	2	1	1	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• High HOV violation rates.</li> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Non-recurrent congestion, such as collisions, weather, and construction reduce operating speed.</li> </ul>	<ul style="list-style-type: none"> <li>• Share vehicle occupancy count data with the CHP so they can prioritize their enforcement efforts. (E1)</li> <li>• Implementation of corridor-wide advanced ramp metering between 2020 and 2025. (O2)</li> <li>• US-50 is included in a study to implement Integrated Corridor Management system in District 3. (O9)</li> <li>• Repair and upgrade vehicle detector system to improve data collection. 03-3F840 construction began in July 2016 and completed in September 2017. 03-2H570 will begin construction in March 2019.</li> <li>• District 3 is conducting a Regional Managed Lanes Feasibility Study started in 2017 and will be completed by early 2019. The study will identify, evaluate, and recommend the long range 20-year managed lane network including HOV, HOT, express lanes, and reversible lanes in the Sacramento region. (O3)</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
80	EB	SAC	M9.399	SAC	13.902	1	1	1	1	2
		SAC	13.902	PLA	0.000	1	1	1	1	2
80	WB	PLA	0.000	SAC	13.904	2	2	2	1	2
		SAC	13.903	SAC	M9.400	2	2	3	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• High HOV violation rates.</li> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed. Primary sources of congestion are the I-80/SR-51 interchange and Madison Ave.</li> <li>• Non-recurrent congestion, such as collisions, weather, and construction reduce operating speed.</li> </ul>	<ul style="list-style-type: none"> <li>• Share vehicle occupancy count data with the CHP so they can prioritize their enforcement efforts. <b>(E1)</b></li> <li>• Adjust ramp meter release rates along the corridor.</li> <li>• 03-1F2304 will install ramp meter at Antelope Rd. on-ramp to EB I-80.</li> <li>• Implementation of corridor-wide advanced ramp metering between 2020 and 2025. <b>(O2)</b></li> <li>• Repair and upgrade vehicle detector system to improve data collection. 03-3F840 construction began in July 2016 and completed in September 2017. 03-2H570 will begin construction in March 2019.</li> <li>• District 3 is conducting a Regional Managed Lanes Feasibility Study started in 2017 and will be completed by early 2019. The study will identify, evaluate, and recommend the long range 20-year managed lane network including HOV, HOT, express lanes, and reversible lanes in the Sacramento region. <b>(O3)</b></li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



District	Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
							2013	2014	2015	2016	2017
3	99	NB	SAC	16.031	SAC	20.165	3	4	4	3	3
			SAC	20.166	SAC	R24.300	3	2	3	3	2
3	99	SB	SAC	R24.300	SAC	20.167	2	4	4	4	4
			SAC	20.168	SAC	16.034	2	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• High HOV violation rates.</li> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Non-recurrent congestion, such as collisions, weather, and construction reduce operating speed.</li> </ul>	<ul style="list-style-type: none"> <li>• Share vehicle occupancy count data with the CHP so they can prioritize their enforcement efforts. <b>(E1)</b></li> <li>• Extended ramp metering hours are scheduled to be implemented in 2019. <b>(O2)</b></li> <li>• District 3 is currently conducting a study to implement coordinated ramp metering along this route with the assistance from U.C. Berkley PATH. <b>(O2)</b></li> <li>• 03-2F550 will reconfigure the ramp and add HOV lane metering to control the on-ramp traffic. Construction is scheduled to complete in July 2018.</li> <li>• 03-0F351 will install ramp metering system along southbound SR-99 and SR-51 to control the on-ramp traffic. Construction is scheduled to start in 2018 and complete in late 2019. <b>(O2)</b></li> <li>• Implementation of corridor-wide advanced ramp metering between 2020 and 2025. <b>(O2)</b></li> <li>• Repair and upgrade vehicle detector system to improve data collection. 03-3F840 construction began in July 2016 and completed in September 2017. 03-2H570 will begin construction in March 2019.</li> <li>• District 3 is conducting a Regional Managed Lanes Feasibility Study started in 2017 and will be completed by early 2019. The study will identify, evaluate, and recommend the long range 20-year managed lane network including HOV, HOT, express lanes, and reversible lanes in the Sacramento region. <b>(O3 &amp; C3)</b></li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded

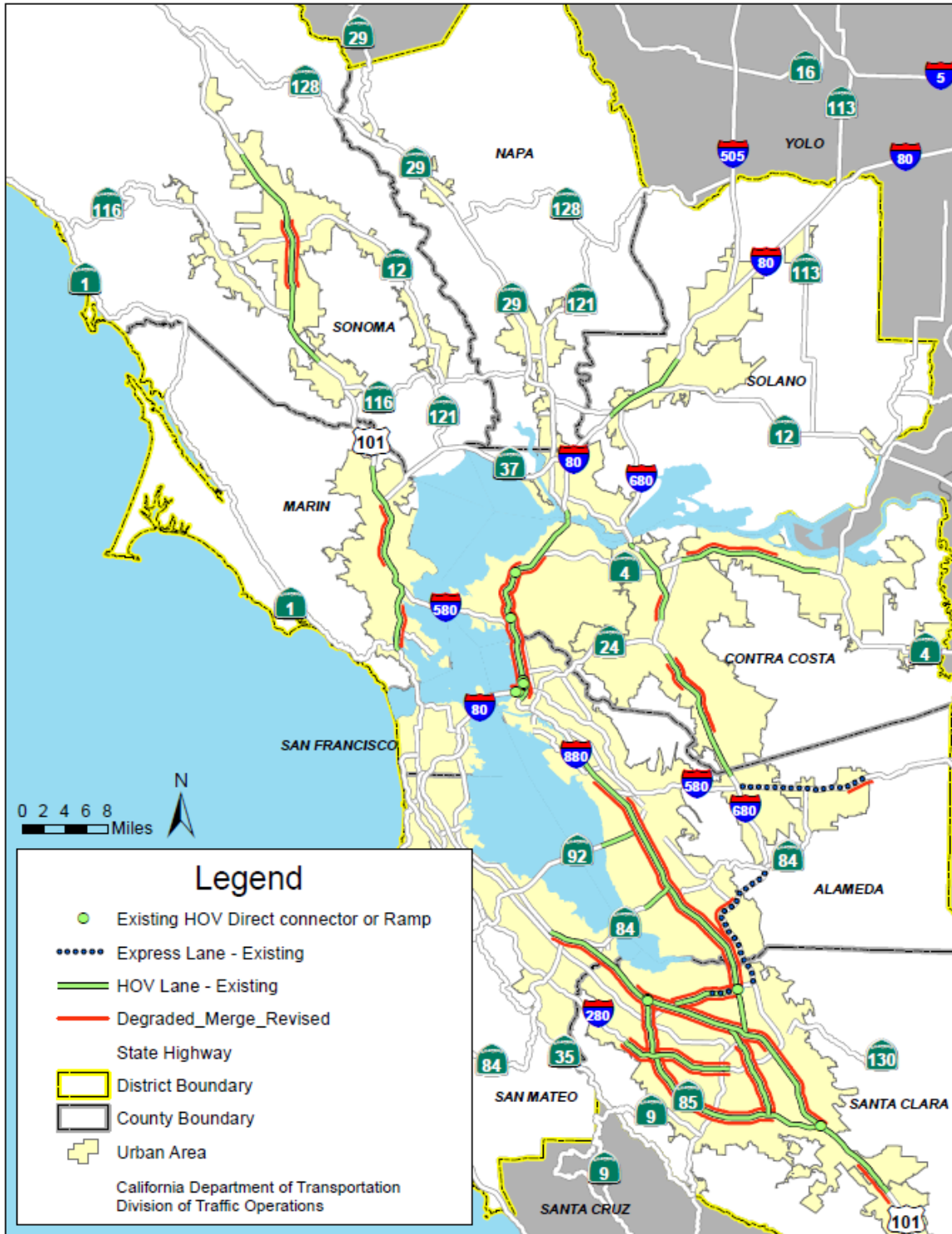


**4.2. DISTRICT 4 DEGRADATION SUMMARY AND ACTION PLAN**

<b>Table 4</b>						
<b>DISTRICT 4 LIST OF DEGRADED HOV FACILITIES</b>						
<b>Route</b>	<b>Direction</b>	<b>Begin County</b>	<b>Begin Post Mile</b>	<b>End County</b>	<b>End Post Mile</b>	<b>Minimum Occupancy</b>
4	WB	CC	24.400	CC	R15.800	2
80	EB	ALA	2.500	CC	9.900	3
80	WB	CC	7.446	ALA	1.900	3
85	NB	SCL	4.795	SCL	R23.800	2
85	SB	SCL	R23.800	SCL	4.795	2
87	NB	SCL	0.200	SCL	7.297	2
87	SB	SCL	7.297	SCL	0.200	2
101	NB	MRN	3.800	MRN	8.323	2
101	NB	SON	15.200	SON	21.600	2
101	SB	SON	21.600	SON	12.846	2
101	NB	SCL	R26.448	SCL	49.702	2
101	SB	SM	6.600	SM	R35.534	2
101	SB	SCL	R21.724	SCL	R17.000	2
237	EB	SCL	3.000	SCL	9.500	2
237	WB	SCL	9.500	SCL	3.000	2
280	NB	SCL	L4.700	SCL	14.000	2
280	SB	SCL	14.000	SCL	L4.700	2
580	EB	ALA	10.485	ALA	R7.800	2
680	NB	CC	R4.182	CC	R11.413	2
680	NB	CC	R18.800	CC	20.300	2
680	SB	CC	R18.579	CC	R9.248	2
680	SB	ALA	R6.980	ALA	M2.385	2
880	NB	SCL	8.700	ALA	R19.069	2
880	SB	ALA	22.700	SCL	8.700	2

FIGURE 4

DISTRICT 4 MAP OF DEGRADED HOV FACILITIES





Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
4	WB	CC	24.400	CC	R20.088	4	1	2	2	2
		CC	R20.088	CC	R15.800	4	2	2	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Vehicle weaving at the end of the HOV lane causes reduced speed in all lanes.</li> <li>• General-purpose lanes bottleneck downstream at the I-680/SR-4 interchange and at the SR-242 merge to I-680, backing up on WB SR-4 and impacting the HOV lane terminus.</li> </ul>	<ul style="list-style-type: none"> <li>• District 4 is working with the Contra Costa Transportation Authority (CCTA) to initiate a proposal near the HOV lane western terminus to extend the HOV lane.</li> <li>• Work with CCTA on ballot measure to fund improvements on corridor capacity downstream of WB HOV lane terminus, including CC SR-242 and CC I-680/SR-4 interchanges. Construction is estimated to start in 2021.</li> <li>• Ramp metering activation from Sand Hill to Alhambra interchange, started October 2017. Ramp metering has provided some improvement to the route. (O2)</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
80	EB	ALA	2.500	ALA	6.552	1	4	4	4	4
		ALA	6.552	CC	2.582	2	2	3	3	3
		CC	2.582	CC	6.634	2	3	4	4	4
		CC	6.634	CC	9.900	3	2	3	4	4
80	WB	CC	7.446	CC	2.923	3	2	2	2	2
		CC	2.923	ALA	6.423	2	3	4	4	4
		ALA	6.423	ALA	1.900	2	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• High HOV violation rates.</li> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds HOV lane capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• The Metropolitan Transportation Commission (MTC) will provide funding of \$1.2 million per year for one year with an option to extend it to three years starting in July 2018 for four CHP officers to specifically conduct enhanced HOV enforcement. The limits on I-80 are from the Carquinez Bridge to the San Francisco Bay Bridge. MTC and Caltrans will collect data to evaluate effectiveness of the enhanced enforcement effort.</li> <li>• Caltrans has updated HOV violation fine amount on existing signs along this corridor to the current dollar amount to support the enhanced HOV enforcement effort.</li> <li>• (Westbound only) utilize the WB I-80 ICM electronic overhead lane control sign to display HOV diamond symbol on lane #1 control signal</li> <li>• Future project to convert HOV lane to express lane. Preliminary engineering and environmental studies are pending. Scheduled to open early 2022. Project limits are from the Carquinez Bridge to the San Francisco Oakland Bay Bridge approach. Preliminary project cost is estimated at \$75 million and would be funded by the MTC.</li> <li>• SHOPP project to add auxiliary lane from Pinole Valley Rd. to SR-4. This project will reduce vehicle hours of delay on EB I-80. Construction is scheduled for FY 24/25. (O1A)</li> </ul>

<sup>4</sup> Degradation Status:

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
85	NB	SCL	4.795	SCL	9.590	2	2	2	3	3
		SCL	9.590	SCL	R14.210	4	2	3	3	3
		SCL	R14.210	SCL	R19.005	3	2	2	3	3
		SCL	R19.005	SCL	R23.800	4	1	2	3	3
85	SB	SCL	R23.800	SCL	R19.005	4	2	3	4	4
		SCL	R19.005	SCL	R14.210	4	3	4	4	4
		SCL	R14.210	SCL	9.590	2	2	4	4	4
		SCL	9.590	SCL	4.795	2	1	2	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds HOV lane capacity.</li> </ul>	<ul style="list-style-type: none"> <li>• Project to convert existing HOV lane to HOT/express lane and add a second express lane to operate as a dual lane facility. The project limits are from the US-101 interchange in San Jose to the US-101 interchange in Mountain View. Preliminary project cost is estimated at \$185 million and would be funded by the Santa Clara Valley Transportation Authority (VTA) through the design stage of the project. VTA plans to build this project and US-101 project in phases, currently in the PS&amp;E project phase. The first segment would be between I-280 and US-101 (Mountain View). Construction is estimated to begin in the summer 2019. <b>(O3)</b></li> <li>• Option to raise occupancy to HOV 3+ with HOT/express lane conversion. Also, can operate the HOT/express lane in “HOV Only” mode if lane becomes degraded. In addition, HOV 2+ and Clean Air Vehicles can be tolled at a discounted rate. <b>(O6)</b></li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded





Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
87	NB	SCL	0.200	SCL	3.748	3	3	3	4	3
		SCL	3.748	SCL	7.297	3	3	3	3	2
87	SB	SCL	7.297	SCL	3.748	2	2	2	3	3
		SCL	3.748	SCL	0.200	1	1	1	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>Demand exceeds HOV lane capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Valley Transportation Authority is currently conducting a corridor study and planning a future project to convert the HOV lane to an HOT/express lane. At the time of conversion, occupancy could be increased to HOV 3+ with HOT/express lane conversion. Also, can operate the HOT/express lane in "HOV Only" mode if lane becomes degraded. In addition, HOV 2+ and Clean Air Vehicles can be tolled at a discounted rate. The corridor study is anticipated to complete in August 2018. (O3 &amp; O6)</li> </ul>

<sup>4</sup> Degradation Status:

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
101	NB	SON	15.200	SON	18.400	3	2	2	3	3
		SON	18.400	SON	21.600	1	1	1	1	2
101	SB	SON	21.600	SON	15.200	1	1	1	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• The October 2017, Sonoma fires may have changed the commute patterns as the people impacted may have relocated.</li> </ul>	<ul style="list-style-type: none"> <li>• Modification of the Hearn Avenue interchange slated to relieve congestion in the area.</li> <li>• Several projects along the Marin-Sonoma Narrows Corridor are being developed that include HOV lane or completion of gaps in the HOV lane network:               <ul style="list-style-type: none"> <li>➤ Realign US-101 at San Antonio Road to upgrade roadway profile and alignment. Project will be completed by the end of 2018. Cost estimate is \$71 million.</li> <li>➤ Construct NB and SB HOV lanes on US-101 between the Marin County/Sonoma County line and Atherton Avenue. Construction funding to begin after 2018.</li> <li>➤ Construct NB and SB HOV lanes on US-101 between Petaluma Boulevard South and the Marin/Sonoma County line and stripe for HOV lanes from Petaluma Boulevard South to SR-116. Construction funding to begin after 2018.</li> <li>➤ Current HOV hours of operation start at 4:30 PM. HOV lane hours of operation may be changed to 3:00 PM to coincide with HOV hours north of the corridor upon completion of the projects. (07)</li> </ul> </li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
101	NB	MRN	3.800	MRN	8.323	4	4	4	4	1
101	SB	MRN	18.900	MRN	12.846	3	3	3	3	3

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds HOV lane capacity.</li> <li>• Vehicle speeds dropped further in both HOV and general-purpose lanes near the Sir Francis Drake and Lucky Drive interchanges. Sir Francis Drake interchange provides easy access to eastbound I-580.</li> <li>• The October 2017, Sonoma fires may have changed the commute patterns as the people impacted may have relocated.</li> </ul>	<ul style="list-style-type: none"> <li>• Proposed third lane starting from Sir Francis Drake Blvd. merge on EB I-580 could improve traffic flow. Right lane on NB US-101 is congested due to traffic exiting at Sir Francis Drake Boulevard to continue to the Richmond-San Rafael Bridge. Construction is on-going with completion of the third eastbound traffic lane for fall 2018. \$60 million cost estimate to be funded by the Bay Area Toll Authority.</li> <li>• Project to implement ramp metering on the NB segment. Anticipated start of construction is Spring 2019. (O2)</li> <li>• Several projects along the Marin-Sonoma Narrows Corridor are being developed that include HOV lane or completion of gaps in the HOV lane network:               <ul style="list-style-type: none"> <li>➤ Realign US-101 at San Antonio Road to upgrade roadway profile and alignment. Project will be completed by the end of 2018. Cost estimate is \$71 million.</li> <li>➤ Construct NB and SB HOV lanes on US-101 between the Marin County/Sonoma County line and Atherton Avenue. Construction funding to begin after 2018.</li> <li>➤ Construct NB and SB HOV lanes on US-101 between Petaluma Boulevard South and the Marin/Sonoma County line and stripe for HOV lanes from Petaluma Boulevard South to SR-116. Construction funding to begin after 2018.</li> <li>➤ Current HOV hours of operation start at 4:30 PM. HOV lane hours of operation may be changed to 3:00 PM to coincide with HOV hours north of the corridor upon completion of the projects. (O7)</li> </ul> </li> </ul>

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
101	NB	SCL	R26.448	SCL	30.810	4	1	1	2	2
		SCL	30.810	SCL	R35.534	2	2	2	3	3
		SCL	R35.534	SCL	40.254	2	3	3	3	3
		SCL	40.254	SCL	44.978	3	2	3	3	3
		SCL	44.978	SCL	49.702	2	1	2	2	2
101	SB	SM	6.600	SM	1.876	4	3	4	4	4
		SM	1.876	SCL	49.702	4	2	3	3	2
		SCL	49.702	SCL	44.978	3	1	2	3	3
		SCL	44.978	SCL	40.254	2	4	4	4	4
		SCL	40.254	SCL	R35.534	2	2	4	4	4
		SCL	R21.724	SCL	R17.000	2	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> </ul>	<ul style="list-style-type: none"> <li>Project to convert existing HOV lane to HOT/express lane and add a second express lane to operate as a dual lane facility. Project limits are from East Dunne Avenue to Oregon Exp/Embarcadero Road. Preliminary project cost is estimated at \$416 million and would be funded by Santa Clara Valley Transportation Authority (VTA) through the design stage of the project. VTA plans to build this project and SR-85 project in segments, currently in the PS&amp;E project phase. The first segment would be between Fair Oaks interchange and the San Mateo County line. (O3)</li> <li>Option to raise occupancy to HOV 3+ with HOT/express lane conversion. Also, can operate the HOT/express lane in "HOV Only" mode if lane becomes degraded. In addition, HOV 2+ and Clean Air Vehicles can be tolled at a discounted rate. (O6)</li> <li>SHOPP project to widen southbound US-101 off-ramp to southbound SR-87 to two lanes. Currently, the demand for this off-ramp exceeds the capacity of one lane causes congestion on SB US-101. Estimated construction date FY 23/24.</li> <li>SMCTA, C/CAG, and Caltrans are developing a project for an express lane between San Antonio Rd. (SCL County) and I-380 (SM County). This lane is being proposed as a HOT 3+ lane and is currently finishing up the PA&amp;ED phase of the project. Estimated cost of the project is \$514 million and estimated to be completed in 2022.</li> </ul>



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
237	EB	SCL	3.000	SCL	R6.241	2	3	4	4	4
		SCL	R6.241	SCL	9.500	4	3	4	4	4
237	WB	SCL	9.500	SCL	R6.265	4	2	1	2	2
		SCL	R6.265	SCL	3.000	2	2	3	3	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>Demand exceeds HOV lane capacity.</li> </ul>	<ul style="list-style-type: none"> <li>Project to extend the express lane from Zanker Rd. to Mathilda Ave. Construction is scheduled to begin in March 2018 and be completed by the Fall 2019. Project Cost is \$42 million.</li> <li>Option to raise occupancy to HOV 3+ with HOT/express lane conversion. Also, can operate the HOT/express lane in "HOV Only" mode if lane becomes degraded. In addition, HOV 2+ and Clean Air Vehicles can be tolled at a discounted rate. <b>(O3 &amp; O6)</b></li> <li>Project in PSR-PDS phase to add an auxiliary lane by widening the freeway between Zanker Rd. and N. 1st Street. Estimated to be completed by 2025. Start construction FY 21/22. <b>(O1A)</b></li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
280	NB	SCL	L4.700	SCL	6.879	3	3	3	3	4
		SCL	6.879	SCL	10.439	4	2	3	4	2
		SCL	10.439	SCL	14.000	2	2	3	3	3
280	SB	SCL	14.000	SCL	10.439	2	1	2	2	3
		SCL	10.439	SCL	6.879	3	3	3	4	4
		SCL	6.879	SCL	L4.700	4	2	3	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>Roadway geometric constraints and traffic bottlenecks along this corridor.</li> <li>Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>Demand exceeds HOV lane capacity.</li> </ul>	<ul style="list-style-type: none"> <li>I-280 corridor study to determine potential improvements. (O13)</li> <li>Project to widening NB I-280 Lawrence Exp. off-ramp is in construction to be completed in 2018/2019.</li> <li>NB I-280 Wolfe Road off-ramp widening is in construction to be completed in 2017. Improvement from 2016 to 2017 segment from extremely degraded to slightly degraded.</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
580	EB	ALA	10.485	ALA	R7.800	2	4	3	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Reduced capacity of uphill grade at the express lane termini causing bottlenecks that back up into both express lanes and general-purpose lanes.</li> </ul>	<ul style="list-style-type: none"> <li>• Alameda CTC is conducting a post-implementation study for the express lane. District 4 will coordinate with ACTC in the study to evaluate potential improvements. (O13)</li> </ul>

<sup>4</sup> Degradation Status:

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
680	NB	CC	R3.898	CC	R8.100	3	2	3	3	3
		CC	R8.100	CC	R11.900	2	3	4	4	3
		CC	R18.800	CC	20.300	3	2	2	2	2
680	SB	CC	R18.579	CC	16.300	4	3	3	3	3
		CC	R11.900	CC	R9.248	1	1	1	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Gap in the HOV lane network at the SR-24 interchange, between North Main St. and Rudgear Rd.</li> <li>• Corridor bottleneck south of SR-24 backing up through SR-24 interchange into HOV lane terminus at Livorna Rd.</li> </ul>	<ul style="list-style-type: none"> <li>• The conversion of existing HOV lane to express lane from Rudgear Rd. to Alcosta Blvd. was completed at the end of 2017. Preliminary data showed some performance improvements.</li> <li>• Gap closure project to complete the express lane network at the SR-24 interchange, between North Main St. and Rudgear Rd. The estimated construction cost is \$70 million, funded by Contra Costa Transportation Authority. Construction began in 2017, with completion planned for 2019.</li> </ul>

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
680	SB	ALA	R6.980	ALA	M2.385	4	3	3	3	3

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Express lane speed drop due to vehicles weaving to exit the express lane onto the congested general-purpose lanes.</li> </ul>	<ul style="list-style-type: none"> <li>• Existing limited-access ingress-egress express lane facility is being converted to continuous access. Construction will be a part of the NB express lane project to be completed in 2019.</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
880	NB	SCL	8.700	ALA	3.089	2	4	4	4	4
		ALA	3.089	ALA	7.705	2	2	3	2	3
		ALA	7.705	ALA	12.321	2	3	4	4	4
		ALA	12.321	ALA	19.300	2	4	4	4	4
		ALA	R34.700	ALA	R35.400	3	3	1	2	2
880	SB	ALA	22.700	ALA	17.855	2	2	3	3	2
		ALA	17.855	ALA	13.009	2	3	3	3	3
		ALA	13.009	ALA	8.164	2	3	3	3	4
		ALA	8.164	ALA	3.318	2	2	2	2	3
		ALA	3.318	SCL	8.700	2	2	2	3	3

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• High cross-bay demand with vehicle weaving conflict at SR-84 interchange and SR-92 interchange.</li> <li>• High volume coming from SR-238.</li> </ul>	<ul style="list-style-type: none"> <li>• Convert existing HOV lane to express lane. Construction is on-going with completion by end of 2019. Project limits are from Hegenberger Rd. in Oakland to SR-237. Striped buffers are proposed in segments between SR-84 and SR-92 to minimize weaving and movement conflicts between the general-purpose lanes and the express lanes.</li> <li>• Option to raise occupancy to HOV 3+ with HOT/express lane conversion. Also, can operate the HOT/express lane in "HOV Only" mode if lane becomes degraded. In addition, HOV 2+ and Clean Air Vehicles can be tolled at a discounted rate. (O3 &amp; O6)</li> <li>• MTC proposing a pilot project (Video Occupancy Detection) to increase enforcement on I-880, pilot to start in the Spring 2018.</li> <li>• Construct auxiliary lane between A St. and Winton Ave. Estimated construction start date is FY 25/26. (O1A)</li> </ul>

<sup>4</sup> Degradation Status:

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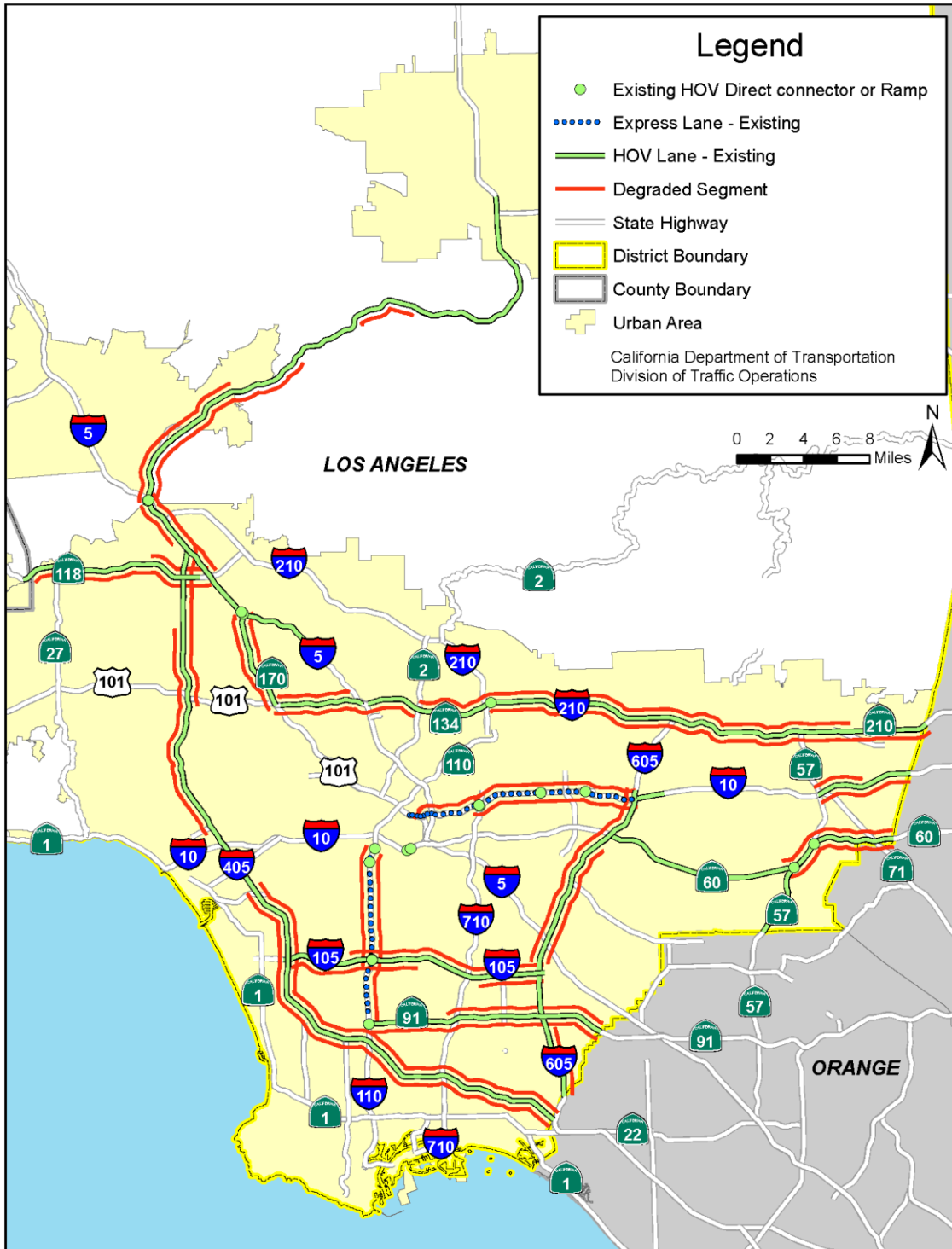


**4.3. DISTRICT 7 DEGRADATION SUMMARY AND ACTION PLAN**

TABLE 5						
DISTRICT 7 LIST OF DEGRADED HOV FACILITIES						
Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Minimum Occupancy
5	NB	LA	39.400	LA	R45.600	2
5	SB	LA	R45.600	LA	42.389	2
10	EB	LA	20.904	LA	31.200	2 (3 during peak periods)
10	EB	LA	42.400	LA	48.260	2
10	WB	LA	45.330	LA	42.400	2
10	WB	LA	31.200	LA	17.000	2 (3 during peak periods)
14	NB	LA	R24.800	LA	R47.256	2
14	SB	LA	33.812	LA	R24.788	2
60	EB	LA	R23.000	LA	R30.450	2
60	WB	LA	R30.450	LA	R23.000	2
91	EB	LA	R6.400	LA	R20.700	2
91	WB	LA	R20.700	LA	R11.167	2
105	EB	LA	R2.200	LA	R18.090	2
105	WB	LA	R18.090	LA	R6.172	2
110	NB	LA	9.800	LA	20.500	2
110	SB	LA	20.500	LA	13.367	2
118	EB	LA	R0.000	LA	R11.400	2
118	WB	LA	R11.400	LA	R7.600	2
134	EB	LA	0.000	LA	R8.855	2
134	WB	LA	R13.300	LA	0.000	2
170	NB	LA	R17.505	LA	R20.510	2
170	SB	LA	R20.510	LA	R14.500	2
210	EB	LA	R25.000	LA	R52.100	2
210	WB	LA	R47.532	LA	R25.000	2
405	NB	LA	0.000	LA	48.600	2
405	SB	LA	43.758	LA	0.000	2
605	NB	LA	R0.000	LA	R16.560	2
605	SB	LA	20.700	LA	R8.280	2

FIGURE 5

DISTRICT 7 MAP OF DEGRADED HOV FACILITIES





Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
5	NB	LA	39.400	LA	42.389	4	2	2	2	2
		LA	42.389	LA	R45.600	4	2	3	4	3
5	SB	LA	R45.600	LA	42.389	1	2	1	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• General-purpose lane drops at San Fernando Mission Road causes bottleneck.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lane.</li> <li>• Construction activity with ongoing pavement slab replacement project.</li> <li>• Volume exceeds capacity at approximately PM R42.0. The entire volume of the NB I-405 merges onto the I-5 freeway. This merge point of volume of vehicle shows the highest percentage of degradation.</li> <li>• At approximately PM R44.0, portion of the volume from the westbound I-210 merging, especially the truck volume.</li> <li>• At PM R 45.29, the HOV lane ends and merges into the #1 lane. Then within one mile from end of HOV lane, the separate designated truck route merges into the NB I-5.</li> <li>• SB is slightly degraded most likely due to construction activity from on-going safety enhancement project.</li> </ul>	<ul style="list-style-type: none"> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• Continue the separate designated truck route more north past the Santa Clarita Valley. Widen the outside shoulder to extend the beginning of the designated truck route more south of the existing beginning.</li> <li>• Construction of HOV and truck lanes PM R45.4-R59.0, which will ease traffic delay and absorb the growth of traffic due to increase in population and bigger surrounding communities – residential and commercial. Begin construction May 2019, end construction March 2021. Estimated construction cost is \$343.3 million.</li> <li>• Construction between PM 44.2-46.0. Safety enhancement project to improve safety for the I-5/SR-14 interchange area, including traffic flow and relieving congestion. Begin construction January 2017, end construction July 2018.</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> </ul>

<sup>4</sup> Degradation Status:

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
10	EB	LA	20.904	LA	25.464	4	4	1	1	2
		LA	25.464	LA	31.200	4	4	4	3	4
10	WB	LA	31.200	LA	25.464	3	3	3	2	2
		LA	25.464	LA	20.904	3	4	3	3	3
		LA	20.904	LA	17.000	4	4	2	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>The HOV lane was converted to an express lane as of February 23, 2013. Vehicle volume has increased as a result of the addition of the toll paying vehicles as well as an increase in violation rates. It is anticipated that this will decrease over time as motorists become accustomed to using the FasTrak transponders, and the new pricing demand strategies.</li> <li>Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>Construction activities between PM 20.2-28.2 for bridge maintenance projects including removal and reconstruct portions of bridge decks, seal the bridge decks, deck spalls, railings, slabs, backwalls, joints, etc. Estimate completion date by September 2018.</li> <li>On-going construction activities to widen the freeway and construct a new HOV lane connecting the gap in the HOV lane network between PM 33.4-42.4. Two projects are currently in construction.               <ul style="list-style-type: none"> <li>Segment between PM 33.4-37.5 will be complete by April 2019.</li> <li>Segment between PM 37.2-42.4 will be complete by December 2021.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Two projects are currently in construction to widen the freeway and construct a new HOV lane connecting the gap in the HOV lane network. Caltrans will assess its effectiveness at reducing HOV lanes degradation upon completion of the projects and traffic patterns normalized to the new facilities.</li> <li>Caltrans, in partnership with the Metropolitan Transportation Authority (MTA), is considering the following additional strategies to improve performance:               <ul style="list-style-type: none"> <li>Increase the minimum toll rate.</li> <li>Operational changes to express lane operation by adjusting congestion pricing algorithm on a continual basis. Charge clean air vehicles a reduced toll rate instead of being toll-free. (O6)</li> <li>Modify the express lane operation including eliminating ingress/egress locations to reduce vehicle movement conflict, increasing occupancy requirement, and removing the limit on toll rates.</li> <li>Repair and update detector system to improve data collection. The work is ongoing.</li> <li>Install digital occupancy sign panels that will display the transponder setting which will assist the CHP to enforce vehicle occupancy or toll violations.</li> <li>Deploy a CCTV (VPS) to convert video streams into vehicle counts and vehicle classification counts, including CCTV surveillance system, hardware/software and CCTV/VPS and Web Services operation and maintenance. The project began October 2016 and ends April 2018.</li> </ul> </li> <li>District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> </ul>

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
10	EB	LA	42.400	LA	45.330	2	4	4	4	3
		LA	45.330	LA	48.260	3	4	4	4	4
10	WB	LA	45.330	LA	42.400	1	1	1	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• High truck traffic volume.</li> <li>• On-going construction activities to widen the freeway and construct a new HOV lane connecting the gap in the HOV lane network between PM 33.4-42.4. Two projects are currently in construction.               <ul style="list-style-type: none"> <li>➤ Segment between PM 33.4-37.5 will be completed by April 2019.</li> <li>➤ Segment between PM 37.2-42.4 will be completed by December 2021.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Two projects are currently in construction to widen the freeway and construct a new HOV lane connecting the gap in the HOV lane network. Caltrans will assess its effectiveness at reducing HOV lanes degradation upon completion of the projects and traffic patterns normalized to the new facilities.</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> <li>• This corridor extends into San Bernardino County. Please refer to District 8 Action Plan for additional remediation strategies.</li> </ul>

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
14	NB	LA	R24.800	LA	R29.281	1	4	4	4	4
		LA	R29.281	LA	33.812	1	1	2	3	2
		LA	33.812	LA	38.293	1	1	1	2	2
		LA	38.293	LA	42.775	1	1	1	1	1
		LA	42.775	LA	R47.256	2	2	2	1	2
14	SB	LA	33.812	LA	R29.281	2	1	1	2	2
		LA	R29.281	LA	R24.788	1	2	2	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Lane drop at Sand Canyon creates a bottleneck. Demand exceeds capacity from three lanes down to two on the route, causing friction between HOV and general-purpose lanes.</li> <li>• Possible non-metered on-ramps allowing a platoon of vehicles to enter the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• Pavement preservation project between PM 28.76R-30.9R includes restriping the existing HOV lane buffer from limited access to continuous access. Begin construction in 2016, and end construction in 2018. (O14)</li> <li>• Placerita Canyon widening at PM 28.08 at the NB off-ramp to manage traffic on the existing freeway bottleneck. Begin construction in 2018 and end in 2019.</li> <li>• Pavement preservation project from PM 32.06-60.7 includes restriping the existing HOV lane buffer from limited access to continuous access. Begin construction July 2017, and end construction July 2019. (O14)</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> </ul>

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
60	EB	LA	R23.000	LA	R26.725	2	2	2	2	2
		LA	R26.725	LA	R30.450	2	2	2	3	3
60	WB	LA	R30.450	LA	R26.725	2	2	2	2	3
		LA	R26.725	LA	R23.000	4	2	2	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• High truck volume.</li> <li>• High volume due to the merging of SR-57 and SR-60 together.</li> <li>• Demand exceeds capacity, especially at Grand Ave.</li> <li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• Reconstruct Grand Ave overcrossing and SR-60/SR-57 interchange connectors. Begin construction 2019/2020. Estimated construction cost is \$263 million.</li> <li>• Relocating and widening WB SR-60 off-ramp to WB Grand Ave. and add an auxiliary lane. Begin construction September 2016; end construction December 2019. <b>(O1A)</b></li> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> <li>• This corridor extends into San Bernardino County. Please refer to District 8 Action Plan for additional remediation strategies.</li> </ul>

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
91	EB	LA	R6.400	LA	R11.167	4	4	4	4	4
		LA	R11.167	LA	R15.933	3	4	4	4	4
		LA	R15.933	LA	R20.700	2	4	3	2	3
91	WB	LA	R20.700	LA	R15.933	2	2	3	3	2
		LA	R15.933	LA	R11.167	1	3	3	4	3

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• General-purpose lane drops at I-710 interchange and I-605 interchange reduce capacity resulting in bottleneck.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• Widen freeway by adding one to two lanes along SR-91 from Paramount Boulevard to Shoemaker Avenue. Construction will begin August 2022 and will end September 2024. Estimated project cost is \$450 million.</li> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> <li>• The SR-91/I-605 interchange is included in a Congestion Hot Spots Study for I-605 from Valley Blvd. (just south of I-10) to I-405. The study includes analysis of passenger rail projects, bus service expansion, HOV lanes, HOV connectors, express lane, freight movement, Transportation Demand Management, and Intelligent Transportation Systems. Preliminary engineering and environmental studies are pending. Construction will be funded by Measure R funds and the forthcoming Transportation Strategic Plan-Phase II. The project would also be eligible for federal-aid funding. <b>(C2)</b></li> <li>• This corridor extends into Orange County. Please refer to District 12 Action Plan for additional remediation strategies.</li> </ul>

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						2013	2014	2015	2016	2017
105	EB	LA	R2.200	LA	R6.173	3	4	4	4	4
		LA	R6.173	LA	R10.145	2	4	4	4	4
		LA	R10.145	LA	R14.117	2	1	1	2	1
		LA	R14.117	LA	R18.090	4	4	2	1	2
105	WB	LA	R18.090	LA	R14.117	2	1	1	2	2
		LA	R14.117	LA	R10.145	4	2	2	3	3
		LA	R10.145	LA	R6.172	4	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• High HOV violation rates.</li> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• General-purpose lane drops at Prairie Ave, and South Vermont Ave, causes bottleneck.</li> <li>• .Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• Congestion in the general-purpose lanes extends into the HOV lane at the end termini.</li> <li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• Share vehicle occupancy count data with the CHP so they can prioritize their enforcement efforts. <b>(E1)</b></li> <li>• Restripe the general-purpose lanes to four lanes. The Project Initiation Document approved. The project funded by South Bay Measure R (Highway Program) which includes construction of an auxiliary lane on EB I-105 from Nash Ave. to Van Ness Ave. Project begins 2020. The project cost is \$30 million. <b>(O1A)</b></li> <li>• Add active traffic management and traffic monitoring system improvements along I-105 between I-605 and US-1. Project construction began in November 2017; completion by 2020.</li> <li>• Add auxiliary lane on WB 105 from Wilton Place to Hawthorne Blvd. Planned for completion by 2020. <b>(O1A)</b></li> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• The I-105/I-605 interchange is included in a Congestion Hot Spots Study for I-605 from Valley Blvd. (just south of I-10) to I-405. The study includes analysis of passenger rail projects, bus service expansion, HOV lanes, HOV connectors, express lane, freight movement, Transportation Demand Management, and Intelligent Transportation Systems. Preliminary engineering and environmental studies are pending. Construction will be funded by Measure R funds and the forthcoming Transportation Strategic Plan-Phase II. The project would also be eligible for federal-aid funding. <b>(C2)</b></li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> </ul>



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
110	EB	LA	9.800	LA	13.367	2	2	2	2	2
		LA	13.367	LA	16.933	2	2	3	3	3
		LA	16.933	LA	20.500	3	4	4	4	4
110	WB	LA	20.500	LA	16.933	3	1	4	4	3
		LA	16.933	LA	13.367	2	2	2	2	2
		LA	13.367	LA	9.800	2	1	1	2	1

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>The HOV lane converted to an express lane as of November 10, 2012. Vehicle volume has increased as a result of the addition of the toll paying vehicles as well as an increase in violation rates. It is anticipated that this will decrease over time as motorists become accustomed to using the FasTrak transponders and the new pricing demand strategies.</li> <li>The conversion of the I-110 HOV lane into the express lanes increased the vehicle volume at the termini at Adams Blvd. The location was not upgraded to sustain the increase in vehicle volumes.</li> <li>Congestion in the general-purpose lanes extends into the express lane at the end termini.</li> </ul>	<ul style="list-style-type: none"> <li>Installed channelizer within the buffer area to prevent violators crossing the buffer to avoid the toll transponder readers. Will monitor the effectiveness of the channelizer. Installed in November of 2017.</li> <li>Caltrans, in partnership with the Metropolitan Transportation Authority (MTA), is considering the following additional strategies to improve performance:               <ul style="list-style-type: none"> <li>➤ Increase the minimum toll rate.</li> <li>➤ Operational changes to express lane operation by adjusting congestion pricing algorithm on a continual basis. Charge clean air vehicles a reduced toll rate instead of being toll-free. (O6)</li> <li>➤ Modify the express lane operation including eliminating ingress/egress locations to reduce vehicle movement conflict, increasing occupancy requirement, and removing the limit on toll rates.</li> <li>➤ Additional signs were installed along the express lane to inform motorists of regulations and to deter violators. MTA has added additional signs notifying motorists that FasTrak transponders are required to access the express lane.</li> <li>➤ Repair and update detector system to improve data collection. The work is ongoing.</li> <li>➤ Install digital occupancy sign panels that will display the transponder setting which will assist the CHP to enforce vehicle occupancy or toll violations.</li> <li>➤ Deploy a CCTV (VPS) to convert video streams into vehicle counts and vehicle classification counts, including CCTV surveillance system, hardware/software and CCTV/VPS and Web Services operation and maintenance. The project began October 2016 and ends April 2018.</li> </ul> </li> <li>District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons.</li> </ul>



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
118	EB	LA	R0.000	LA	R3.800	1	1	1	1	2
		LA	R3.800	LA	R7.600	2	2	2	1	3
		LA	R7.600	LA	R11.400	3	3	3	4	4
118	WB	LA	R11.400	LA	R7.600	1	2	2	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• The HOV lane terminates before the I-5 interchange and merges into the number two lane. Congestion in the general-purpose lanes extends into the HOV lane at the end termini.</li> <li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• Add auxiliary lane at Tampa Ave. (PM 4.82) for operational improvements by 2020. <b>(O1A)</b></li> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> </ul>

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						2013	2014	2015	2016	2017
134	EB	LA	0.000	LA	4.428	2	2	3	3	3
		LA	4.428	LA	R8.855	1	4	4	4	4
134	WB	LA	R13.300	LA	R8.872	1	2	2	2	2
		LA	R8.872	LA	4.428	1	1	1	2	1
		LA	4.428	LA	0.000	3	2	2	3	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• EB SR-134 incomplete interchange with no freeway connector to NB I-5. Motorists must exit the freeway onto local streets to get onto NB I-5. Off-ramp back up, lane reduction and end of HOV lane.</li> <li>• Vehicle weaving conflict at I-5 interchange.</li> <li>• HOV lane ends at SR-170 and the numbers of lanes reduce from five lanes down to two causes back up.</li> <li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• US-101/SR-170/SR-134 interchange capacity improvements will widen the freeway. Estimated PA&amp;ED will be July 2018; construction begins December 2020; end construction July 2023. Estimated construction cost is \$28 million.</li> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> </ul>

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						2013	2014	2015	2016	2017
170	NB	LA	R17.505	LA	R20.510	1	4	2	2	2
170	SB	LA	R20.510	LA	R17.505	1	1	2	1	2
		LA	R17.505	LA	R14.500	4	4	3	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• High vehicle volume from NB SR-170 commuting to northern LA County merging into the NB I-5.</li> <li>• High truck volume.</li> <li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• SCAG RTP has the I-5 between limits of I-605 to SR-14 lists as a Truck Lane Study Project which the truck volume impacts the I-5/SR-170 interchange.</li> <li>• US-101/SR-170/SR-134 interchange capacity improvements will widen the freeway. Estimated PA&amp;ED will be July 2018; construction begins December 2020; end construction July 2023. Estimated construction cost is \$28 million.</li> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li> </ul>

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						2013	2014	2015	2016	2017
210	EB	LA	R25.000	LA	L29.568	2	4	4	2	2
		LA	L29.568	LA	R33.827	4	4	4	4	4
		LA	R33.827	LA	R38.396	2	4	4	4	4
		LA	R38.396	LA	R42.964	3	4	4	4	4
		LA	R42.964	LA	R47.532	2	3	3	4	4
		LA	R47.532	LA	R52.100	2	3	3	4	3
210	WB	LA	R47.532	LA	R42.964	2	1	2	2	2
		LA	R42.964	LA	R38.395	2	3	2	3	4
		LA	R38.395	LA	R33.827	4	4	4	4	4
		LA	R33.827	LA	L29.568	3	4	4	4	4
		LA	L29.568	LA	R25.000	3	3	3	3	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• General-purpose lane drops at El Molino Ave., Rosemead Blvd., and San Dimas Ave cause bottlenecks.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• High truck volume.</li> <li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• District 7 is establishing the Operational Connected Corridor. This will involve the coordination between Caltrans, local agencies, the CHP, first responders for incident management, construction activities, and special events. The project includes ramp metering synchronization, traffic signal synchronization, Transportation Management System, and Intelligent Transportation System. Completion planned by 2020. <b>(O2)</b></li> <li>• Restripe to add general-purpose lane from San Dimas to Fruit St. Project completion planned by 2020.</li> <li>• Extend auxiliary lane from WB I-210/SR-134 EB connectors to Lincoln Avenue. Completion planned for 2020. <b>(O1A)</b></li> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages. <b>(O12)</b></li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor. <b>(O13)</b></li> <li>• This corridor extends into San Bernardino County. Please refer to District 8 Action Plan for additional remediation strategies.</li> </ul>

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						2013	2014	2015	2016	2017
405	NB	LA	0.000	LA	4.842	2	3	3	4	4
		LA	4.842	LA	9.861	3	2	2	3	4
		LA	9.861	LA	14.703	2	4	4	4	4
		LA	14.703	LA	19.546	3	4	4	4	4
		LA	19.546	LA	24.388	4	4	4	4	4
		LA	24.388	LA	26.400	2	2	2	2	4
		LA	38.915	LA	43.758	2	4	4	4	4
		LA	43.758	LA	48.600	3	3	4	4	4
405	SB	LA	43.758	LA	38.915	3	4	4	4	4
		LA	38.915	LA	34.073	2	2	4	4	4
		LA	34.073	LA	30.700	3	2	3	2	4
		LA	26.400	LA	24.388	4	4	3	3	4
		LA	24.388	LA	19.546	2	3	3	4	4
		LA	19.546	LA	14.703	4	4	4	4	4
		LA	14.703	LA	9.861	2	4	4	4	4
		LA	9.861	LA	4.842	2	2	3	4	4
		LA	4.842	LA	0.000	1	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>Demand exceeds capacity.</li> <li>General-purpose lane drop prior to I-110 interchange causes a bottleneck.</li> <li>Construction activities along the route.               <ul style="list-style-type: none"> <li>➤ Bridge rehabilitation between PM 3.4-4.5 will be completed in 2018.</li> <li>➤ Installation of concrete and metal barriers between PM 1.74-11.5 will be completed in 2019.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Add auxiliary lanes from Redondo Beach Blvd. to Hawthorne Blvd. and from Hawthorne to Inglewood Ave. Widen NB Inglewood loop onramp to NB I-405. Add NB auxiliary lane from Normandie Ave. to Western Ave. Add NB auxiliary lane from Inglewood Ave. to Rosecrans Ave. Construct grade separation at La Cienega Blvd. and Manchester Blvd. Widen NB off ramp to Rosecrans Ave. Planned completion by 2020. <b>(O1A)</b></li> <li>Improvements to I-405/Crenshaw interchange. The NB off-ramp backs up onto the mainline. Project will include improvements to on/off-ramps, widening and adding auxiliary lane. Begin construction July 2020; end construction March 2022. Estimated construction cost is \$68 million. <b>(O1A)</b></li> <li>Add connector metering and ramp metering between I-105 to SR-90 interchanges. Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages. <b>(O2)</b></li> </ul>



<p>➤ Modification of Wilmington Ave interchange did not finish until the end of 2017.</p> <ul style="list-style-type: none"><li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li><li>• Changing traffic patterns due to I-405/Avalon interchange modifying configuration construction.</li><li>• Changing traffic patterns due to construction of a new auxiliary lane between Howard Hughes Parkway to a quarter mile south of SR-90.</li><li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li></ul>	<p>(Continue, D7: I-405)</p> <ul style="list-style-type: none"><li>• The SR-91/I-605 interchange is included in a Congestion Hot Spots Study for I-605 from Valley Blvd. (just south of I-10) to I-405. The study includes analysis of passenger rail projects, bus service expansion, HOV lanes, HOV connectors, express lane, freight movement, Transportation Demand Management, and Intelligent Transportation Systems. Preliminary engineering and environmental studies are pending. Construction will be funded by Measure R funds and the forthcoming Transportation Strategic Plan-Phase II. The project would also be eligible for federal-aid funding. <b>(C2)</b></li><li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons along the corridor.</li><li>• This corridor extends into Orange County. Please refer to District 12 Action Plan for additional remediation strategies.</li></ul>
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<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
605	NB	LA	R0.000	LA	R4.140	1	1	1	1	2
		LA	R4.140	LA	R8.280	3	2	2	1	2
		LA	R8.280	LA	R12.420	3	3	3	4	3
		LA	R12.420	LA	R16.560	3	4	3	3	2
605	SB	LA	20.700	LA	R16.560	1	1	1	1	2
		LA	R16.560	LA	R12.420	2	2	4	4	4
		LA	R12.420	LA	R8.280	3	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• General-purpose lane drop at I-5 interchange causes bottleneck.</li> <li>• High vehicle volume from I-5 causes congestion in the general-purpose lanes.</li> <li>• Construction activities along the route. I-10/I-605 interchange improvement project will complete in 2017.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• Possible non-metered on-ramps allowing platoons of vehicles entering the freeway.</li> </ul>	<ul style="list-style-type: none"> <li>• A Congestion Hot Spots Study is underway for I-605 from Valley Blvd. (just south of I-10) to I-405. The study includes analysis of passenger rail projects, bus service expansion, HOV lanes, HOV connectors, express lane, freight movement, Transportation Demand Management, and Intelligent Transportation Systems. Preliminary engineering and environmental studies are pending. Construction will be funded by Measure R funds and the forthcoming Transportation Strategic Plan-Phase II. The project would also be eligible for federal-aid funding. (C2)</li> <li>• Capacity Enhancement/Congestion Relief project planned. Project will widen freeway by adding one to two lanes along SR-91 from Paramount Blvd. to Shoemaker Ave. Project also includes capacity enhancement on I-605 between Centralia St. to Rosecrans Ave. Project begins construction on August 2022 and ends construction in September 2024. Project cost estimated at \$450 million.</li> <li>• Mainline, ramps, and connectors improvements. From Slauson to I-105, Florence Ave to Paramount Blvd, PM R7.63-R11.57. PA&amp;ED September 2019; Begin construction August 2023; End construction August 2025. Construction cost estimate is \$580 million.</li> <li>• I-605/SR-60 interchange improvements will add one general-purpose lane in each direction to reduce congestion and increase safety. PA&amp;ED August 2019; Begin construction February 2022; end construction January 2025. Construction cost estimate is \$964 million.</li> <li>• Meter HOV preferential lanes at on-ramps. Work is in progress. Completion date will be in 2020. Various routes are in different stages.</li> <li>• District 7 is assessing the viability of implementing Dynamic Active Traffic Management through installation of Dynamic Message Signs above the freeway to display advisory speed limits and actively manage vehicle platoons.</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded

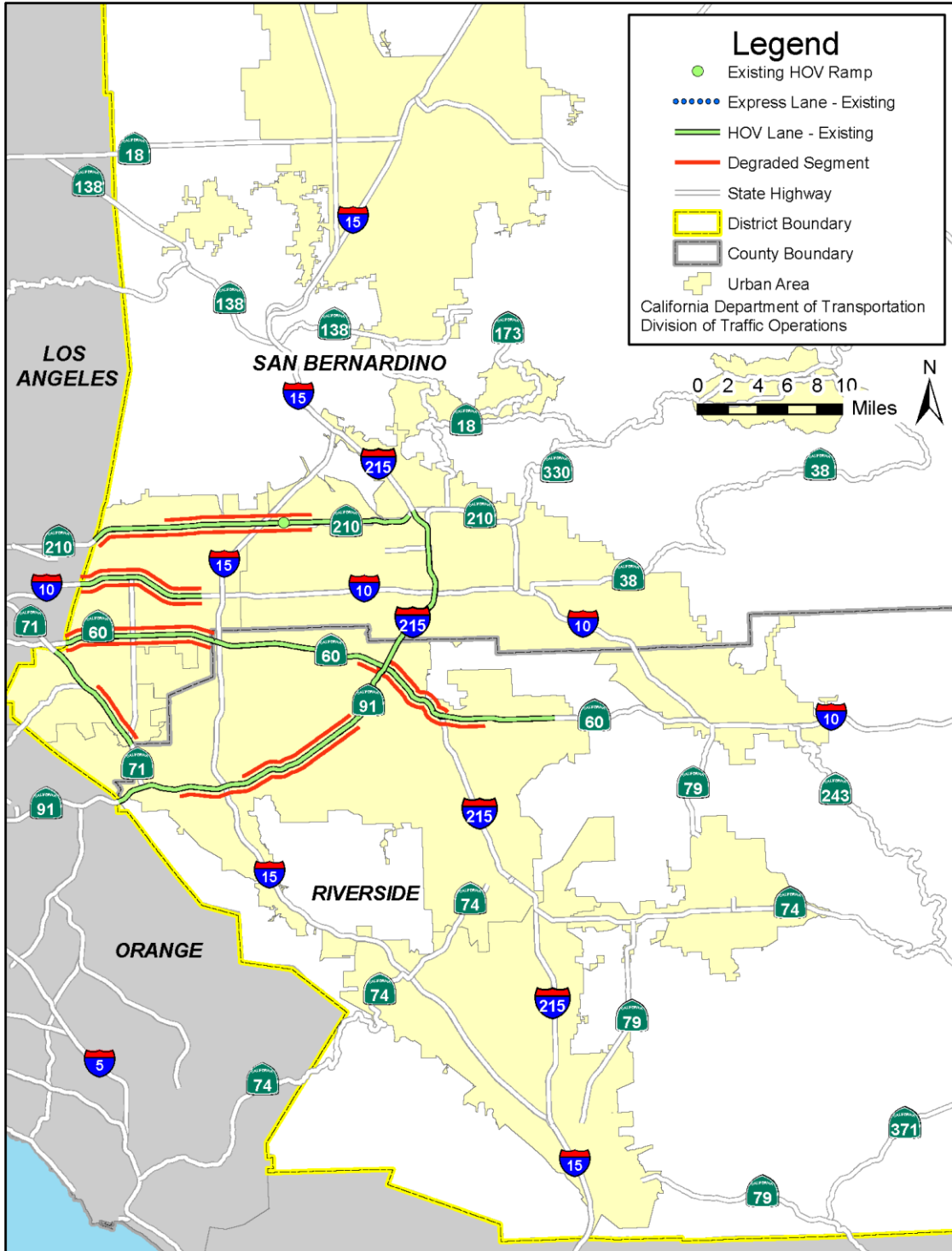


**4.4. DISTRICT 8 DEGRADATION SUMMARY AND ACTION PLAN**

<b>TABLE 6</b>						
<b>DISTRICT 8 LIST OF DEGRADED HOV FACILITIES</b>						
<b>Route</b>	<b>Direction</b>	<b>Begin County</b>	<b>Begin Post Mile</b>	<b>End County</b>	<b>End Post Mile</b>	<b>Minimum Occupancy</b>
10	EB	SBD	0.000	SBD	9.900	2
10	WB	SBD	9.900	SBD	0.000	2
60	EB	SBD	R0.000	RIV	R0.017	2
60	EB	RIV	10.266	RIV	15.413	2
60	WB	RIV	R0.017	SBD	R0.000	2
71	SB	SBD	R8.300	SBD	R4.150	2
91	EB	RIV	4.266	RIV	17.400	2
91	WB	RIV	17.400	RIV	8.644	2
210	EB	SBD	0.000	SBD	14.800	2
210	WB	SBD	14.800	SBD	0.000	2
215	NB	RIV	R38.300	RIV	43.300	2
215	SB	RIV	43.300	SBD	R38.300	2

FIGURE 6

DISTRICT 8 MAP OF DEGRADED HOV FACILITIES





Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
10	EB	SBD	0.000	SBD	4.950	3	2	2	2	3
		SBD	4.950	SBD	9.900	1	4	4	4	4
10	WB	SBD	9.900	SBD	4.950	1	2	2	2	2
		SBD	4.950	SBD	0.000	3	1	1	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lane.</li> <li>• The HOV lane ends at the junction of I-15. Congestion in the general-purpose lane extends into the HOV lane at the end termini.</li> <li>• High HOV violation rates.</li> <li>• High truck traffic volumes.</li> </ul>	<ul style="list-style-type: none"> <li>• 08-0C251 (phase 1), PM 0.00-13.20 &amp; LA PM 44.9-48.3 to widen two express lanes in each direction from Haven Ave. overcrossing to California St. Project cost estimate is \$522.7 million. Construction is estimated to begin on September 2018 to June 2022.</li> <li>• 08-0C252 (phase 2), PM 10.0-37.0 to add one express lane each direction from California St. to Ford St. Project cost estimate is \$847.6 million. Construction is estimated to begin on September 2021 to July 2025.</li> <li>• 08-0J400, PM 3.8-5.60, in Ontario between Grove Ave. undercrossing and 4th St. interchange and Grove Ave. corridor from E. 6th to E. Holt Blvd., to construct partial cloverleaf interchange at Grove Ave., remove 4th St interchange, replace UC at Grove Ave &amp; 4th St &amp; widen 4th St. Project cost estimate is \$244 million. Construction is estimated to begin on July 2020, to February 2022.</li> <li>• Share vehicle occupancy count data with the CHP so they can prioritize their enforcement efforts. (E1)</li> <li>• This corridor extends into Los Angeles County. Please refer to District 7 Action Plan for additional remediation strategies.</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
60	EB	SBD	R0.000	SBD	R4.987	2	4	4	4	4
		SBD	R4.987	RIV	R0.017	1	3	0	4	3
		RIV	10.266	RIV	15.413	1	3	4	4	2
60	WB	RIV	R0.017	SBD	R4.987	2	2	0	3	4
		SBD	R4.987	SBD	R0.000	1	2	0	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• Low visibility guide signs.</li> <li>• Possible congestion due to vehicles merging from on/off ramps due to closely spaced interchange.</li> <li>• Possible congestions caused by narrow bridges when vehicles merging.</li> </ul>	<ul style="list-style-type: none"> <li>• 08-1F361, 08-1F371 to replace existing signs with retro-reflective sheeting. Construction is estimated to begin on November 2020 to March 2022.</li> <li>• 08-1F260, SBD PM R7.8-R7.9 to widen Archibald Ave. interchange. The project has the total current estimate of \$11.4 million. Construction is estimated to begin on August 2019 to April 2021.</li> <li>• 08-033U, SBD PM R7.3-R10.0 in Ontario from 0.2-mile west of Cucamonga Creek bridge to Milliken Ave. to add WB auxiliary lane, add EB deceleration lane, widen I-15 S-W Connector and widen ramps and bridges. The project has the total current estimate of \$33.8 million. Construction is estimated to begin March 2021 to June 2022. <b>(O1A)</b></li> <li>• 08-0E334, SBD PM R4.56-R7.30 between Euclid Ave. and Archibald Ave. to add auxiliary lanes and ramp widening. The project is in planning and has a cost estimate of \$17.5 million. Construction is estimated to begin on May 2024 to May 2026. <b>(O1A)</b></li> <li>• 08- 1J230, RIV PM R1.0-12.0 from Wineville Rd. undercrossing to 0.2-mile west of SR-60/SR-91/I-215 interchange to install new ramp metering systems. Project cost estimate is \$9.4 million. Construction is estimated to begin on January 2021 to June 2021. <b>(O2)</b></li> <li>• This corridor extends into Los Angeles County. Please refer to District 7 Action Plan for additional remediation strategies.</li> </ul>

<sup>4</sup> Degradation Status:

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
71	SB	SBD	R8.300	SBD	R4.150	1	1	1	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Low visibility guide signs.</li> </ul>	<ul style="list-style-type: none"> <li>• 08-1J410, PM R4.7, realign SB Central Ave. off-ramp to add a third lane (PID phase). Project cost estimate is \$1.2 million. Construction is estimated to begin on May 2019 to November 2019.</li> <li>• 08-1F362, PM 0.0-R8.5, replace existing guide signs with type XI reflectivity (phase 2).</li> </ul>

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
91	EB	RIV	R0.000	RIV	4.266	4	4	4	3	1
		RIV	4.266	RIV	8.644	3	4	1	1	2
		RIV	8.644	RIV	13.022	1	1	1	2	3
		RIV	13.022	RIV	17.400	1	2	4	2	4
91	WB	RIV	17.400	RIV	13.022	1	1	1	2	2
		RIV	13.022	RIV	8.644	1	1	2	2	2
		RIV	8.644	RIV	4.266	3	4	2	2	1
		RIV	4.266	RIV	R0.000	2	3	2	1	1

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• Low visibility guide signs.</li> <li>• Possible congestion due to vehicles merging from on/off ramps due to closely spaced interchange.</li> </ul>	<ul style="list-style-type: none"> <li>• 08-G192, PM 7.40-15.60, convert existing buffer separated and limited access to continuous access HOV lane. Project cost estimate is \$825,000. Construction is estimated to begin on July 2019 to April 2020.</li> <li>• 08- 0F543, PM 6.10-7.60, add HOT/express lane from I-15/SR-91 south to west connector and I-15/SR-91 east to south direct connector NDC (SB132). Project cost estimate is \$160.8 million. Construction is estimated to begin on November 2020 to November 2022.</li> <li>• 08-1H180, PM 15.50-15.70, interchange modifications. Project is in PID stage. Cost estimate is \$61.2 million. Construction is estimated to begin on December 2021 to June 2024.</li> <li>• This corridor extends into Orange County. Please refer to District 12 Action Plan for additional remediation strategies.</li> </ul>

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0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
210	EB	SBD	0.000	SBD	4.933	2	4	4	4	4
		SBD	4.933	SBD	9.867	1	2	3	4	4
		SBD	9.867	SBD	14.800	1	1	1	1	2
210	WB	SBD	14.800	SBD	9.867	1	1	2	2	2
		SBD	9.867	SBD	4.933	1	2	2	2	2
		SBD	4.933	SBD	0.000	1	1	1	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• High truck volume.</li> </ul>	<ul style="list-style-type: none"> <li>• 08- 1G191, PM 0.0-10.3, convert existing buffer separated and limited access to continuous access HOV lane. Project cost estimate is \$650,000. Construction is estimated to begin on November 2017 to February 2018.</li> <li>• 08-1G210, PM 10.5-12.70 at route 210/15 interchange, install new freeway-to-freeway connector metering systems. The project has the total current estimate of \$3.6 million. Construction is estimated to begin on October 2019 to July 2020.</li> <li>• This corridor extends into Los Angeles County. Please refer to District 7 Action Plan for additional remediation strategies.</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
215	NB	RIV	R38.300	RIV	40.646	2	2	4	4	4
		RIV	40.646	RIV	43.300	4	2	2	2	2
215	SB	RIV	43.300	RIV	40.646	2	4	4	4	4
		RIV	40.646	RIV	R38.300	3	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• High HOV violation rates.</li> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• High truck volume.</li> </ul>	<ul style="list-style-type: none"> <li>• Share vehicle occupancy count data with the CHP so they can prioritize their enforcement efforts. (E1)</li> <li>• This corridor is continuation of the HOV lane from SR-60. Please refer to SR-60 for additional remediation strategies.</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



#### 4.5. DISTRICT 11 DEGRADATION SUMMARY AND ACTION PLAN

<b>TABLE 7</b>						
<b>DISTRICT 11 LIST OF DEGRADED HOV FACILITIES</b>						
<b>Route</b>	<b>Direction</b>	<b>Begin County</b>	<b>Begin Post Mile</b>	<b>End County</b>	<b>End Post Mile</b>	<b>Minimum Occupancy</b>
5	NB	SD	R30.700R	SD	R38.500	2
15	NB	SD	M12.000	SD	M27.600	2
15	SB	SD	M27.600	SD	M23.700	2

FIGURE 7

DISTRICT 11 MAP OF DEGRADED HOV FACILITIES





Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
5	NB	SD	R30.700	SD	R34.600	4	2	4	3	3
		SD	R34.600	SD	R38.500	1	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Construction activities.</li> <li>• The HOV lane ends at Manchester Ave. Congestion in the general-purpose lanes extends into the HOV lane at the end termini.</li> </ul>	<ul style="list-style-type: none"> <li>• Projects to improve traffic operations on I-5 include: extension of the northbound HOV lane an additional nine miles from Manchester Ave. to Palomar Airport Rd., construct a direct access ramp at Manchester Ave., construct a southbound auxiliary lane between Santa Fe Dr. and Birmingham Dr., and construct auxiliary lanes in both directions between Poinsettia Ln. and Palomar Airport Rd. Construction began in the fall of 2015 and will take two years to complete, by 2017. Currently, the HOV lane ends at a location that experiences recurrent congestion. Extension of the HOV lane an additional nine miles to the north and through the congested segment to the major interchange at Palomar Airport Rd. should relieve congestion on the HOV facility. (O1A &amp; O11)</li> <li>• EA 11-2T171 (PM 38.9 to 44.07) will extend the HOV lane an additional five miles to the I-5/SR-78 interchange will start construction in the fall of 2018. Performance of the constructed HOV facility will be monitored at the completion of the second stage (extension to SR-78). Construction is estimated at \$2 billion and is funded by STIP and local TransNet sales tax revenue.</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
15	NB	SD	M12.000	SD	M15.900	3	3	3	1	3
		SD	M15.900	SD	M19.800	0	1	2	1	2
		SD	M19.800	SD	M23.700	0	1	2	2	2
		SD	M23.700	SD	M27.600	0	1	1	2	2
15	SB	SD	M27.600	SD	M23.700	0	1	1	1	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>Operational issues at locations of intermediate access points and direct access ramps.</li> <li>Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> </ul>	<ul style="list-style-type: none"> <li>Monitor area and reassess network performance now that construction project is complete. District 11, San Diego Metropolitan Transit Service, and SANDAG have formed a multi-agency Corridor Management Team (CTM). The CTM meets monthly to assess performance and develop strategies to remediate congestion. The team will conduct on-going data collection, analysis, and reporting in order to track, prioritize, quantify, and summarize performance findings for initially strategies. Performance measures for data collection, analysis, and reporting include:               <ul style="list-style-type: none"> <li>Quantity of Travel                   <ul style="list-style-type: none"> <li>Number of FasTrak transponders and users</li> <li>Average FasTrak user trip length</li> <li>FasTrak cost recovery</li> <li>Peak period express lane volumes and VMT</li> <li>General-purpose lanes volume and VMT</li> <li>Number of vanpools and transit ridership</li> </ul> </li> <li>Quality of Travel                   <ul style="list-style-type: none"> <li>Peak period speeds, travel time, person-delay, etc.</li> <li>Transit – on-time performance/or peak load factor</li> </ul> </li> <li>Strategies that will be implemented include:                   <ul style="list-style-type: none"> <li>Changes to information distribution/traveler-related strategies (modify existing express lane signs).</li> <li>Enhancements to system operations, includes adjusting ramp meters.</li> <li>Modifications to FasTrak algorithm for allowing vehicles into the HOV lane (completed June 2015).</li> <li>The CMT will continue to monitor changes to the reversible barrier configurations and make necessary adjustments as necessary.</li> <li>Changes to access points – congestion at intermediate access points creating degradation upstream. Modifications proposed include creating weaving lane within access point or changing access to continuous access.</li> </ul> </li> <li>Public awareness campaign implementation.</li> </ul> </li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



**4.6. DISTRICT 12 DEGRADATION SUMMARY AND ACTION PLAN**

<b>TABLE 8</b>						
<b>DISTRICT 12 LIST OF DEGRADED HOV FACILITIES</b>						
<b>Route</b>	<b>Direction</b>	<b>Begin County</b>	<b>Begin Post Mile</b>	<b>End County</b>	<b>End Post Mile</b>	<b>Minimum Occupancy</b>
5	NB	ORA	20.497	ORA	38.901	2
5	SB	ORA	43.500	ORA	R25.096	2
22	EB	ORA	R4.368	ORA	R11.600	2
22	WB	ORA	R11.600	ORA	R0.700	2
55	NB	ORA	R6.000	ORA	17.300	2
55	SB	ORA	17.300	ORA	R6.000	2
57	NB	ORA	10.800	ORA	R22.500	2
57	SB	ORA	R22.500	ORA	10.800	2
91	EB	ORA	R0.000	ORA	R9.859	2
91	WB	ORA	R9.870	ORA	R0.000	2
405	NB	ORA	0.230	LA	0.300	2
405	SB	LA	0.300	ORA	5.080	2



FIGURE 8

DISTRICT 12 MAP OF DEGRADED HOV FACILITIES





Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
5	NB	ORA	20.497	ORA	R25.097	4	3	3	3	2
		ORA	R25.097	ORA	29.703	4	4	4	4	4
		ORA	29.703	ORA	34.302	1	4	4	4	4
		ORA	34.302	ORA	38.901	1	1	2	2	3
		ORA	38.901	ORA	43.500	1	1	1	1	1
5	SB	ORA	43.500	ORA	38.901	1	1	1	1	2
		ORA	38.901	ORA	34.302	4	3	4	3	3
		ORA	34.302	ORA	29.703	3	4	3	2	4
		ORA	29.703	ORA	R25.096	1	2	2	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• Bottlenecks at I-5/SR-55 HOV direct connector and I-5/SR-57 HOV direct connector.</li> <li>• Second HOV lane drop in the SB direction at Los Alisos Blvd. creates a bottleneck.</li> </ul>	<ul style="list-style-type: none"> <li>• In February 2017, Caltrans District 12 completed the development of the Orange County Managed Lanes Feasibility Study (MLFS) and Managed Lane Network Study (MLNS) to assess future region-wide development of the ML network. These studies evaluate and plan for the construction of additional ML lanes and prioritize recommended corridors in the next phase of the project development process. The District is evaluating corridors to proceed with development of the Project Initiation Document (PID) and I-5 from SR-55 to SR-91 will be evaluated for PID initiation with the goal of completing construction by 2030. <b>(O13)</b></li> <li>• 12-0C890 will add a second HOV lane between SR-55 and SR-57 to provide a dual HOV lane facility. Construction will begin in July 2018, and will be completed in July 2020. Project cost is estimated at \$42 million and is funded by Measure M2. <b>(C1)</b></li> <li>• 12-0K023 includes extending a second HOV lane in both directions between El Toro Rd. and Alicia Pkwy. Construction will begin in November 2019, and complete in June 2023. Project cost for three segments including 12-0K021 and 12-0K022 is estimated at \$300 million and is funded by Measure M2. <b>(C1)</b></li> <li>• 12-0Q690K reconstructs inductive detection systems, vehicle detection systems, and ramp metering systems at various locations on I-5, I-405, I-605, SR-22, SR-55, SR-57. The improvement will provide more accurate real time. <b>(O2)</b></li> </ul> <p><i>(Continue, D12 I-5)</i></p>



	<p>traveler information, reduce congestion, and improve efficiency and operations of the freeway system. Construction is scheduled to begin in December 2020, and will be completed by July 2022. Project cost is estimated at \$10.5 million and is funded by SHOPP.</p> <ul style="list-style-type: none"><li>• 12-0Q950K, I-5 HOT lane project between SR-55 and SR-91. Construction is scheduled to begin in September 2023, and will be completed by December 2024. PID phase was funded by SB-1 funding.</li><li>• Projects to construct HOV lanes in both directions on I-5 were divided into 3 segments.<ul style="list-style-type: none"><li>➤ Segment 1 (0F96A) begins south of Avenida Pico to south of Avenida Vista Hermosa in San Clemente.</li><li>➤ Segment 2 (0F96C) is between south of Avenida Vista Hermosa and south of Pacific Coast Highway.</li><li>➤ Segment 3 (F96E) starts at south of Pacific Coast Highway and terminates at San Juan Creek Road.</li><li>➤ Project costs for all three segment are estimated at \$76, \$57 and \$49 million respectively and are funded by Measure M2, STIP, and Congestion Mitigation and Air Quality Improvement (CMAQ) Program.</li><li>➤ Construction began in 2014, and all segments completed and opened to traffic on March 2018.</li></ul></li></ul>
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<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
22	EB	ORA	R0.700	ORA	R4.368	1	1	1	1	1
		ORA	R4.368	ORA	R8.036	1	2	2	2	3
		ORA	R8.036	ORA	R11.600	1	2	2	2	3
22	WB	ORA	R11.600	ORA	R8.036	1	1	2	2	3
		ORA	R8.036	ORA	R4.368	1	1	1	1	1
		ORA	R4.368	ORA	R0.700	4	3	1	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Vehicle weaving conflict at ingress/egress locations due to congestion in the general-purpose lanes.</li> <li>• Geometric constraints and a major bottleneck at SR-22/I-5/SR-57 interchange.</li> <li>• Queue jumpers to avoid bottleneck at collector-distributor roads.</li> <li>• High HOV violation rates.</li> </ul>	<ul style="list-style-type: none"> <li>• 12-0M900K proposes to shorten the existing collector-distributor roads concrete barrier and relocate the point of divergence easterly to the N. Bristol St. interchange, and reconfigure EB SR-22 mainline by striping to add one auxiliary lane, widen the SR-22 EB connector to NB I-5/SR-57 to add one lane, restrict entrance to EB SR-22 from collector-distributor road, and install new traffic control devices. Project cost is estimated at \$15.8 million and is funded by the SHOPP program. Construction will begin in December 2018, and will be completed by January 2021. <b>(O1A &amp; O14)</b></li> <li>• 12-0Q690K reconstructs inductive detection systems, vehicle detection systems and ramp metering systems at various locations on I-5, I-405, I-605, SR-22, SR-55, SR-57. The improvement will provide more accurate real time traveler information, reduce congestion, and improve efficiency and operations of the freeway system. <b>(O2)</b> Construction is scheduled to begin in December 2020, and will be completed by July 2022. Project cost is estimated at \$10.5 million and is funded by SHOPP.</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
55	EB	ORA	R6.000	ORA	R9.761	4	4	4	4	4
		ORA	R9.761	ORA	13.539	2	3	3	3	4
		ORA	13.539	ORA	17.300	3	2	3	4	2
55	WB	ORA	17.300	ORA	13.539	3	3	3	2	2
		ORA	13.539	ORA	R9.761	1	4	4	4	4
		ORA	R9.761	ORA	R6.000	1	1	2	2	2

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Bottlenecks at SR-55/I-405 HOV direct connector and I-5 HOV direct connector.</li> <li>• Mainline bottlenecks at SR-55/SR-22 interchange and SR-55/SR-91 interchange. <b>(O13)</b></li> <li>• NB HOV lane ends and transitions into general-purpose lane prior to joining the SR-91 express lane.</li> </ul>	<ul style="list-style-type: none"> <li>• In February 2017, Caltrans District 12 completed the development of the Orange County Managed Lanes Feasibility Study (MLFS) and Managed Lane Network Study (MLNS) to assess future region-wide development of the ML network. These studies evaluate and plan for the construction of additional ML lanes and prioritize recommended corridors in the next phase of the project development process. The District is evaluating corridors to proceed with development of the Project Initiation Document (PID) and I-5 from SR-55 to SR-91 will be evaluated for PID initiation with the goal of completing construction by 2030.</li> <li>• 12-0J340 proposed to add one HOV lane, one general-purpose lane, and an additional auxiliary lane in both directions between I-405 and I-5. Design had begun. Construction is scheduled to begin in January 2021, and will be completed by July 2024. Project cost is estimated at \$209 million and is funded by Measure M2 and SHOPP. <b>(O1A)</b></li> <li>• 12-0K970 is in development to construct a direct connector between SR-241 and SR-91 interchange. Construction will begin in September 2018, and will be completed in November 2020. Project cost is estimated at \$100 million. Transportation Corridor Agencies (TCA) is the lead agency.</li> <li>• 12-0Q690K reconstructs inductive detection systems, vehicle detection systems and ramp metering systems at various locations on I-5, I-405, I-605, SR-22, SR-55, SR-57. The improvement will provide more accurate real-time traveler information, reduce congestion, and improve efficiency and operations of the freeway system. <b>(O2)</b> Construction is scheduled to begin in December 2020, and will be completed by July 2022. Project cost is estimated at \$10.5 million and is funded by SHOPP.</li> </ul>

<sup>4</sup> Degradation Status:

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Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
57	NB	ORA	10.800	ORA	14.700	2	1	1	2	2
		ORA	14.700	ORA	18.600	1	2	3	4	4
		ORA	18.600	ORA	R22.500	1	3	4	4	4
57	SB	ORA	R22.500	ORA	18.600	2	3	4	4	4
		ORA	18.600	ORA	14.700	2	2	3	4	4
		ORA	14.700	ORA	10.800	1	3	3	3	3

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Bottlenecks at SR-55/I-405 HOV direct connector and I-5 HOV direct connector.</li> <li>• Major bottleneck at the SR-91 HOV direct connector</li> <li>• Geometric constraints and bottlenecks along this corridor.</li> <li>• Termination of SR-57 at the I-5/SR-22 interchange results in major weaving.</li> <li>• Queuing of vehicles from the SB I-5 HOV lane onto SB SR-57 at the interchange.</li> </ul>	<ul style="list-style-type: none"> <li>• In February 2017, Caltrans District 12 completed the development of the Orange County Managed Lanes Feasibility Study (MLFS) and Managed Lane Network Study (MLNS) to assess future region-wide development of the ML network. These studies evaluate and plan for the construction of additional ML lanes and prioritize recommended corridors in the next phase of the project development process. The District is evaluating corridors to proceed with development of the Project Initiation Document (PID) and I-5 from SR-55 to SR-91 will be evaluated for PID initiation with the goal of completing construction by 2030.</li> <li>• 12-0Q690K reconstructs inductive detection systems, vehicle detection systems and ramp metering systems at various locations on I-5, I-405, I-605, SR-22, SR-55, SR-57. The improvement will provide more accurate real-time traveler information, reduce congestion, and improve efficiency and operations of the freeway system. Construction is scheduled to begin in December 2020, and will be completed by July 2022. Project cost is estimated at \$10.5 million and is funded by SHOPP. (O2)</li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
91	EB	ORA	R0.000	ORA	0.864	0	4	0	4	4
		ORA	0.864	ORA	5.361	2	2	2	2	2
		ORA	5.361	ORA	R9.859	3	2	3	4	4
91	WB	ORA	R9.870	ORA	5.356	2	4	4	3	3
		ORA	5.356	ORA	0.841	2	2	2	2	2
		ORA	0.841	ORA	R0.000	3	4	4	4	4

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Major bottlenecks at the I-5 interchange and SR-57 interchange.</li> <li>• Weaving conflicts are created when the eastern portion of the HOV lane ends to become a general-purpose.</li> </ul>	<ul style="list-style-type: none"> <li>• In February 2017, Caltrans District 12 completed the development of the Orange County Managed Lanes Feasibility Study (MLFS) and Managed Lane Network Study (MLNS) to assess future region-wide development of the ML network. These studies evaluate and plan for the construction of additional ML lanes and prioritize recommended corridors in the next phase of the project development process. The District is evaluating corridors to proceed with development of the Project Initiation Document (PID) and I-5 from SR-55 to SR-91 will be evaluated for PID initiation with the goal of completing construction by 2030. <b>(O13)</b></li> <li>• 12-0K970 is in development to construct a direct connector between SR-241 and SR-91 interchange. Construction will begin in September 2018, and will be completed in November 2020. Project cost is estimated at \$100 million. Transportation Corridor Agencies (TCA) is the lead agency.</li> <li>• 12-0Q690K reconstructs inductive detection systems, vehicle detection systems and ramp metering systems at various locations on I-5, I-405, I-605, SR-22, SR-55, SR-57. The improvement will provide more accurate real-time traveler information, reduce congestion, and improve efficiency and operations of the freeway system. <b>(O2)</b> Construction is scheduled to begin in December 2020, and will be completed by July 2022. Project cost is estimated at \$10.5 million and is funded by SHOPP. <b>(O2)</b></li> </ul>

<sup>4</sup> Degradation Status:

0 = No Data; 1 = Not Degraded; 2 = Slightly Degraded; 3 = Very Degraded; 4 = Extremely Degraded



Route	Direction	Begin County	Begin Post Mile	End County	End Post Mile	Latest 5-Year Degradation Status <sup>4</sup>				
						2013	2014	2015	2016	2017
405	EB	ORA	0.230	ORA	5.080	3	2	2	2	3
		ORA	5.080	ORA	9.929	4	3	3	3	2
		ORA	9.929	ORA	14.779	3	4	4	4	4
		ORA	14.779	ORA	19.628	2	4	4	4	4
		ORA	19.628	LA	0.300	3	2	2	3	3
405	WB	LA	0.300	ORA	19.628	4	3	3	3	3
		ORA	19.628	ORA	14.779	2	4	4	4	4
		ORA	14.779	ORA	9.929	4	2	2	2	2
		ORA	9.929	ORA	5.080	2	4	4	4	4
		ORA	5.080	ORA	0.230	1	1	2	2	1

Potential Cause(s)	Remediation Strategies
<ul style="list-style-type: none"> <li>• Peak period recurrent congestion in all lanes reduces HOV lane performance and speed.</li> <li>• Demand exceeds capacity.</li> <li>• Vehicle weaving conflict at ingress/egress locations.</li> <li>• Congestion in the general-purpose lanes at SR-55 interchange and SR-22 interchange and through Irvine.</li> <li>• High traffic volume and demand from the John Wayne Airport and the South Coast Metro Center.</li> <li>• Bottleneck at I-405/SR-55 HOV direct connector.</li> </ul>	<ul style="list-style-type: none"> <li>• In February 2017, Caltrans District 12 completed the development of the Orange County Managed Lanes Feasibility Study (MLFS) and Managed Lane Network Study (MLNS) to assess future region-wide development of the ML network. These studies evaluate and plan for the construction of additional ML lanes and prioritize recommended corridors in the next phase of the project development process. The District is evaluating corridors to proceed with development of the Project Initiation Document (PID) and I-5 from SR-55 to SR-91 will be evaluated for PID initiation with the goal of completing construction by 2030.</li> <li>• A proposed Design-Build widening project on I-405 between SR-73 and I-605 is currently in the design phase. Alternative three was selected to add one general-purpose lane, one express lane, and convert the existing HOV lane to an express lane to create a dual express lane system. Design-build process began in 2017, and will be completed in August 2023. Project cost is estimated at \$1.9 billion, and is funded by a combination of federal, state, local Measure M2, and TIFIA loan.</li> <li>• 12-0Q690K reconstructs inductive detection systems, vehicle detection systems and ramp metering systems at various locations on I-5, I-405, I-605, SR-22, SR-55, SR-57. The improvement will provide more accurate real time traveler information, reduce congestion, and improve efficiency and operations of the freeway system. Construction is scheduled to begin in December 2020, and will be completed by July 2022. Project cost is estimated at \$10.5 million and is funded by SHOPP. (O2)</li> </ul>





APPENDIX

Table A-1

DISTRIBUTION OF HYBRID AND ILEV DECALS BY COUNTY

County	Number of Green Plug-in Hybrid Decals as of 12/31/2017	Number of White ILEV Decals as of 12/31/2017	County	Number of Green Plug-in Hybrid Decals as of 12/31/2017	Number of White ILEV Decals as of 12/31/2017
Alameda	9,578	15,624	Placer	1,195	1,399
Alpine	3	3	Plumas	4	3
Amador	17	13	Riverside	4,600	3,192
Butte	40	39	Sacramento	2,590	2,880
Calaveras	24	18	San Benito	133	62
Colusa	2	2	San Bernardino	4,471	2,518
Contra Costa	5,681	7,189	San Diego	8,402	10,859
Del Norte	4	2	San Francisco	2,337	4,503
El Dorado	468	444	San Joaquin	713	628
Fresno	218	451	San Luis Obispo	218	144
Glenn	5	16	San Mateo	4,340	7,563
Humboldt	115	24	Santa Barbara	459	468
Imperial	21	16	Santa Clara	17,598	30,162
Inyo	10	12	Santa Cruz	1,122	1,131
Kern	246	123	Shasta	38	18
Kings	6	19	Sierra	8	1
Lake	45	25	Siskiyou	12	5
Lassen	3	7	Solano	1,327	982
Los Angeles	41,072	42,493	Sonoma	2,392	2,505
Madera	13	62	Stanislaus	198	153
Marin	1,731	2,608	Sutter	25	14
Mariposa	8	5	Tehama	17	3
Mendocino	109	58	Trinity	5	2
Merced	116	36	Tulare	34	57
Modoc	1	2	Tuolumne	23	12
Mono	3	406	Ventura	2,671	1,735
Monterey	523	471	Yolo	508	472
Napa	417	71	Yuba	21	15
Nevada	82	21,785	Out-of-State	168	1,793
Orange	19,324	15,624	Unknown	1,239	1,570
<b>Total</b>	<b>136,753</b>	<b>166,873</b>			