DEPARTMENT OF TRANSPORTATION
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Flex your power!
Be energy efficient!

October 7, 2013

The Honorable Mark DeSaulnier
Chair, Senate Transportation and Housing Committee
California State Senate
State Capitol, Room 2209
Sacramento, CA 95814

Dear Senator DeSaulnier:

I am pleased to submit the California Department of Transportation's "Safety Enhancement–Double Fine Zones: Report to the Legislature," as required by Streets and Highways Code section 97.5.

Distribution to the California State Legislature has been made pursuant to Government Code section 9795. This report is available on the Internet at <www.dot.ca.gov/reports-legislature.htm>.

Sincerely,

MALCOLM DOUGHERTY
Director

Enclosure

Distribution:
The Honorable Mark DeSaulnier, Chair, Senate Transportation and Housing Committee
The Honorable Bonnie Lowenthal, Chair, Assembly Transportation Committee
Diane Boyer-Vine, Legislative Counsel, California State Legislature
Gregory Schmidt, Secretary of the Senate, California State Senate
E. Dotson Wilson, Chief Clerk of the Assembly, California State Assembly

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October 7, 2013

The Honorable Bonnie Lowenthal
Chair, Assembly Transportation Committee
California State Assembly
State Capitol, Room 112
Sacramento, CA 95814

Dear Assembly Member Lowenthal:

I am pleased to submit the California Department of Transportation's "Safety Enhancement–Double Fine Zones: Report to the Legislature," as required by Streets and Highways Code section 97.5.

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October 7, 2013

Ms. Diane Boyer-Vine
Legislative Counsel
State Capitol, Room 3021
Sacramento, CA 95814

Dear Ms. Boyer-Vine:

I am pleased to submit the California Department of Transportation's "Safety Enhancement–Double Fine Zones: Report to the Legislature," as required by Streets and Highways Code section 97.5.

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October 7, 2013

Mr. Gregory Schmidt
Secretary of the Senate
State Capitol, Room 3044
Sacramento, CA 95814

Dear Mr. Schmidt:

I am pleased to submit the California Department of Transportation's "Safety Enhancement–Double Fine Zones: Report to the Legislature," as required by Streets and Highways Code section 97.5.

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October 7, 2013

Mr. E. Dotson Wilson
Chief Clerk of the Assembly
State Capitol, Room 3196
Sacramento, CA 95814

Dear Mr. Wilson:

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E. Dotson Wilson, Chief Clerk of the Assembly, California State Assembly

CALIFORNIA DEPARTMENT OF TRANSPORTATION

SAFETY ENHANCEMENT–DOUBLE FINE ZONES

Report to the Legislature

Prepared in Compliance With
Streets and Highways Code Section 97.5

October 2013

BACKGROUND

Streets and Highways Code section 97.5, amended in 2008 with the passage of Senate Bill 1419 (Yee, Chapter 121, Statutes of 2008), requires the California Department of Transportation (Caltrans) to report on the performance of designated "Safety Enhancement–Double Fine Zones" in place to improve pedestrian safety on the following highway segments within the city and county of San Francisco: (1) State Route 1 between Junipero Serra Boulevard and Lake Street, and (2) U.S. Route 101 between Golden Gate Avenue and Lyon Street. Section 97.5 identifies these two highway segments for focused enforcement efforts with enhanced fines as defined in Streets and Highways Code section 97, subdivisions (e), (f), and (g).

In cooperation with departments of the City and County of San Francisco, Caltrans implemented two major pedestrian safety and signal improvement projects on the State Route 1 segment. Double fine zone signing was put in place on both State Route 1 and U.S. Route 101. This one-time report summarizes the pedestrian safety benefits of the double fine zones on these highway segments and fulfills code requirements.

Double fine zones in California were originally established through legislation in 1995 (Senate Bill 414, Thompson, Chapter 841, Statutes of 1995). In December 1997 Caltrans completed a study on the double fine zones in place at that time. That study of double fine zones was inconclusive because of the limited number of comparison sites and insufficient time to collect collision data.

The use of double fine zones expanded to fourteen locations, nine in Northern California and five in Southern California. A more thorough study done in December 2002 analyzed collision data from twelve existing double fine zones on various roadway types across the state. The study evaluated roadway segments designated only as double fine zones against roadway segments designated as double fine zones that included constructed roadway safety improvements such as roadway widening or median barrier or rumble strip installations. This study used the best analytical approach available at the time for evaluating safety improvements.

The analysis indicated both a slight increase in total collisions and a minor reduction in fatal and injury collisions on roadway sections with double fine zone signage but no other safety improvements. By comparison, there were large reductions in fatal and injury collisions on double fine zones with safety improvements.

Caltrans recommended that (1) double fine zones with enhanced enforcement and public education be used within designated corridors, and (2) the corridors have corresponding safety improvements under construction in order to engage the public and raise awareness of safety concerns.

STATE ROUTE 1

State Route 1 is a major urban arterial highway connecting the San Francisco peninsula to the Golden Gate Bridge and Northern California, serving on average 67,000 vehicles a day. The corridor is an avenue for commercial, residential, and recreational areas as well as a gateway to San Francisco State University. Speed limits along the corridor are 35 miles an hour except within school zones, where they are reduced to 25 miles an hour. There are a number of existing automated red light enforcement cameras and speed feedback signs in place. The San Francisco Municipal Railway train tracks are located within the median for a portion of the southern end of the corridor between Junipero Serra Boulevard and Rossmoor Drive where the tracks cross the northbound lanes. There are paved sidewalks in both directions, except between Lincoln Way and Fulton Street within the Golden Gate National Park, where dirt paths are present.

The signals in this corridor are owned by the State but are operated by the City and County of San Francisco, with the exception of the signal at the Stonestown Center parking lot and Rossmoor Drive intersection, which is operated and maintained by the State. Two major safety improvement projects upgraded existing signals to the current standard for multilane urban conventional highways with the installation of mast arms, pedestrian signals, and improved intersection lighting. Corresponding intersection improvements included upgrades to pedestrian crosswalk markings and installation of pedestrian ramps at the intersection corners. Caltrans installed bulb-outs at selected intersection corners to reduce the pedestrian crossing distance.

U.S. ROUTE 101

U.S. Route 101 between Golden Gate Avenue and Lyon Street is a major urban arterial highway, serving on average 48,000 vehicles a day, that passes through various commercial, residential, and recreational areas within San Francisco, providing access to the Golden Gate Bridge at the northern end of the safety segment. There is a large construction project underway at the northern end of the corridor to replace the approach structure to the Golden Gate Bridge. In contrast to the double fine zone on State Route 1, there were no pedestrian safety improvement projects on the U.S. Route 101 segment during the study period.

ANALYSIS OF STATE ROUTE 1 AND U.S. ROUTE 101 DOUBLE FINE ZONES COLLISION DATA

Because of pedestrian collisions on State Route 1, local residents, State officials, and local legislators expressed increased awareness and interest in pedestrian safety. Portions of State Route 1 and U.S. Route 101 were statutorily designated Safety Enhancement–Double Fine Zones in 2008. Subsequently physical improvements were made on the State Route 1 segment and a public education campaign was implemented. In contrast, the U.S. Route 101 segment was only designated and signed as a double fine zone; there were no pedestrian safety improvement projects during the study period and no continual public education campaign.

Caltrans conducted a before-and-after analysis evaluating overall performance of the two double fine zones. The annual collision history involving pedestrians demonstrates that pedestrian collisions have declined since 2008 on the State Route 1 segment (see Figure 1 on page 5).

Similar statistics for the U.S. Route 101 segment indicate a slight increase in pedestrian-related collisions at the outset of the study period (see Figure 2 on page 6). The increase in collisions beginning in 2009 may be due to changes in traffic patterns at the ends of this segment or other activity within the segment.

Before-and-after summaries for the two double fine zones are listed in Tables 1 and 2 on pages 7 and 8. Since establishing the double fine zone on State Route 1, there has been a slight increase in rear-end collisions and a decrease in broadside collisions on this segment. This change in collision patterns is consistent with the expected safety benefits from the installation of traffic signals. The increase in injury collisions on the U.S. Route 101 segment indicates that the double fine zone designation alone has not provided a safety benefit.

CONCLUSION

On State Route 1, where the double fine zone was combined with a series of major physical improvements, pedestrian collisions declined from 24 collisions to 17 collisions. Of those, there were five fatal collisions before and zero fatal collisions after the double fine zone designation. On U.S. Route 101, after establishing the double fine zone without implementing improvement projects, pedestrian collisions increased from 22 collisions to 36 collisions. Of those, there were two fatal collisions before and one fatal collision after the double fine zone designation.

Both double fine zones were established with similar publicity at the outset. The initial publicity and continued focused enforcement and public education raised public awareness of pedestrian safety issues throughout the course of the safety improvement projects on State Route 1.

NEW TOOLS AVAILABLE FOR ANALYSIS OF CORRIDORS

Subsequent to designation of the State Route 1 and U.S. Route 101 segments as double fine zones, the American Association of State Highway and Transportation Officials (AASHTO) adopted new analytical tools that can be used to assess, evaluate, quantify, and predict the effects on various roadway types of proposed safety improvements, both infrastructure and noninfrastructure, such as those completed on State Route 1. The AASHTO *Highway Safety Manual,* Edition 1, published in 2010, provides new predictive tools that can assist in the evaluation of corridors similar to State Route 1 and that can be used to compare the expected safety benefits of proposed alternatives relative to overall project costs.

The new federal transportation bill, "Moving Ahead for Progress in the 21st Century Act" or "MAP–21" (Pub. L. 112–141, July 6, 2012; 126 Stat. 405), has provided more flexibility in funding infrastructure and noninfrastructure corridor improvements similar to the projects completed on State Route 1. The available tools and funding flexibility allow comprehensive evaluation of safety corridors and quantification of the safety effects of proposed improvements when projects are being considered as well as focused enforcement and public education, similar to the capability provided in Streets and Highways Code section 97, as part of safety projects under construction.

RECOMMENDATIONS

1. Caltrans does not recommend additional criteria for the establishment of pedestrian safety corridors or double fine zones be added to Streets and Highways Code section 97, subdivision (a), which defines the conditions for designation of a highway segment as a Safety Enhancement–Double Fine Zone.

   U.S. Route 101 was used as the control location for the before-and-after analysis of the double fine zones established in 2008 on State Route 1 and U.S. Route 101. The only real improvement to pedestrian safety on U.S. Route 101 was the reduction of one fatality from two. While it is important to recognize this reduction, it cannot be definitively attributed to the double fine zone designation. Because of the small fatal data population size on U.S. Route 101, this reduction cannot be considered statistically significant. The observed reduction is more likely attributable to the manifestation of a random event. In addition, pedestrian injury collisions increased on U.S. Route 101. Therefore, it is concluded that the double fine zone designation had no measurable pedestrian safety benefit to the U.S. Route 101 study location.

   The double fine zone on State Route 1 was established with a continued public awareness campaign and physical improvement projects. Pedestrian safety did improve at this location. However, because the double fine zone on U.S. Route 101 alone did not have a measureable benefit to pedestrian safety, the conclusion can be drawn that the double fine zone contribution to pedestrian safety on State Route 1 was negligible and that the continued public awareness campaign and physical improvement projects contributed to the majority of the benefits to pedestrian safety.

   A double fine zone study conducted in December 2002 (not pedestrian-focused) indicated both a slight increase in total collisions and a minor reduction in fatal and injury collisions on roadway sections with double fine zone signage but no other safety improvements. By comparison, there were large reductions in fatal and injury collisions on double fine zones with safety improvements. The December 2002 double fine zone study drew a similar conclusion to this pedestrian double fine zone study. The conclusion is that double fine zones alone are ineffective and where double fine zones are implemented, the inclusion of enhanced enforcement, public education, and safety improvements are necessary.

2. Since Caltrans does not recommend additional criteria for the establishment of pedestrian safety corridors or double fine zones be added to Streets and Highways Code section 97, subdivision (a), and since historically State Route 1 and U.S. Route 101 have not met the existing double fine zone criteria set forth in that section, Caltrans recommends the double fine zone designations on State Route 1 and U.S. Route 101 defined in Streets and Highways Code section 97.5, subdivision (a), be allowed to expire.

Figure 1

ANNUAL PEDESTRIAN COLLISION RATES WITHIN STATE ROUTE 1 DOUBLE FINE ZONE

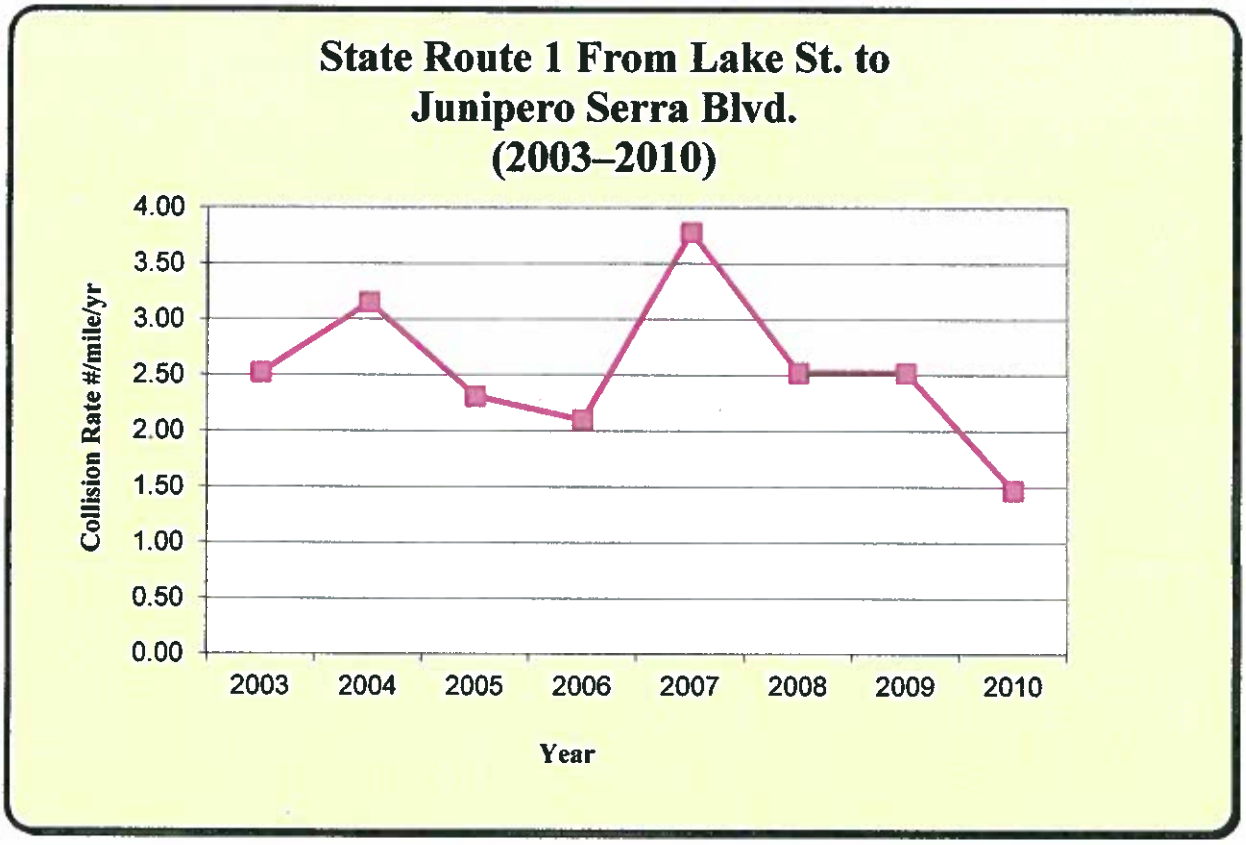

Figure 2

ANNUAL PEDESTRIAN COLLISION RATES WITHIN U.S. ROUTE 101 DOUBLE FINE ZONE

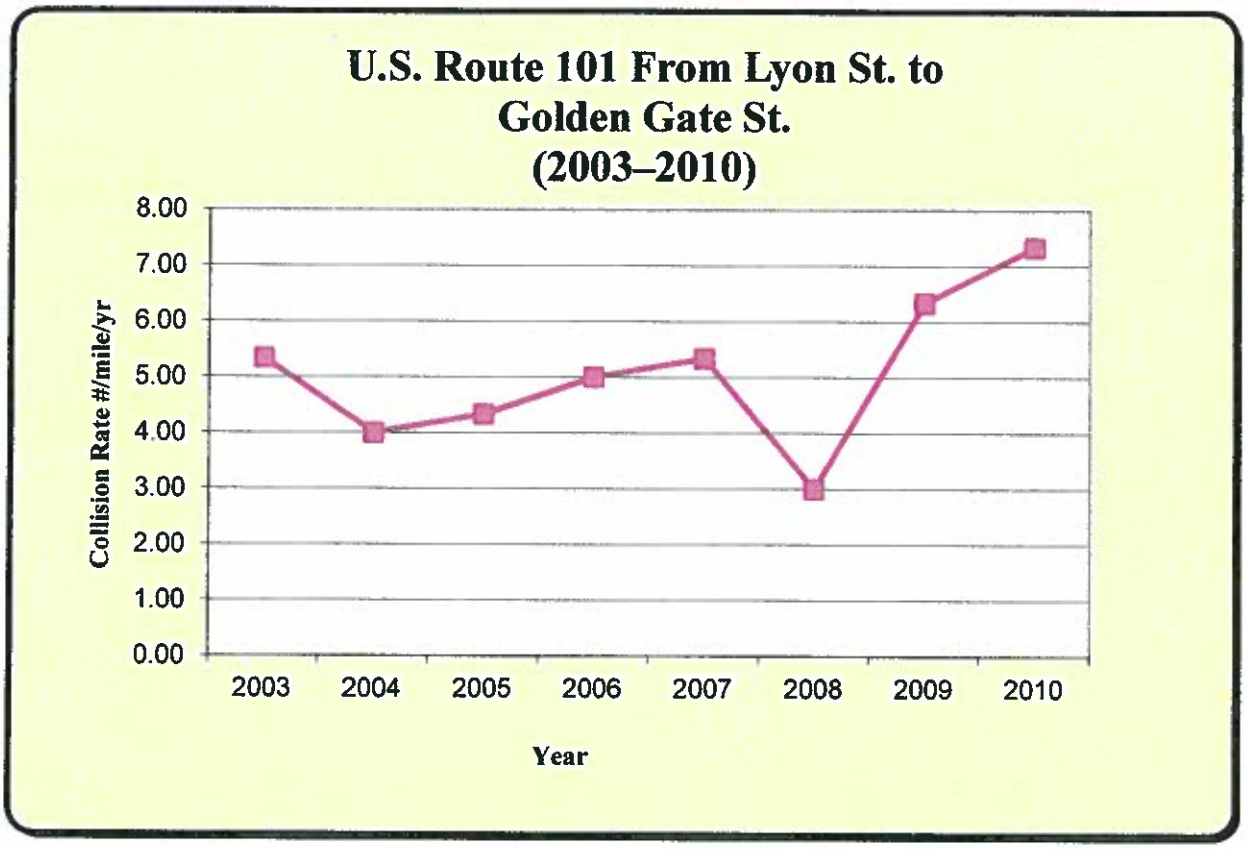

Table 1

**DISTRICT 4 BEFORE-AND-AFTER SUMMARY
STATE ROUTE 1, SAN FRANCISCO
FROM JUNIPERO SERRA BOULEVARD TO LAKE STREET
PM R0.68–5.88, 5.20 MILES**

Total Collisions

		Pre-Double Fine Zone 01/01/07–12/31/08 (Based on 211 Total Collisions)	Post-Double Fine Zone 01/01/09–12/31/10 (Based on 196 Total Collisions)
Severity	# of Fatals	6	0
	# of Injuries	155	154
	# of Prop. Dam. Only	50	42
Collision Type	Rear-end	43.1%	44.4%
	Broadside	23.2%	15.8%
	Pedestrian Involved	10.0%	7.7%
	Sideswipe	8.1%	11.2%
	Fixed Object	7.1%	9.7%
	Head-on	1.9%	5.1%
	Overturned Vehicle	1.9%	2.6%
	Other Type	4.7%	3.5%
Primary Collision Factor	Speeding	41.7%	43.4%
	Failing to Yield	9.0%	8.2%
	Influence of Alcohol	5.7%	9.2%
	Improper Turns	6.6%	5.1%
	Following Too Closely	5.2%	8.2%
	Other Violations	31.8%	25.9%

Pedestrian-Involved Collisions From Total Collisions

		Pre-Double Fine Zone 01/01/07–12/31/08 (Based on 24 Pedestrian Collisions* Out of 211 Total)	Post-Double Fine Zone 01/01/09–12/31/10 (Based on 17 Pedestrian Collisions* Out of 196 Total)
Severity	# of Fatals	5	0
	# of Injuries	19	17
	# of Prop. Dam. Only	0	0
Primary Collision Factor	Failing to Yield	62.5%	29.4%
	Speeding	4.2%	17.6%
	Other Violations	33.3%	53.0%

*These collisions also include those coded as pedestrian-related as a secondary event and therefore do not reflect in the "Pedestrian Involved" collision type noted in the Total Collision figures above.

Table 2

DISTRICT 4 BEFORE-AND-AFTER SUMMARY
U.S. ROUTE 101 , SAN FRANCISCO
FROM GOLDEN GATE AVENUE TO LYON STREET
PM R5.26–8.05, 2.79 MILES

Total Collisions

		Pre-Double Fine Zone 01/01/07–12/31/08 (Based on 186 Total Collisions)	Post-Double Fine Zone 01/01/09–12/31/10 (Based on 229 Total Collisions)
Severity	# of Fatals	2	1
	# of Injuries	140	159
	# of Prop. Dam. Only	44	69
Collision Type	Rear-end	34.3%	31.9%
	Broadside	26.9%	24.0%
	Pedestrian Involved	17.2%	15.7%
	Sideswipe	11.8%	15.7%
	Fixed Object	3.8%	4.4%
	Head-on	3.2%	6.6%
	Overturned Vehicle	2.2%	0.9%
	Other Type	0.6%	0.8%
Primary Collision Factor	Speeding	21.0%	24.5%
	Failing to Yield	19.4%	17.5%
	Influence of Alcohol	5.4%	4.4%
	Improper Turns	8.6%	7.0%
	Following Too Closely	6.5%	4.4%
	Other Violations	39.1%	42.2%

Pedestrian-Involved Collisions From Total Collisions

		Pre-Double Fine Zone 01/01/07–12/31/08 (Based on 22 Pedestrian Collisions* Out of 186 Total)	Post-Double Fine Zone 01/01/09–12/31/10 (Based on 36 Pedestrian Collisions* Out of 229 Total)
Severity	# of Fatals	2	1
	# of Injuries	18	34
	# of Prop. Dam. Only	2	1
Primary Collision Factor	Failing to Yield	31.8%	50.0%
	Speeding	4.5%	2.8%
	Improper Turn	4.5%	0.0%
	Other Violations	59.2%	47.2%

*These collisions also include those coded as pedestrian-related as a secondary event and therefore do not reflect in the "Pedestrian Involved" collision type noted in the Total Collision figures above.