AMENDED AGENDA

CALIFORNIA TRAFFIC CONTROL DEVICES COMMITTEE (CTCDC)
August 30, 2012 Meeting (Start Time 9 am)
220 South Daisy Avenue
Santa Ana (Corporate Yard), CA 92703

The Meeting is open, and public/local agencies are invited to attend. For further information regarding this meeting, please contact Devinder Singh at (916) 654-4715, or at Devinder.singh@dot.ca.gov. Electronic copies of this meeting Agenda and minutes of the previous meeting are available at http://www.dot.ca.gov/hq/traffops/signtech/newtech/index.htm

Organization Items

1 Introduction
2 Election of Chairman and Vice Chairman, Membership
3 Approval of Minutes of the May 24, 2012 Meetings
4 Public Comments

At this time, members of the public may comment on any item not appearing on the agenda. Matters presented under this item cannot be discussed or acted upon by the Committee at this time. For items appearing on the agenda, the public is invited to make comments at the time the item is considered by the Committee. Any person addressing the Committee will be limited to a maximum of five (5) minutes so that all interested parties have an opportunity to speak. When addressing Committee, please state your name, address, and business or organization you are representing for the record.

Agenda Items

5 Public Hearing
Prior to adopting rules and regulations prescribing uniform standards and specifications for all official traffic control devices placed pursuant to Section 21400 of the California Vehicle Code (CVC), the Department of Transportation is required to consult with local agencies and hold public hearings.

		Page #s
12-13	Proposal to amend Section 2C.29 SPEED HUMP Sign (W17-1) based on the Experiment conducted by the City of Stockton with SPEED HUMP (W17-1) Signs See Final Report on the following website: http://www.dot.ca.gov/hq/traffops/signtech/newtech/reports.htm	(Continued) (Knowles) 8-8
12-14	Table updates throughout Part 6 of the CA MUTCD 2012 -Submitted by Caltrans	(Introduction) (Fogle) 9-16
12-15	High-visibility safety apparel policy updates throughout Part 6 of the CA MUTCD 2012 - Submitted by Caltrans	(Introduction) (Fogle) 17-18
12-16	Proposal to Amend Section 3B.18 of the CA MUTCD 2012 to Enhance Uncontrolled Intersection or Mid-Block Crossings – Submitted by Caltrans	(Introduction) (Fogle) 19-20

12-17	Adopt an Interim Approval (1A-15) issued by the FHWA for the Optional Use of an Alternative Design for the U.S. Bicycle Route (M1-9) Sign - Submitted by Caltrans	(Introduction) (Fogle) 21-24

6. Request for Experimentation

12-18	Request to experiment with Red Colored Transit-only Lanes - Submitted by San Francisco	(Introduction) (Knowles) 25-40
12-19	Request to Experiment with Highlighted Shared Lane Markings - Submitted by the City of Los Angeles	(Introduction) (Bahaodri) 41-45
Added12-21	Request to Experiment with In-Roadway Warning Lights (IRWL) System that would supplement existing traffic signals along the Metro Gold Line – Submitted by LA County Metro	(Introduction) (Robinson) 46-55

7 Information Items - None

12-20	FHWA's 2009 MUTCD Revisions 1 and 2 –Engineering Judgment & Compliance Dates	(Introduction) (Fogle) 56-56

8 Next Meeting

9 Adjourn

ITEM UNDER EXPERIMENTATION

06-2 Experiment with Colored Bike Lane (Ku/Wong)
(Proposed by the City of San Francisco)
Status:
San Francisco has designed and installed green thermoplastic in the dashed portions of bicycle lanes at 7 intersections. Photos of the green installation at a few locations can be viewed here: http://sf.streetsblog.org/2012/06/22/sfmta-adding-more-green-treatments-to-bike-lane-merging-zones/. We will be working on collecting "After" data in the next two months followed by an analysis of the data to determine if the treatment improves safe merging behavior and compliance with proper lane placement by both bicyclist and motorists.
The revised schedule for the remainder of the experiment is as follows:
August 2012 – Ongoing data collection to continue through September
October 2012 – Draft report
December 2012 – Final report
Thanks,
Darcie Lim, PE
SFMTA | Municipal Transportation Agency
One South Van Ness Avenue, 7th Floor
San Francisco, CA 94103
phone: (415) 701-4545

08-7 Request for Experimentation with new Warning Sign for Bicyclists (Ku/Wong)
(Proposed by the City/Co of San Francisco)
Status: No new update. No change since their last report. The City and County of San Francisco would like to bring this experiment to a close and therefore will analyze collision data collected before and after the installation of this experimental warning sign and submit the results to the Committee within the next 12 months for its evaluation.

08-21 Proposal to Experiment with Regulatory Sign "BIKES IN LANE" with (Fogle/Henley)
Bicycle Symbol (Originally submitted as "Bike May Use Full Lane")
Status: No New update. Caltrans District 5 still looking for funding for the human factors study. The signs have been well received and there are no negative issues to report at this time. State collision data is not yet available, however, collision data obtained from the City of Santa Cruz up to 09/01/09, shows that there have been 3 bike related collisions since the signs went up, 5 in the year previous, and 7 in the year prior to that.

09-9 Request to Experiment with Steady Red Stop Line Light (Fisher)

Status: LADOT prepared a draft evaluation report which indicated that the Steady Red Stop Lights at two intersections did reduce vehicle/bus and vehicle/train conflicts based on the camera surveillance data. However, the "Control Intersections" (locations where no Steady Red Stop Lights were installed) also showed similar improvements. Further analysis of more data will be conducted in the next twelve months.
See report on the following website.
http://www.dot.ca.gov/hq/traffops/signtech/newtech/status.htm

09-21 Request for Permission to Experiment with Separated/Protected Bikeway (Fisher)
On the Left Side of Two One-Way Streets in the City of Long Beach (Rte 9-112E)
Status: No new update. See report on the following website.
http://www.dot.ca.gov/hq/traffops/signtech/newtech/status.htm

10-3 Experiment with Second Train Warning Sign "Additional Train May Approach" with a Symbol Sign (Submitted by City of Riverside) (Fisher)

Status: No new update. See report on the following website.
http://www.dot.ca.gov/hq/traffops/signtech/newtech/status.htm

11-3 Request to Experiment with Buffered Bicycle Lanes on 2nd St.between Bayshore & PCH in Naples (Fisher)
Status: No update.

11-4 Request for Permission to Experiment with Round Rapid Flashing Beacon (Fisher)
Status: See report on the following website.
http://www.dot.ca.gov/hq/traffops/signtech/newtech/status.htm

11-12 Request for Permission to Experiment with Circular Rapid Flashing Beacon and Rectangular Rapid Flashing Beacon (Fisher)
Status: No update.

11-13 Request to experiment with a Sign "RECKLESS DRIVING PROHIBITED" (Mansourian)
Status: No update.

11-19 Request to experiment with 2nd advance California Welcome Center Destination Sign (Fogle)
Status: No update.

12-9 Request to Experiment with Yellow LED Border on Pedestrian Signal (Fogle)
Status:

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF TRANSPORTATION
OFFICE OF TRAFFIC ENGINEERING & OPERATIONS
1657 RIVERSIDE DRIVE
P. O. BOX 496073
REDDING, CA 96049-6073
PHONE (530) 225-3229
FAX (530) 225-3299

Flex your power!
Be energy efficient!

July 27, 2012

Federal Highway Administration
1200 New Jersey Avenue, S.E., HOTO-1
Washington, DC 20590

Status Report: 4(09)-13 (E) Yellow LED Border on Ped Signal – Caltrans

Thank you for your December 12, 2011 response letter approving our request to experiment with the addition of a yellow LED border to a standard pedestrian signal head. As requested in the response, we are submitting an interim status report to show what has been completed over the last six months. Although the project started off slower than anticipated, I am pleased to report that two major milestones towards evaluating the proposed modification have been completed.

As you are aware, before we can proceed with an evaluation plan for a new traffic device in the State of California, the California Traffic Control Devices Committee (CTCDC) must have an opportunity to review and approve the experiment proposal. Since the CTCDC typically convenes only three times a year, it was important to get on the earliest agenda possible to keep the project on track. Fortunately, thanks to CTCDC Executive Secretary, Devinder Singh, this item was placed on the agenda for the February 16th CTCDC meeting in San Diego.

The proposed pedestrian signal modification and the evaluation plan were described to the committee at the February meeting. The presentation was followed by numerous questions from committee members seeking clarification about the functionality of the device and its proposed operation. One suggestion from the committee was to consider expanding the evaluation to compare the effectiveness of the yellow LED border against the animated eyes symbol that is already allowed in the MUTCD (Section 4E.04). However, the committee was reminded that the FHWA only approved evaluating the yellow LED border modification. Expanding the study would likely require that another evaluation plan be submitted to FHWA for approval. With that understanding, the idea to compare the yellow LED border against the animated eyes symbol was offered only as a consideration. In the end, the CTCDC approved the evaluation plan as presented.

The meeting minutes can be viewed at the following link:
http://www.dot.ca.gov/hq/traffops/signtech/newtech/minutes/Min021612.pdf.

The second major hurdle was to develop the device to use for the evaluation. Several manufacturers from Caltrans' Pre-Qualified Product List for LED Traffic Signal Modules were

contacted to see if they were interested in fabricating the modified pedestrian signal. Most manufacturers declined taking on the work, but after a few months of correspondence with Western Regional Marketing Manager, Kimberly Konte, Leotek Electronics agreed to develop the device.

The prototype pedestrian signal module was demonstrated on May 30th at a Caltrans facility in Sacramento. The module was connected to a pre-programmed 2070 traffic signal controller to show how the yellow LED border would function when a pedestrian call is made. The prototype looked very similar to the illustration submitted to FHWA for conceptual approval and it performed perfectly. It was agreed to move forward with the prototype with only a few minor adjustments – the major change being the reduction of the spacing between the individual yellow LEDs from 2 inches to 1 inch. The reduction in spacing was considered necessary to make the yellow border more visible in bright daylight conditions.

Attached are pictures of the prototype module placed in a standard pedestrian signal housing. The unit has been mounted on a portable signal pole (with pedestrian push button) that can easily be connected to a 2070 controller and used for demonstration purposes. The sequence of pictures shows how the modified signal will operate during the evaluation.

We are currently in the process of purchasing 16 prototype modules that will be used for the evaluation project. Assuming four crosswalks per traffic signal, this will allow us to evaluate two intersections at a time. Provided there are no delays in acquiring the prototype modules, data for at least two intersections will be gathered before winter conditions influence pedestrian activity. Studies will resume in the Spring of 2013 and continue until data is gathered for five intersections.

Feel free to contact me if you have any questions. I can be reached at 530-225-3229 or via email at rob_stinger@dot.ca.gov.

Sincerely,

ROB STINGER, P.E.
Chief, Traffic Engineering & Operations
District 2

Attachment

Cc: FHWA California Division Office
Devinder Singh – CTCDC Executive Secretary
Ed Lamkin – Caltrans District 2 Maintenance & Operations
Don Fogle – Caltrans HQ Traffic Operations
Kim Konte – Leotek Electronics

4(09)-13(E) YELLOW LED BORDER ON PED SIGNAL - CALTRANS

Before activation

(LED border - dark)

Pedestrian push button is activated

(LED border - illuminated)

Walk signal

(LED border - illuminated)

Flashing hand / countdown begins

(LED border - dark)

12-13 Proposal to amend Section 2C.29 SPEED HUMP Sign (W17-1) based on the experiment conducted by the City of Stockton with SPEED HUMP (W17-1) Signs

See Final Report on the following website:
http://www.dot.ca.gov/hq/traffops/signtech/newtech/reports.htmns

Recommendation: The City of Stockton recommends continued use of the "BUMP" pavement legend to draw attention to vertical traffic calming measures and requests that CTCDC adopt the revised Section 2C.29 of the CA MUTCD 2012 as shown in this proposal.

Agency Making Request: City of Stockton

Sponsor: Jeff Knowles – CTCDC member, League of California Cities (LOCC)

Background:

The City of Stockton's Experimented with Traffic Calming Signs, Final Report (April 2012) has been posted on the following website:
http://www.dot.ca.gov/hq/traffops/signtech/newtech/reports.htm

Proposal (revision shown in red color):

Section 2C.29 SPEED HUMP Sign (W17-1)

Guidance:

01 *The SPEED HUMP (W17-1) sign (see Figure 2C-6) should be used to give warning of a vertical deflection in the roadway that is designed to limit the speed of traffic.*

02 *If used, the SPEED HUMP sign should be supplemented by an Advisory Speed plaque (see Section 2C.08).*

Option:

03 If a series of speed humps exists in close proximity, an Advisory Speed plaque may be eliminated on all but the first SPEED HUMP sign in the series.

04 The legend SPEED BUMP may be used instead of the legend SPEED HUMP on the W17-1 sign.

04a If a series of speed humps exists in close proximity, an optional SPEED HUMPS AHEAD (WXX(CA)) sign may replace the first SPEED HUMP sign in the series, provided additional warning of speed humps are provided through signs or pavement markings at the speed humps.

04b If speed humps exist on a network of streets within an area accessible by a limited number of access points to the area, an optional SPEED HUMP AREA (WYY(CA)) sign may be placed at each access point to the area, provided additional warning of speed humps are provided through signs or markings at the speed humps.

Support:

05 Speed humps generally provide more gradual vertical deflection than speed bumps. Speed bumps limit the speed of traffic more severely than speed humps. Other forms of speed humps include speed tables and raised intersections. However, these differences in engineering terminology are not well known by the public, so for signing purposes these terms are interchangeable.

12-14 Table updates throughout Part6 of the CA MUTCD 2012

Recommendation:

As part of the cleanup efforts, various tables in Part6 need to be changed or updated.

Agency Making Request: Caltrans

Sponsor: Caltrans

Background:

An error was discovered on two of the Part 6 tables. Table 6C-1 and Table 6H-3 are identical but the California edits are different between the two.

Table 6C-1. Recommended Advance Warning Sign ~~Minimum~~ Spacing

Road Type	Distance Between Signs*		
	A	B	C
Urban (low speed) - 25 mph or less	100 feet	100 feet	100 feet
Urban (high speed) - more than 25 mph to 40 mph	250 feet	250 feet	250 feet
Urban (high speed) - more than 40 mph	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

Table 6H-3. Meaning of Letter Codes on Typical Application Diagrams

Road Type	Distance Between Signs**		
	A	B	C
Urban (low speed)* - 25 mph or less	100 feet	100 feet	100 feet
Urban (low speed)* - more than 25 mph to 40 mph	250 feet	250 feet	250 feet
Urban (high speed)* - more than 40 mph	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

When the tables were reviewed in detail we also realized that all data are limited to speeds up to 70 mph. Because there are freeways with speed limit of 70 mph, many places the anticipated operating speed would exceed 70 mph. Caltrans recommends increasing the tables to include data for speed at 75 mph.

At 75 mph, based on 2009 MUTCD policy, the channelizing device spacing would be 150 feet apart on a tangent portion of the work zone. If one cone is displaced it will leave a gap of 300 in the line of cones. Caltrans recommends capping the channelizing device spacing at the 50 mph level for all speeds higher than 50 mph.

CA MUTCD has similar policy for delineator spacing on horizontal curves. The spacing is kept at 40 feet for the radius of the curve ranging from 250 feet to 600 feet.

Table 3F-1. Approximate Spacing for Delineators on Horizontal Curves

Radius (R) of Curve	Approximate Spacing (S) on Curve
50 feet	20 feet
115 feet	25 feet
180 feet	35 feet
250 feet	40 feet
300 feet	~~50 feet~~ 40 feet
400 feet	~~55 feet~~ 40 feet
500 feet	~~65 feet~~ 40 feet
600 feet	~~70 feet~~ 40 feet
700 feet	75 feet
800 feet	80 feet
900 feet	85 feet
1,000 feet	90 feet

Proposal:

Table 6C-1. Recommended Advance Warning Sign ~~Minimum~~ Spacing

Road Type	Distance Between Signs*		
	A	B	C
Urban ~~(low speed)~~ - 25 mph or less	100 feet	100 feet	100 feet
Urban ~~(high speed)~~ - more than 25 mph to 40 mph	250 feet	250 feet	250 feet
Urban ~~(high speed)~~ - more than 40 mph	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

* ~~Speed category to be determined by the highway agency.~~

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

Table 6C-2. Stopping Sight Distance as a Function of Speed on Level Roads. (Used as suggested longitudinal buffer space length or location for flagger station)

Speed*	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed.

Can also be used as Stopping Sight Distance as suggested buffer space length or location for flagger station.

Table 6C-101(CA). Stopping Sight Distance as a Function of Speed on Downgrades. (Used as suggested longitudinal buffer space length or location for flagger station)

Speed (mph)	% Downgrade (Buffer Space)		
	-3% (feet)	-6% (feet)	-9% (feet)
20	116	120	126
25	158	165	173
30	205	215	227
35	257	271	287
40	315	333	354
45	378	400	427
50	446	474	507
55	520	553	593
60	598	638	686
65	682	728	785
70	771	825	891
75	866	927	1003

***Exhibit 3-2A Policy on Geometric Design of Highway and Streets, AASHTO 2001, P.115.**

Table 6C-3(CA). Taper Length Criteria for Temporary Traffic Control Zones (for 12 feet Offset Width)

Speed* S (mph)	Minimum Taper Length** for Width of Offset 12 feet (W)			
	Merging L (feet)	Shifting L/2 (feet)	Shoulder L/3 (feet)	Down Stream (feet)***
20	80	40	27	50
25	125	63	42	50
30	180	90	60	50
35	245	123	82	50
40	320	160	107	50
45	540	270	180	50
50	600	300	200	50
55	660	330	220	50
60	720	360	240	50
65	780	390	260	50
70	840	420	280	50
75	900	450	300	50

* - Posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph.

** - For other offsets use the following merging taper length formula for L:

For speeds of 40 mph or less, $L=WS^2/60$

For speeds of 45 mph or more, $L=WS$

Where: L = taper length in feet
W = width of offset in feet
S = posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

*** - Maximum downstream taper length is 100 feet. See Section 6C.08.

Table 6E-1. Stopping Sight Distance as a Function of Speed on Level Roads. (Used as suggested longitudinal buffer space length or location for flagger station)

Speed*	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

* Posted speed, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed.

~~Can also be used as Stopping Sight Distance as suggested buffer space length or location for flagger station.~~

Table 6E-101(CA). Stopping Sight Distance as a Function of Speed on Downgrades. (Used as suggested longitudinal buffer space length or location for flagger station)

~~Table 6E-101(CA). Longitudinal Buffer Space or Flagger Station Spacing on Downgrades~~

Speed (mph)	% Downgrade (Buffer Space)		
	-3% (feet)	-6% (feet)	-9% (feet)
20	116	120	126
25	158	165	173
30	205	215	227
35	257	271	287
40	315	333	354
45	378	400	427
50	446	474	507
55	520	553	593
60	598	638	686
65	682	728	785
70	771	825	891
75	866	927	1003

* Exhibit 3-2. A Policy on Geometric Design of Highways and Streets, AASHTO, 2001, p.115.

Table 6F-101(CA). Maximum Spacing of Channelizing Devices

Speed (mph)	Maximum Channelizing Devices Spacing		
	Taper* (feet)	Tangent (feet)	Conflict** (feet)
20	20	40	10
25	25	50	12
30	30	60	15
35	35	70	17
40	40	80	20
45	45	90	22
50	50	100	25
55	~~55~~ 50	~~110~~ 100	~~27~~ 25
60	~~60~~ 50	~~120~~ 100	~~30~~ 25
65	~~65~~ 50	~~130~~ 100	~~32~~ 25
70	~~70~~ 50	~~140~~ 100	~~35~~ 25
75	50	100	25

* Maximum channelizing device spacing for all speeds on one-lane/two-way tapers is 20 feet.
Maximum channelizing device spacing for all speeds on downstream tapers is 20 feet.
All other tapers are as shown.

** Use on intermediate and short-term projects for taper and tangent sections where there are no pavement markings or where there is a conflict between existing pavement markings and channelizers (CA)

Table 6H-3. Meaning of Letter Codes on Typical Application Diagrams

Road Type	Distance Between Signs**		
	A	B	C
Urban ~~(low speed)~~* - 25 mph or less	100 feet	100 feet	100 feet
Urban ~~(low speed)~~* - more than 25 mph to 40 mph	250 feet	250 feet	250 feet
Urban (~~high speed~~)* - more than 40 mph	350 feet	350 feet	350 feet
Rural	500 feet	500 feet	500 feet
Expressway / Freeway	1,000 feet	1,500 feet	2,640 feet

* ~~Speed category to be determined by highway agency.~~

** The column headings A, B, and C are the dimensions shown in Figures 6H-1 through 6H-46. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The "first sign" is the sign in a three-sign series that is closest to the TTC zone. The "third sign" is the sign that is furthest upstream from the TTC zone.)

Table 6H-4(CA). Taper Length Criteria for Temporary Traffic Control Zones
(for 12 feet Offset Width)

Speed* S (mph)	Minimum Taper Length** for Width of Offset 12 feet (W)			
	Merging L (feet)	Shifting L/2 (feet)	Shoulder L/3 (feet)	Down Stream (feet)***
20	80	40	27	50
25	125	63	42	50
30	180	90	60	50
35	245	123	82	50
40	320	160	107	50
45	540	270	180	50
50	600	300	200	50
55	660	330	220	50
60	720	360	240	50
65	780	390	260	50
70	840	420	280	50
75	900	450	300	50

* - Posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph.

** - For other offsets use the following merging taper length formula for L:
For speeds of 40 mph or less, $L=WS^2/60$
For speeds of 45 mph or more, $L=WS$

Where: L = taper length in feet
W = width of offset in feet
S = posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

*** - Maximum downstream taper length is 100 feet. See Section 6C.08.

12-15 High-visibility safety apparel policy updates throughout Part 6 of the CA MUTCD 2012

Recommendation:
Various parts of Part 6 contain standards for high-visibility safety apparels, but the standards are not uniform between each section. Various sections in Part 6 need to be updated so they can be uniform.

Agency Making Request/Sponsor: Caltrans

Background:
In the 2009 MUTCD FHWA allowed use of "ANSI/ISEA 107-2004" or "equivalent revisions" standards high-visibility safety apparel in Section 6D.03.

However the same revision of standards is not included in Section 6E.02. The ANSI/ISEA 107-2010 standards are published and most high-visibility safety apparel on the market are labeled as ANSI/ISEA 107-2010 standards. If we do not make the same revision in Section 6E.02 flaggers and law-enforcement traffic controllers would have to use older standards of high-visibility safety apparel

Policies in Section 6E.02 have to be updated so everyone in temporary traffic control zones can wear the newer standards of high-visibility safety apparels

Proposal:

Section 6D.03 Worker Safety Considerations

Standard:
04 **All workers, including emergency responders, within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to work vehicles and construction equipment within the TTC zone shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107–2004 publication entitled "American National Standard for High-Visibility Safety Apparel and Headwear" (see Section 1A.11), or equivalent revisions, and labeled as meeting the ANSI 107-2004, or equivalent revisions, standard performance for Class 2 or 3 risk exposure, except as provided in Paragraph 5. A person designated by the employer to be responsible for worker safety shall make the selection of the appropriate class of garment.**
04a Refer to Construction Safety Order in the California Code of Regulations (Title 8, Division 1, Chapter 4, Subchapter 4, Article 11, Section 1598 and 1599). See Section 1A.11 for information regarding this publication.
Option:
05 Emergency and incident responders and law enforcement personnel within the TTC zone may wear high-visibility safety apparel that meets the performance requirements of the ANSI/ISEA 207-2006 publication entitled "American National Standard for High-Visibility Public Safety Vests" (see Section 1A.11), or equivalent revisions, and labeled as ANSI 207-2006, or equivalent revisions, in lieu of ANSI/ISEA 107-2004 apparel.
Standard:
06 **When uniformed law enforcement personnel are used to direct traffic, to investigate crashes, or to handle lane closures, obstructed roadways, and disasters, high-visibility safety apparel as described in this Section shall be worn by the law enforcement personnel.**
07 **Except as provided in Paragraph 8, firefighters or other emergency responders working within the right-of-way shall wear high-visibility safety apparel as described in this Section.**

Section 6E.02 High-Visibility Safety Apparel

Standard:

01 **For daytime and nighttime activity, flaggers shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107–2004 publication entitled "American National Standard for High-Visibility Apparel and Headwear" (see Section 1A.11), or equivalent revisions, and labeled as meeting the ANSI 107-2004, or equivalent revisions, standard performance for Class 2 or 3 risk exposure. The apparel background (outer) material color shall be fluorescent orange-red, fluorescent yellow-green, or a combination of the two as defined in the ANSI standard. The retroreflective material shall be orange, yellow, white, silver, yellow green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1,000 feet. The retroreflective safety apparel shall be designed to clearly identify the wearer as a person.**

Guidance:

02 *For nighttime activity, high-visibility safety apparel that meets the Performance Class 3 requirements of the ANSI/ISEA 107–2004 publication entitled "American National Standard for High-Visibility Apparel and Headwear" (see Section 1A.11), or equivalent revisions, and labeled as meeting the ANSI 107-2004, or equivalent revisions, standard performance for Class 3 risk exposure should be considered for flagger wear.*

Standard:

03 **When uniformed law enforcement officers are used to direct traffic within a TTC zone, they shall wear high-visibility safety apparel as described in this Section.**

Option:

04 In lieu of ANSI/ISEA 107-2004 apparel, law enforcement personnel within the TTC zone may wear high-visibility safety apparel that meets the performance requirements of the ANSI/ISEA 207-2006 publication entitled "American National Standard for High-Visibility Public Safety Vests" (see Section 1A.11), or equivalent revisions, and labeled as ANSI 207-2006, or equivalent revisions.

12-16 Proposal to Amend Section 3B.18 to Enhance Uncontrolled Intersection or Mid-Block Crossings

Recommendations: Caltrans request the Committee to make recommendations to adopt the amendment to CA MUTCDD Section 3B.18 as shown under the proposal.

Agency Making Request: Caltrans

Sponsor: Caltrans

Background: As a result of Strategic Highway Safety Plan (SHSP) Action 8.10, the California Department of Transportation developed a Crosswalk Enhancements Policy (TOPD 12-03) to address how to enhance "existing" marked crosswalks across uncontrolled roadways System with four or more lanes that have an ADT of 12,000 vehicles per day or greater, where the speed limit exceeds 40 mph. Research shows that marking crosswalks without making additional improvements is associated with higher pedestrian crash rates for the roadway configurations and operating characteristics listed above. However, failing to provide crossing opportunities or over-improving an area are both undesirable solutions. These are low-cost improvements (part of an incremental approach) that have the potential to reduce the number and severity of pedestrian collisions. Each of the selected enhancements are optional in the CA MUTCD. This policy raises a **"may" condition to a "should"** condition for the selected enhancements on roadways that meet the identified roadway configurations and operating characteristics.

For more background history click on the following link to see reports:
http://www.dot.ca.gov/hq/traffops/signtech/newtech/agenda.htm

- Crosswalk Marking Field Visibility Study FHWA-HRT
- NCUTCD Marking No [1]
- Reducing Conflict between Motorist and Pedestrians
- SHSP Action 8.10
- TOPD
- Zegeer Study HRT-04-100

Proposal:

The following are two alternatives for the consideration of CTCDC (language to add to Section 3B.18 of the CA MUTCD):

Alternative 1: If the CTCDC recommends that this policy should not apply to local roads

Guidance:

On State Highways, if a marked crosswalk exists across an uncontrolled intersection or mid-block location where the speed limit exceeds 40 mph and the roadway has four or more lanes of travel and an ADT of 12,000 vehicles per day or greater, advanced yield lines with associated Yield Here to Pedestrian (R1-5, R1-5a) signs should be placed 20 to 50 ft in advance of the crosswalk, pedestrian crossing (W11-2) warning signs with diagonal downward pointing arrow (W16-7p) plaques should be installed at the crosswalk, and a high visibility crosswalk marking pattern should be used.

Alternative 2: If the CTCDC recommends that the policy should apply on all roadways in California

Guidance:

If a marked crosswalk exists across an uncontrolled intersection or mid-block location where the speed limit exceeds 40 mph and the roadway has four or more lanes of travel and an ADT of 12,000 vehicles per day or greater, advanced yield lines with associated Yield Here to Pedestrian (R1-5, R1-5a) signs should be placed 20 to 50 ft in advance of the crosswalk, pedestrian crossing (W11-2) warning signs with diagonal downward pointing arrow (W16-7p) plaques should be installed at the crosswalk, and a high visibility crosswalk marking pattern should be used.

12-17 Adopt an Interim Approval (IA-15) issued by the FHWA for the Optional Use of an Alternative Design for the U.S. Bicycle Route (M1-9) Sign

Recommendations: Caltrans requests that the Committee make recommendation to Caltrans to seek statewide blanket approval to adopt Interim Approval (IA-15) issued by the FHWA for the Optional Use of an Alternative Design for the U.S. Bicycle Route (M1-9) Sign. The blanket approval of the 1A-15 in California will eliminate the need for individual agencies to seek approval from the FHWA.

Agency Making Request/Sponsor: Caltrans

Memorandum

U.S. Department of Transportation
Federal Highway Administration

Subject: **INFORMATION:** MUTCD — Interim Approval for the Optional Use of an Alternative Design for the U.S. Bicycle Route (M1-9) Sign (IA-15)

Date: June 1, 2012

From: Jeffrey A. Lindley
Associate Administrator for Operations

In Reply Refer To: HOTO-1

To: Directors of Field Services
Federal Lands Highway Division Engineers
Director of Technical Services
Division Administrators

Purpose: The purpose of this memorandum is to issue an Interim Approval for the optional use of an alternative design of the U.S. Bicycle Route (M1-9) sign. Interim Approval allows interim use, pending official rulemaking, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD).

Background: The Michigan Department of Transportation requested that the Federal Highway Administration (FHWA) issue an Interim Approval to allow the use of an alternative design of the U.S. Bicycle Route (M1-9) sign that was developed and approved by the National Committee on Uniform Traffic Control Devices (NCUTCD). The NCUTCD recommended that the alternative design be included in the next edition of the MUTCD as a replacement for the existing design that is shown in Figure 9B-4 of the 2009 MUTCD. The existing design of the M1-9 sign has a black background upon which a white acorn-shaped symbol is placed with a large black bicycle symbol shown within and near the top of the acorn below which the route designation is shown in black letters or numerals within and near the bottom of the acorn with a black horizontal line separating the bicycle symbol from the route designation. The alternative design has a green background upon which a white reuleaux triangle is placed in the top portion of the sign and a white rectangle is placed in the bottom portion of the sign. The green letters "US" above a green bicycle symbol are placed within the reuleaux triangle, and the route designation is shown in green letters or numerals within the rectangle.

Research on the U.S. Bicycle Route Sign: The effectiveness of the alternative design for the M1-9 sign was successfully evaluated in March 2012 by researchers at the FHWA's Turner-Fairbank Highway Research Center. The results of human factors testing showed that a sufficient percentage of the survey

participants recognized that the sign was associated with a bicycle route. The researchers concluded that the sign would be useful for indicating the general presence of a bicycle route.

FHWA Evaluation of Results: The Office of Transportation Operations has reviewed the available data and considers the human factors testing of the alternative design for the M1-9 sign to be satisfactorily successful. Although the testing showed that a number of the survey participants identified the sign to be a bicycle route Reference Location or milepost sign, this confusion related to seeing the sign in a static simulation in a laboratory setting would soon dissipate when a series of M1-9 signs are viewed along a bicycle route in a dynamic travel environment. In other words, when a series of M1-9 signs with the same identical route designation are viewed repeatedly along a route, road users would quickly conclude that these signs are not Reference Location signs but instead are providing bicyclists with route information about a designated bicycle route. Further context would be provided by the use of Cardinal Direction auxiliaries in Route Confirmation assemblies and/or Directional Arrow auxiliaries on Directional assemblies at locations where the designated route requires a turn at an intersection.

The alternative design of the U.S. Bicycle Route (M1-9) sign is not proprietary and can be used by any jurisdiction that requests and obtains interim approval from the FHWA to use the alternative design. The FHWA believes that the alternative sign design has a low risk of safety or operational concerns.

The alternative design of the U.S. Bicycle Route (M1-9) sign is a non-controversial sign whose design and use has been endorsed and recommended by the National Committee on Uniform Traffic Control Devices. The granting of an Interim Approval for this sign will provide practitioners with the opportunity to begin using this sign design prior to its possible inclusion in the next edition of the MUTCD.

This Interim Approval does not create a new mandate compelling the use of this alternative sign design, but will allow agencies to install this alternative sign design, pending official MUTCD rulemaking, to sign a bicycle route that has been recognized and designated by American Association of State Highway and Transportation Officials (AASHTO) as a U.S. Bicycle Route. Agencies may also continue to use the design of the M1-9 sign that is specified in the 2009 MUTCD for this application, although they should do so with the knowledge that the FHWA intends to propose that the existing design be replaced by the alternative sign design in the next edition of the MUTCD.

Conditions of Interim Approval: The FHWA will grant Interim Approval for the optional use of the alternative design for the U.S. Bicycle Route (M1-9) sign to any jurisdiction that submits a written request to the Office of Transportation Operations. A State may request Interim Approval for all jurisdictions in that State. Jurisdictions using the alternative design for the U.S. Bicycle Route (M1-9) sign under this Interim Approval must agree to comply with the technical conditions detailed below, to maintain an inventory list of all locations where the signs are installed, and to comply with Item D in Paragraph 18 of Section 1A.10 of the 2009 MUTCD, which requires:

"An agreement to restore the site(s) of the Interim Approval to a condition that complies with the provisions in this Manual within 3 months following the issuance of a Final Rule on this traffic control device; and terminate use of the device or application installed under the interim approval at any time that it determines significant safety concerns are directly or indirectly attributable to the device or application. The FHWA's Office of Transportation Operations has the right to terminate the interim approval at any time if there is an indication of safety concerns."

1. General Conditions:

   The use of the alternative design for the U.S. Bicycle Route (M1-9) sign is optional. However, if an agency opts to use the alternative sign design under this Interim Approval, the following design and installation requirements shall apply, and shall take precedence over any conflicting provisions of the MUTCD.

2. Allowable Uses:

   The use of the optional alternative design for the U.S. Bicycle Route (M1-9) sign is governed by the same provisions as those for the existing sign design in the 2009 MUTCD. Particular attention should be paid to the provisions in Paragraphs 3 through 7 in Section 9B.21.

3. Sign Design and Size:

a. The optional alternative design of the U.S. Bicycle Route (M1-9) sign shall be as shown in the attached sign detail.

b. The minimum size of the optional alternative design of the U.S. Bicycle Route (M1-9) sign shall be 12 inches in width by 18 inches in height when it is used on a shared-use path and shall be 18 inches in width by 24 inches in height when it is used on a roadway.

4. Other:

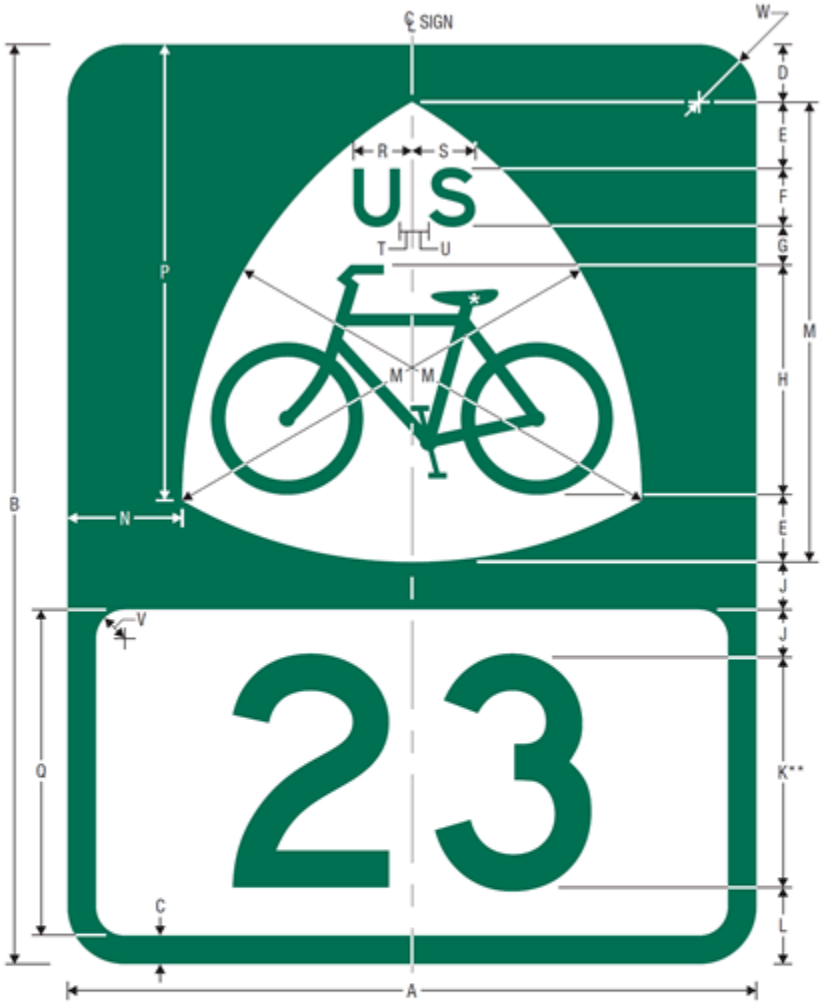
   Except as otherwise provided above, all other provisions of the MUTCD applicable to signs shall apply to U.S. Bicycle Route (M1-9) signs.

Any questions concerning this Interim Approval should be directed to Mr. Bruce Friedman at bruce.friedman@dot.gov.

Attachment

cc:
Associate Administrators
Chief Counsel
Chief Financial Officer

M1-9 (Alternate)
Issued 6/1/2012



M1-9 (Alternate)

U. S. Bicycle Route (Alternate)

A	B	C	D	E	F	G	H	J	K	L	M	N
12	18	0.5	1.5	1.25	1.25 E	0.75	4.5	1	4 D	1.5	9	1.5
18	24	0.75	1.5	1.75	1.5 E	1	6	1.25	6 D	2	12	3

P	Q	R	S	T	U	V	W
9.296	6	1.263	1.388	0.25	0.375	1	1.5
11.895	8.5	1.528	1.653	0.313	0.437	0.75	1.5

★ See page 6-7 for symbol design.

★★ Optically space numerals about vertical centerline.

COLORS: LEGEND – GREEN (RETROREFLECTIVE)
INNER BACKGROUND – WHITE (RETROREFLECTIVE)
OUTER BACKGROUND – GREEN (RETROREFLECTIVE)

IA-15-1

12-18 Request to Experiment with red colored Transit Lanes

RED COLORED TRANSIT-ONLY LANES

REQUEST TO EXPERIMENT

Submitted to:

California Traffic Control Devices Committee Federal Highway Administration, Office of Traffic Operations

Submitted by:

San Francisco Municipal Transportation Agency

June 29, 2012

Recommendation: San Francisco Municipal Transportation Agency requesting authorization to conduct experiment with red colored Transit Lanes

Agency Making Request: San Francisco Municipal Transportation Agency

Sponsor: Jeff Knowles, CTCDC Members representing League of California Cities (LOCC)

BACKGROUND

The San Francisco Municipal Transportation Agency (SFMTA) oversees the surface transportation system in San Francisco, including operation of the San Francisco Municipal Railway (Muni). Muni is one of America's oldest public transit systems, and the seventh largest system in the United States, carrying more than 200 million customers annually on approximately 80 routes throughout San Francisco. The Muni route network includes approximately 15 miles of streets with transit-only lanes. As part of ongoing initiatives to improve Muni service, the SFMTA is seeking improvements to the operation of transit-only lanes. The SFMTA is also evaluating the addition of new transit-only lanes at various along the Muni route network. This request for experimentation is for the use of red colored transit-only lanes along the Muni route network.

NATURE OF THE PROBLEM

Transit-only lanes can reduce transit travel times and improve transit service reliability by allowing transit vehicles to bypass traffic congestion and avoid conflicts with other vehicles in mixed travel lanes. Non-transit vehicles are typically permitted to enter transit-only lanes to access curbside parking or to complete a turn, unless specifically prohibited. However, non-transit vehicles frequently violate transit-only lane restrictions by traveling along or double-parking in transit-only lanes. Transit-only lane violations can cause transit vehicles to slow down to merge into adjacent lanes or stop to wait for the transit-only lane to clear, contributing to longer transit travel times, reduced service reliability and reduced customer safety and comfort. Given limited enforcement resources, the SFMTA seeks to reduce violations of transit-only lane restrictions by making existing and future transit-only lanes more self-enforcing. Appendix A includes photos of various transit-only lane configurations in San Francisco.

PROPOSAL

The SFMTA proposes experimenting with red colored transit-only lanes to determine if they reduce violations of transit-only lane restrictions and reduce delays to transit vehicles.

Transit-only lanes in San Francisco generally include pavement messages indicating the class of vehicles permitted to use the lanes (examples include "BUS ONLY" and "BUS TAXI ONLY") and signs indicating when the transit-only regulation is effective. Some transit-only lanes in San Francisco include diamond symbol pavement markings. The California Manual on Uniform Traffic Control Devices, 2012 Edition (CA MUTCD) provides guidance for preferential lane word, symbol and longitudinal markings, but does not provide specific guidance for the use of colored preferential lanes. Section 3G.01 of the CA MUTCD states:

> "If colored pavement is used within the traveled way, on flush or raised islands, or on shoulders to regulate, warn, or guide traffic or if retroreflective colored pavement is used, the colored pavement is considered to be a traffic control device and shall be limited to the following colors and applications:
>
> A. Yellow pavement color shall be used only for flush or raised median islands separating traffic flows in opposite directions or for left-hand shoulders of roadways of divided highways or one-way streets or ramps.
>
> B. White pavement color shall be used for flush or raised channelizing islands where traffic passes on both sides in the same general direction or for right-hand shoulders.
>
> Colored pavements shall not be used as a traffic control device, unless the device is applicable at all times."

This request for experimentation is for the use of red colored transit-only lanes as a new traffic control device, including both full-time transit-only lanes and part-time transit-only lanes. The SFMTA anticipates that adding red colored treatments to transit-only lanes will improve compliance with existing restrictions and reduce delays to transit vehicles.

SUPPORTING DATA

The Transportation Association of Canada completed a survey of international cities using colored transit-only lanes in 2009 titled "Transit Lane Conspicuity through Surface Treatment: Knowledge Base." Many of the cities surveyed did not have formal evaluations of the effectiveness of colored transit-only lanes, but reductions in violations were reported in several cities, including Auckland, New Zealand; Brisbane, Australia; Edinburgh, United Kingdom; Ottawa, Canada and Sydney, Australia. Most of the cities surveyed used red for colored bus lane.

RELATED FHWA STUDIES

The New York City Department of Transportation (NYCDOT) completed a Federal Highway Administration (FHWA) sponsored study of red colored bus lanes in 2011. The FHWA experiment title is "3-198(Ex) - Colored Pavement for Bus Lanes - NY City." The NYCDOT study evaluated the effect of red treatments on bus travel times, illegal bus lane occupancy by non-bus vehicles, legal parking behaviour in red bus lanes during non-bus lane hours and non-bus vehicle right-turning behaviour. Highlights from the NYCDOT study include:

- Reduced illegal driving in bus lanes after installation of red treatment.
- Reduced illegal standing (under 30 minutes) in bus lanes after installation of red treatment.
- Increased illegal parking (over 30 minutes) in bus lanes after installation of red treatment[1].
- No significant change in bus travel times after installation of red treatment[2].
- No impact on legal parking behaviour when the bus lane is not in effect.
- No impact on legal right-turn behaviour.
- Easier enforcement of bus lane violations after installation of red treatment.

The NYCDOT study showed positive results but was based on relatively small samples.

MATERIAL DETAILS

NYCDOT in conjunction with Penn State University completed an evaluation of nine red bus lane treatment products in 2012. Materials were tested for durability and friction both in the lab and in the field. Field observations of color, susceptibility to dirt and grime and ease of patching were also conducted and lifecycle costs were estimated. The evaluation concluded that epoxy-based paints, epoxy/aggregate treatments, and asphalt concrete micro surface treatments provided the best durability. The evaluation also concluded that aggressive pre-treatment of asphalt roadways, including shot-blasting and crack repair, was necessary prior to application of colored treatments to ensure durability. The San Francisco Department of Public Works (SFDPW) in conjunction with the SFMTA, is currently testing colored treatment products for bicycle facilities and may use this testing to inform material choices for this red colored transit-only lane experiment. The SFDPW and the SFMTA are currently evaluating four products (three epoxy-based materials and one acrylic-based material) for visibility, durability and ease of installation.

1 NYCDOT report notes increase in illegal parking based on very small sample size before and after red treatment installation. Average of 1.4 incidents per block face over a 3-hour period in before sample and average of 1.8 incidents per block face over a 3hour data collection period in after sample. 2 NYCDOT report notes few buses used bus lanes during study period.

EVALUATION PLAN

The SFMTA proposes evaluating red colored transit-only lanes by collecting before and after observational data of transit-only lane violations and before and after data of Muni vehicle travel times.

DATA COLLECTION

The SFMTA proposes manually observing the operation of transit-only lanes before and after installation of red treatments. Each experimental location will be observed multiple times during peak activity periods (typically on weekdays during the hours of approximately 7am-9am and 4pm-6pm). User surveys of motorists, transit vehicle operators and transit customers may also be utilized to collect information on user perceptions of the meaning and effectiveness of the red treatments. Before and after data to be collected includes:

Before/After Data	Unit of Measure
Traffic counts	Vehicles per hour
Illegal motor vehicle travel within transit-only lanes	Vehicles per hour traveling within transit-only lanes, excluding vehicles making legal turning or parking maneuvers Percentage of through-moving vehicles traveling within transit-only lanes
Illegal parking within transit-only lanes	Parking infractions per hour
Parking occupancy adjacent to transit-only lanes	Percentage of legal parking spaces occupied
Vehicle turning behavior	Turning vehicles per hour per approach lane

In addition to manual data collection, the SFMTA proposes to measure before and after transit travel times using automated passenger counters (APC). Approximately 30 percent of the SFMTA's bus fleet is equipped with APC units and these vehicles are rotated regularly throughout the system to ensure adequate coverage of every bus route. The APC units use on-board sensors and a global positioning system (GPS) to record travel times between transit stops and customer activity at each transit stop.

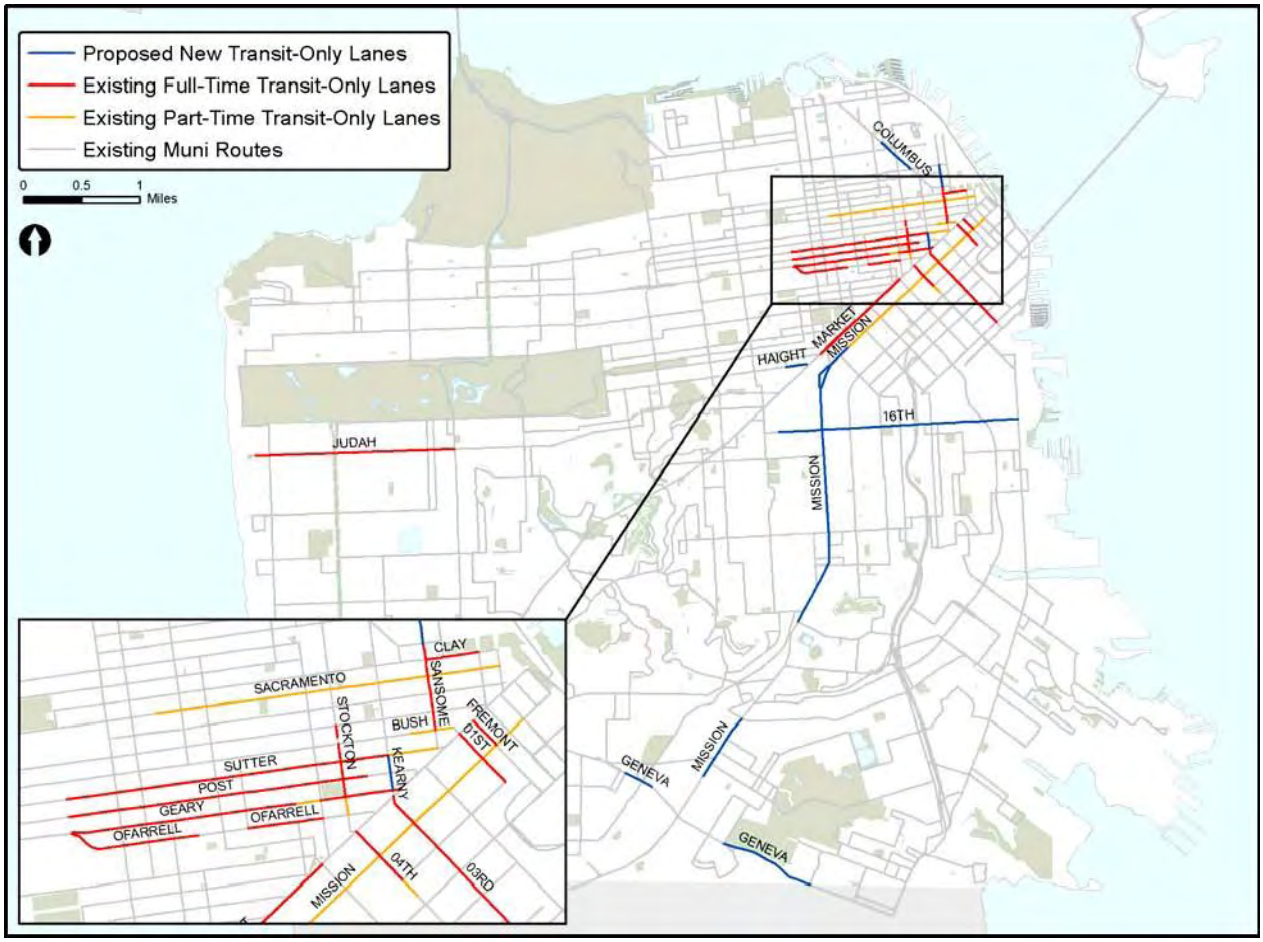
SCHEDULE

The following timeline assumes that permission to experiment is granted by the California Traffic Control Devices Committee (CTCDC) and FHWA by September 2012

Time Period	Activity
May-September 2012	Material testing
September-December 2012	Material procurement
September-December 2012	Before data collection
Spring 2013	Install red treatments
September-December 2013	After data collection
Summer 2014	Submit final report to CTCDC and FHWA

LOCATIONS

The map below shows the locations of existing and proposed transit-only lanes in San Francisco where red treatments may be applied.



The table below provides details for existing transit-only lanes in San Francisco where red treatments may be applied.

Transit-Only Lane Location	Hours of Operation	Typical Configuration
1st Street from Market to Howard streets	All Times	Left-side transit-only lane in one direction adjacent to curb or on-street parking on one-way street (Starting in February 2011, transit-only lane is temporarily removed to accommodate construction).
3rd Street from Townsend to Market streets	All Times	Right-side transit-only lane in one direction adjacent to curb or on-street parking on one-way street, with right-turn pockets approaching some intersections
4th Street from Market to Clementina streets	All Times from Market to Howard streets 3-7PM, Monday-Friday from Howard to Clementina streets	Right-side transit-only lane in one direction adjacent to curb or on-street parking on one-way street, with right-turn pockets approaching some intersections
Transit-Only Lane Location	Hours of Operation	Typical Configuration

Bush Street from Montgomery to Battery streets	7-9AM and 3-7PM, Monday-Friday	Right-side or left-side transit-only lane in one direction adjacent to curb on one-way street, with parking permitted when transit-only restriction is not in effect
Clay Street from Powell to Battery streets	All Times from Leidesdorff to Davis streets 7-9AM and 3-6PM from Kearny to Leidesdorff streets 7-9AM, Monday-Friday from Powell to Kearny streets	Right-side transit-only lane in one direction adjacent to curb or right-turn only lane on one-way street, with parking permitted along some segments when transit-only restriction is not in effect
Fremont Street from Mission to Market streets	All Times	Left-side transit-only lane in one direction adjacent to curb or on-street parking on one-way street
Geary Street from Market to Gough streets	All Times from Market to Powell streets and from Mason to Gough streets 4-6PM, Monday-Friday from Mason to Powell streets	Right-side transit-only lane in one direction adjacent to on-street parking on one-way street, with right-turn pockets approaching some intersections
Judah Street from 20th Avenue to La Playa Street	All Times	Center-running transit-only lanes in both directions on two-way street
Market Street	All Times from 12th to 5th streets inbound and from 8th Street to South Van Ness Avenue outbound	Center-running transit-only lane in one or both directions on two-way street
Mission Street from 11th to Main streets	7AM-6PM, Monday-Friday from 5th to Beale streets inbound 7AM-6PM, Monday-Friday from Main to 4th streets outbound 7-9AM and 4-6PM, Monday-Friday from 11th to 5th streets inbound 4-6PM, Monday-Friday from 4th to 11th streets outbound	Center-running transit-only lane in one or both directions on two-way street

Transit-Only Lane Location	Hours of Operation	Typical Configuration
O'Farrell Street from Gough to Powell streets	All Times	Right-side transit-only lane in one direction adjacent to curb or on-street parking on one-way street, with right-turn pockets approaching some intersections
Post Street from Gough to Grant streets	All Times	Right-side transit-only lane in one direction adjacent to on-street parking on one-way street
Potrero Avenue (NB) from 24th to 22nd streets	All Times	Right-side transit-only lane in one direction adjacent to bicycle lane on two-way street
Sacramento Street from Drumm to Larkin streets	7AM-7PM, Monday-Friday from Drumm to Kearny streets 4-6PM, Monday-Friday from Kearny to Larkin streets	Right-side transit-only lane adjacent to curb on one-way street, with parking permitted when transit-only restriction is not in effect
Sansome Street (SB) from Washington to Bush streets	All times	Right-side transit-only lane in one direction adjacent to commercial loading zones in contraflow direction on one-way street, with transit vehicle, commercial vehicle, and bicycle access permitted in contraflow direction
Stockton Street from Bush to O'Farrell streets	All Times from Bush to Geary streets 7AM-7PM, Monday-Saturday from Geary to O'Farrell streets	Center-running transit-only lane in one direction between through travel lanes and right-turn only lanes on one-way street
Sutter Street from Sansome to Gough streets	All Times from Kearny to Gough streets 3-6PM, Monday-Friday from Sansome to Kearny streets	Right-side transit-only lane in one direction adjacent to on-street parking on one-way street, with right-turn pockets approaching some intersections

Request to Experiment: Red colored Transit-Only Lanes

REPORTING

The SFMTA will submit semiannual progress reports to the CTCDC and FHWA's Office of Transportation Operations for the duration of the experiment and will submit a final report within three months following completion of the experiment.

ADMINISTRATION

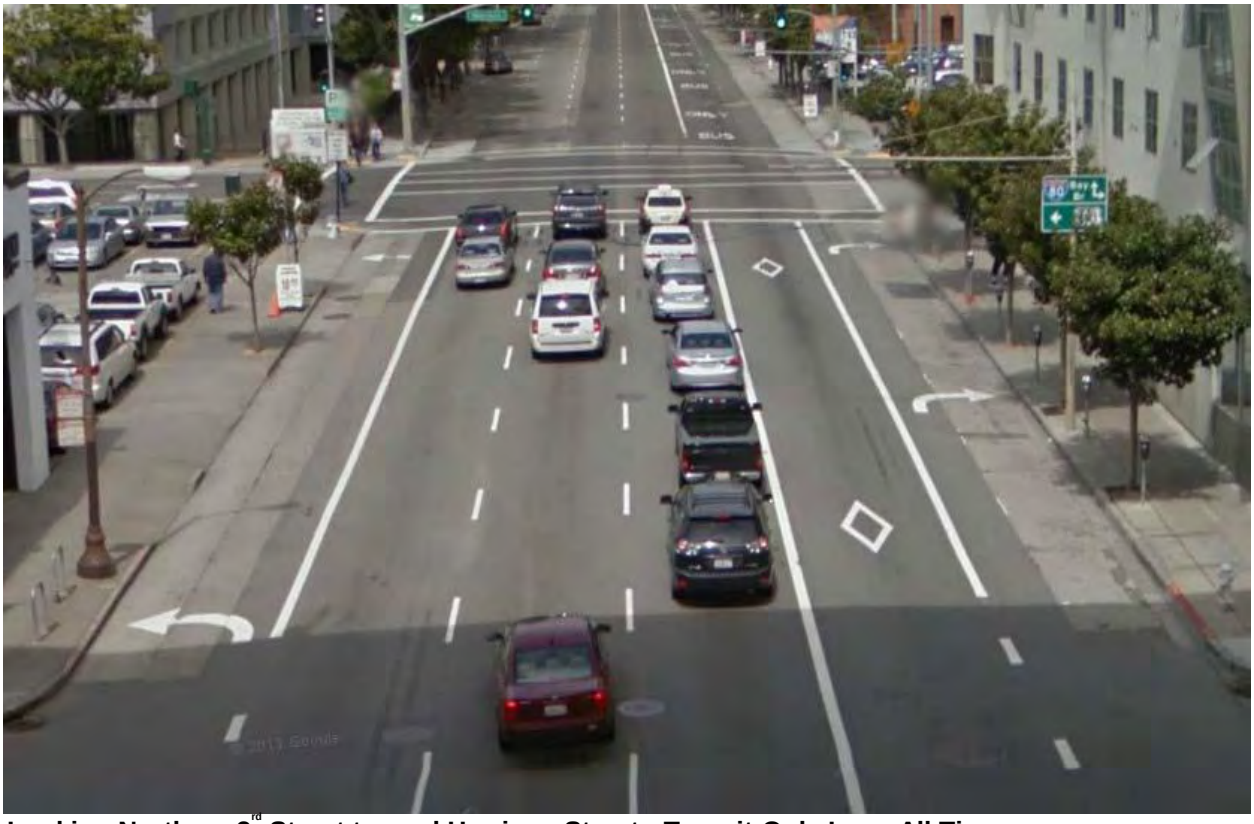
The SFMTA will be the sponsoring agency and consultant services may be used as needed. The concept of red colored transit-only lanes is not protected by patent or copyright.

REMOVAL OF EXPERIMENTATAL INSTALLATIONS

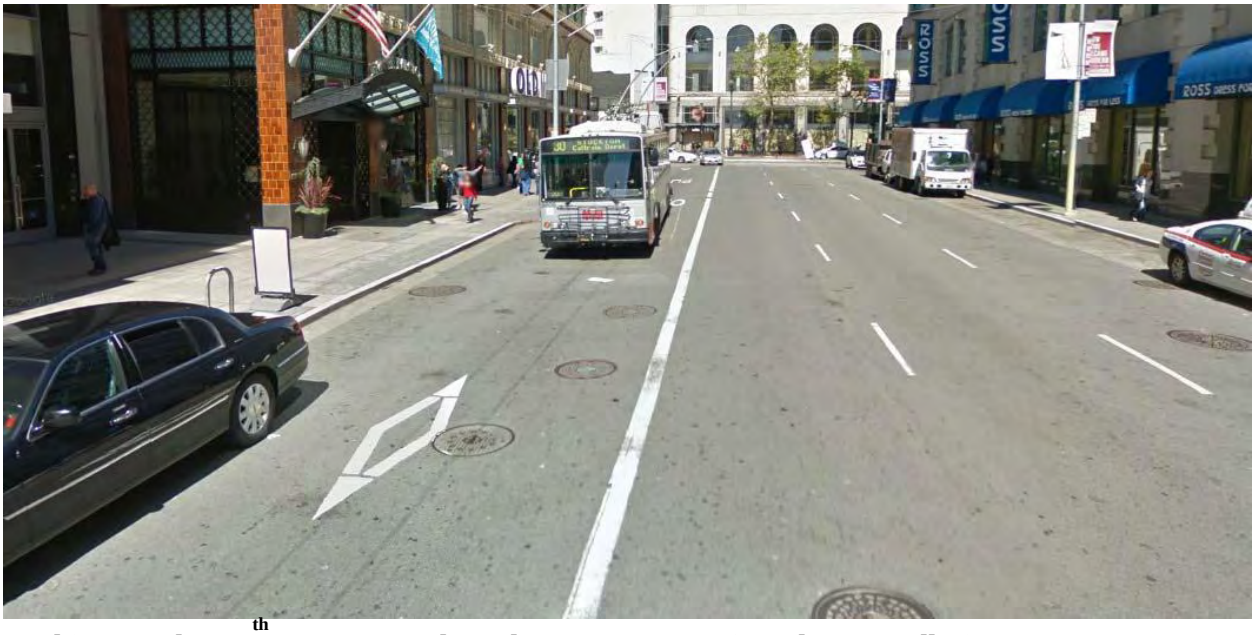
The SFMTA will remove experimental installations within three months of a determination by the CTCDC or the FHWA that changes to the MUTCD or CA MUTCD are not warranted. Additionally, the SFMTA will terminate the experiment if significant safety concerns are found to be attributable to the experiment.

APPENDIX A EXAMPLES OF TRANSIT-ONLY LANES IN SAN FRANCISCO

(All images from maps.google.com)

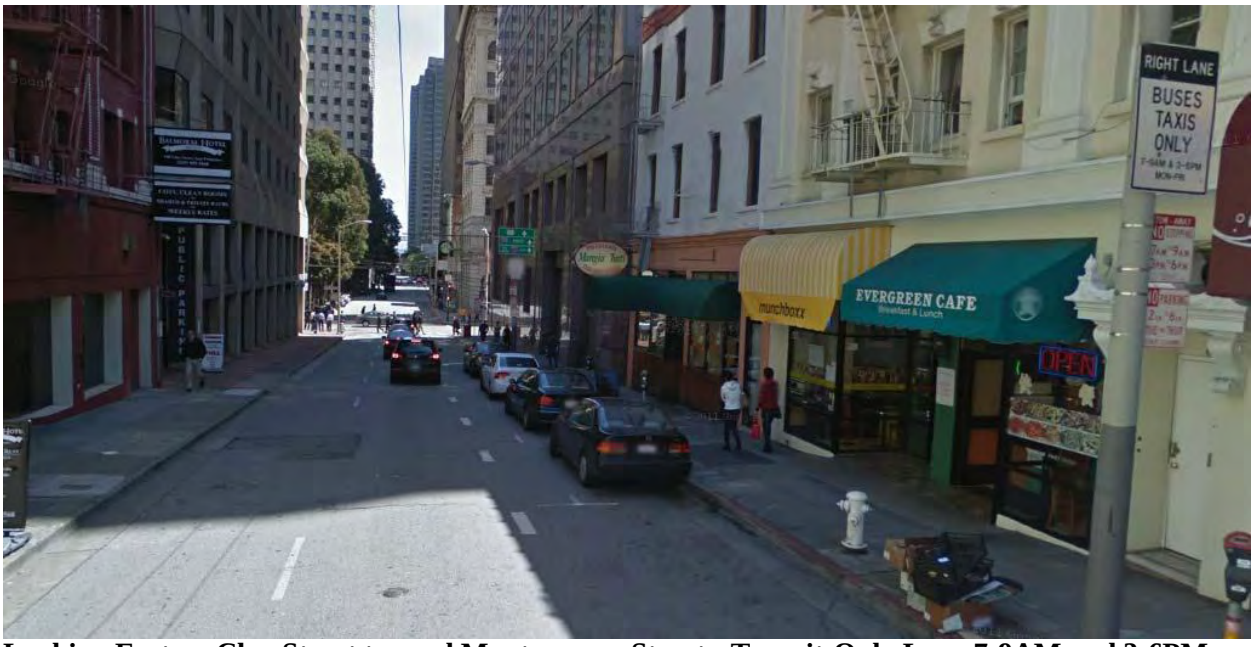


Looking North on 3rd Street toward Harrison Street - Transit-Only Lane All Times



Looking North on 4th Street toward Market Street - Transit-Only Lane All Times

Looking East on Bush Street toward Sansome Street - Transit-Only Lane 7-9AM and 3-7PM



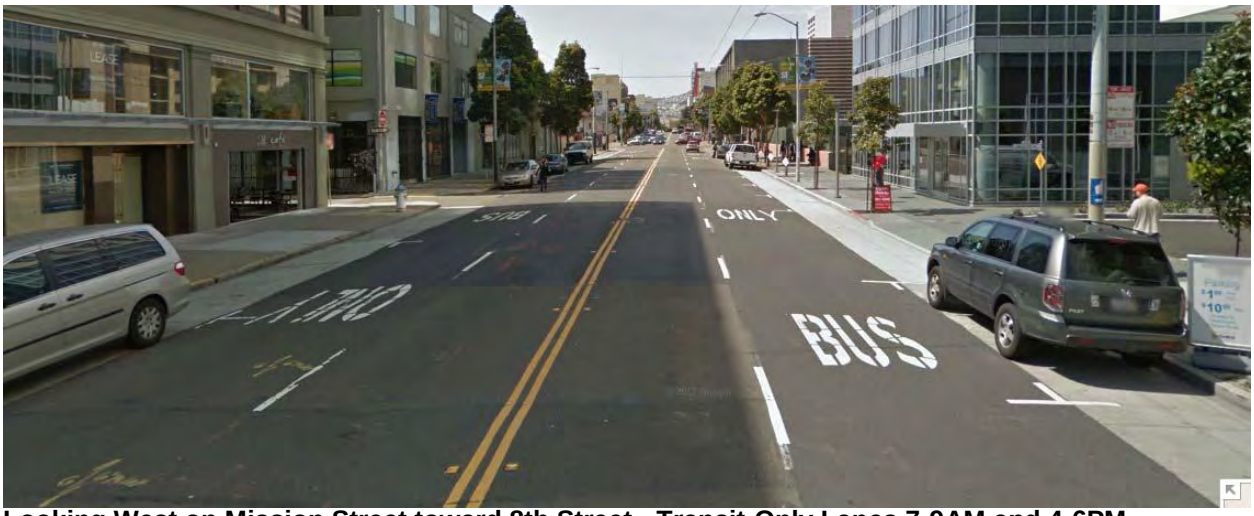
Looking East on Clay Street toward Montgomery Street - Transit-Only Lane 7-9AM and 3-6PM

Looking North on Fremont Street toward Market Street - Transit-Only Lane All Times

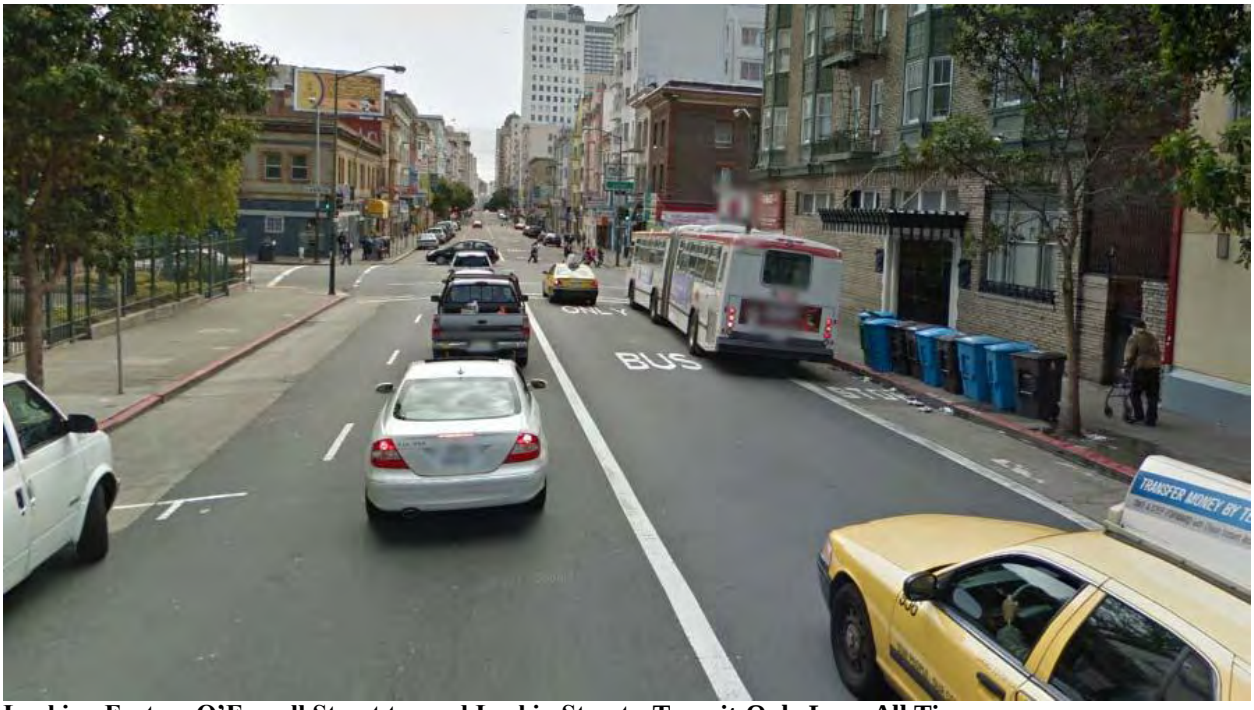
Looking West on Geary Street toward Jones Street - Transit-Only Lane All Times

Looking West on Judah Street toward 22nd Avenue - Transit-Only Lanes All Times

Looking East on Market Street toward 10th Street - Transit-Only Lanes All Times



Looking West on Mission Street toward 8th Street - Transit-Only Lanes 7-9AM and 4-6PM Westbound; 4-6PM Eastbound



Looking East on O'Farrell Street toward Larkin Street - Transit-Only Lane All Times

Looking West on Post Street toward Mason Street - Transit-Only Lane All Times

Looking North on Potrero Avenue toward 22nd Street - Transit-Only Lane All Times

Looking West on Sacramento Street toward Battery Street - Transit-Only Lane 7AM-7PM

Looking South on Sansome Street at Pine Street - Transit-Only Lane All Times

Looking South on Stockton Street toward Sutter Street - Transit-Only Lane All Times

Looking South on Sutter Street toward Jones Street – Transit-Only Lane All Times

12-XX Proposed experiment with Highlighted Shared Lane Markings

Recommendations: The City of Los Angeles request authorization to conduct experiment with Highlighted Lane Markings. The proposed colored marking is the alternative to the existing standard Shared Lane Marking.

Agency Making Request: Los Angeles DOT

Sponsor: Hamid Bahaodri, CTCDC Member representing Auto Club of Southern CA

HIGHLIGHTED SHARED LANE MARKING EXPERIMENTAL PROPOSAL

Submitted to:
California Traffic Control Devices Committee
Federal Highway Administration, Office of Traffic Operations

Submitted by:
Los Angeles Department of Transportation
Bicycle Program

July 13, 2012

A. Statement of the Problem:
In June of 2011 LADOT completed its study of the Shared Lane Marking (SLM) and found that the SLM increased the passing distance by motorists of bicyclists when the marking is present. Anecdotally, it has been brought to LADOT's attention that the marking is sometimes difficult to see in some lighting conditions and with faded asphalt. While, the California Manual on Uniform Traffic Control Devices, (CA MUTCD) allows for the use of black to (CA MUTCD 3A.05 - Colors) "...where a light colored pavement does not permit sufficient contrast with the markings." LADOT proposes to experiment with the use of green thermoplastic to back the marking rather than black to further denote the bicyclists presence to motorists in a shared lane and to add additional visibility to the SLM marking.

Figure 1 Highlighted SLMs increase visibility of pavement markings for motorist and bicyclists. Photo courtesy of SFMTA flickr[1]

LADOT proposes experimenting with Highlighted Shared Lane Markings to determine if the treatment can mitigate the effects of faded asphalt and identifiable lighting conditions that negate the desired outcome of standard SLMs. The Highlighted SLM would take the existing standard Shared Lane Marking and provide a green backing in thermoplastic to conform with the color range as approved by FHWA for green bicycle lane experimentation. Currently, the standard width of the thermoplastic markings ranges from three to five feet, and is placed closer to the center part of the lane in order to mitigate the likelihood of bicyclists riding in the door zone of parked vehicles and ensures bicyclists safety in conflict areas where space is shared between vehicles, bicyclists and pedestrians. LADOT proposes to install the experimental lane markings with dimensions of five feet wide and ten feet long with similar placement of standard SLMs to increase bicyclist safety.

Proposal

B. Scope

The markings will begin at the intersection of Gayley Avenue and Weyburn Avenue and continue approximately every 250 feet or at the beginning and end of each block(s) which precedes 250 feet until reaching Lindbrook Drive. Markings will be placed on both the east and west side of Gayley Avenue to ensure a more comprehensive evaluation. The asphalt and lighting conditions of the chosen site maintain the required conditions to determine the effectiveness of the experimental highlighted SLMs. Lighting conditions on Gayley Avenue can often impair motorists and bicyclists vision throughout the day in addition to weather conditions and high vehicle usage which has caused the asphalt to deteriorate.

[1] http://www.flickr.com/photos/sfmtabike/7490225392/sizes/m/in/photostream/

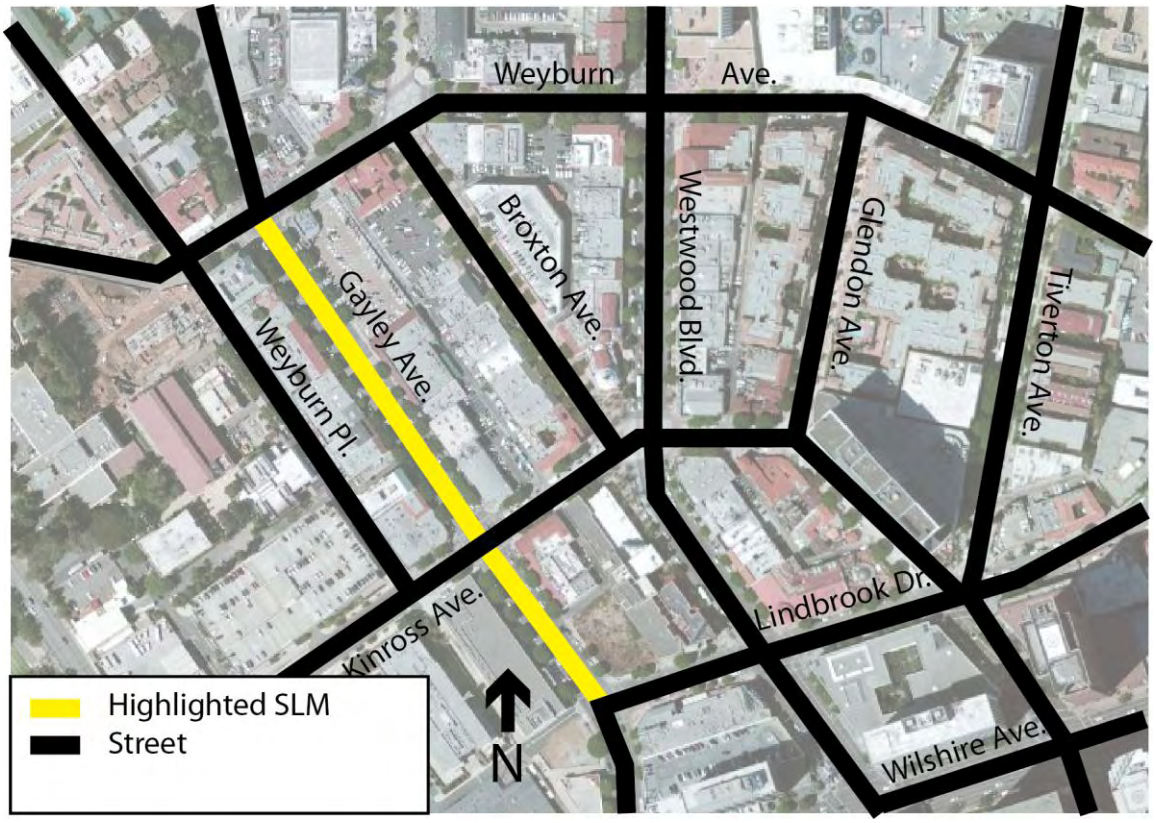


Figure 2 Westwood Village roadway network with proposed Highlighted SLM

C. Work Plan

To exemplify the findings of the experimental Highlighted SLMs LADOT proposes to conduct two distinct evaluation phases utilizing a similar methodology employed in LADOT's 2011 Shared Lane Marking Study. Two female and male bicyclists will alternate riding along Gayley Avenue in order to gauge vehicle, bicyclist and pedestrian interactions throughout various conditions (time of day, weather, traffic flow, etc.). An interaction is defined as a vehicle moving beside a bicyclist and either laterally sharing the lane with the bicyclist, passing the bicyclists, or staying behind the bicyclist within the Zone of Interaction (ZOI). Two observation vans will survey said bicyclists (out of the view of other motorists) in order to monitor and record multiple interactions and overall safety for the bicyclists. For each phase, observations will be recorded for both AM and PM peak motor vehicle volume periods. These measures and observation periods will be held constant with only the proposed treatment being modified to identify the actual effects of the experimental application.

The 2 stages include:

1. Stage 1: Observations of bicyclists and vehicles on Gayley Avenue in current condition (without any SLMs)
2. Stage 2: Observations of bicyclists and vehicles on Gayley Avenue after experimental Highlighted thermoplastic SLMs are installed

Identical variables will be collected throughout both stages in the field. They include:

1. Vehicle lane encroachment (low, medium, high)
2. Motorist's behavior (honking, swerving, braking, aggressive actions, etc.)
3. Variation of vehicle speed
4. Bicyclists position in lane (left, center, right)

5. Breaking (Other motor vehicles' location during interaction (in adjacent/opposite lane, ahead or behind))

When the field data collection is complete, the LADOT team will review, analyze and compare video files and documented observations to compare and document the findings.

D. Supporting Data

In Portland, Oregon a 2010 before and after study focused on the effects of 7 green bike boxes installed at perilous intersections. A public survey included in the research showed that motorists favored the green bike boxes, with 73% of motorists not encroaching into the bike box. Additionally, evidence from video files displayed that the green bike boxes did encourage bicyclists to stop in the box and both motorists and bicyclists showed a strong preference to the boxes with color. [2]

An evaluation of blue bike-lane treatment conducted in Portland, Oregon and analyzed by the University of North Carolina Highway Safety Research Center, under contract of the FHWA found similar results and emphasized the positive effects of colored thermoplastic. Using videotape analysis researchers found, "Significantly higher numbers of motorists yielded to bicyclists and slowed or stopped before entering the blue pavement areas, and more bicyclists followed the colored bike-lane path." Furthermore, a survey found that the majority of bicyclists and motorists credited the blue thermoplastic lanes improved safety for all.[3]

E. Safety and Traffic Operations

No foreseeable adverse safety effects or traffic operations are expected to result from the proposed study. Written observations will be done in an undocumented stationary LADOT vehicle parked near the ZOI. The video camera will be secured atop a tripod inside an additional LADOT vehicle and will be out of sight of approaching vehicles and be able to capture distance 125 to 150 feet away to permit the vehicle to travel at a safe speed. Indistinct orange markings will help to guide bicyclists to the ZOI in stage one and assure their focus remains on their surroundings and passing vehicles. If safety concerns or disruption of traffic operations develop from the experimental proposal LADOT will immediately terminate the experiment and restore Gayley Avenue to its original condition.

F. Time Period

If CTCDC and FHWA grant approval for the experimental proposal by October 2012 the following timeline will be adhered to:

Time Period- October 2012 - July 2014	**Activity**
October-December 2012	Material testing
January-March 2013	Material procurement
April 2013	Stage 1 observations
May-June 2013	Install highlighted SLMs
July 2013	Stage 2 observations
August-November 2013	Data Analysis
February 2014	Submit final report to CTCDC and FHWA

[2] Dill, Jennifer; Monsere, Christopher; McNeil, Nathan. "Evaluation of Bike Boxes at Signalized Intersections." *Science Direct*, 2012, Vol. 44 Issue 1, p.126-134, 9p

[3] Hunter, William; Harkey, David; Stewart, Richard; Birk, Mia. "Evaluation of Blue Bike-Lane Treatment in Portland, Oregon." *Journal of the Transportation Research Board*, 2000, Vol. 1705 Issue 15 p.99-106, 8p

G. Evaluation Procedures
LADOT's proposal will assess the impact of standard SLMs and green thermoplastic backed SLMs for bicyclists and motorists by collecting and analyzing before and after data. Unlike previous research this process will compare driving behavior and vehicle-bicyclist interactions on the same corridor both before and after colored SLM has been installed.

H. Reporting
If the proposal is accepted LADOT will submit quarterly progress reports to the CTCDC and FHWA's Office of Transportation Operations until the completion of the project. A final report will be completed within three months following the close of the experiment and submitted to both parties.

I. Administration
LADOT will be the sponsoring agency and may work with local advocacy organizations as needed.

J. Removal of Experimental Installations
If advised by the CTCDC or the FHWA, LADOT will remove the experimental installations within three months of the recommendation from either agency.

Added12-21 Request to Experiment with In-Roadway Warning Lights (IRWL) System that would supplement existing traffic signals along the Metro Gold Line

Recommendations: The Los Angeles County Metropolitan Transportation Authority (Metro) request authorization to conduct experiment with In-Roadway Warning Lights (IRWLs) system that would supplement existing traffic signals at ten locations.

Agency Making Request: Los Angeles County Metropolitan Transportation Authority

Sponsor: Mike Robinson, CTCDC Member representing Southern CA Counties (CSAC)

August 7, 2012

Submitted to:
California Traffic Control Device Committee
Federal Highway Administration, Office of Transportation Operations

RE: Permission to Demonstrate In-Roadway Warning Lights

The Los Angeles County Metropolitan Transportation Authority ("Metro") respectively requests permission to conduct a demonstration of an In-Roadway Warning Light (IRWL) system that would supplement existing traffic signal indications at ten (10) intersections along the Metro Gold Line Eastside Extension, a Light Rail Train system located in Los Angeles, California. This non-standard traffic control system, which is composed of a series of LED lights embedded in the roadway is designed to increase the awareness of the presence of street running light rail trains among motorists approaching the intersection. The proposed application of IRWLs focuses on enhancing the warning for motorists when trains approach the intersections and deterring them from making illegal left turns. This in turn will reduce violations and accidents by increasing compliance with Red traffic signal indications.

1. Statement of Problem

Metro Gold Line Eastside Extension (MGLEE)

The MGLEE is a six-mile light rail transit (LRT) project, which extends the Metro Gold Line from Downtown Los Angeles at Union Station and proceeds easterly to the terminus near the intersection of Atlantic Avenue and Pomona Boulevard. The MGLEE opened for revenue service on November 16, 2009. For approximately four miles of the alignment, the light rail trains operate in a center median separated from adjacent vehicular traffic by a six-inch high curb. Where at-grade intersection crossings occur, the movement of trains, vehicles, and pedestrians are controlled by traffic signals, train signals, striping, and signage. The California Public Utilities Commission (CPUC) regulations limit speed on surface light rail systems to the legal speed of parallel traffic, but not to exceed 35 miles per hour. Attachment A contains a map of the MGLEE alignment and indicates the locations of the at-grade crossings.

While the MGLEE has maintained a safe standard of operations during its first 30 months of operation, the Metro Board has directed staff to increase awareness of the light rail system, enhance safety measures at at-grade crossings and further reduce left turn violations.

A review of the MGLEE incident summaries revealed that illegal turn violations are responsible for 13 of 17 (76%) incidents that occurred since service began. While a number of industry-wide best practices have already been incorporated into the design of the MGLEE to reduce the risk of left turn violations, additional refinements have been identified by Metro to further reduce this risky behavior. These include refinements to traffic signal phasing at selected intersections, improved advanced train detection, and trial demonstrations of In-Roadway Warning Lights (IRWLs). All of the improvements are designed to increase predictability of traffic signal systems and increase public awareness of train operations.

2. Proposed Solution: In-Roadway Warning Lights System

The predominant cause of train-vehicle incidents occurring on the MGLEE are left turn violations. Metro, in close coordination with the County of Los Angeles Department of Public Works (DPW) and the City of Los Angeles Department of Transportation (LADOT) has initiated improvements that specifically target left turn violations and aim to reduce the number of violations. These improvements have included adjustments to the traffic signal heads to increase the visibility of the left turn arrows at greater distances, and improvements to the advance train detection system along a portion of the alignment so that traffic signals can be programmed with maximum efficiency and predictability. Additionally, Metro is proposing to install IRWLs at ten at-grade intersection crossings to reinforce the existing traffic signals and active "Train Approaching" warning signs.

While limited data has been collected to demonstrate the effectiveness of IRWLs at reducing left turn violations, various applications of IRWLs have demonstrated the ability to change motorist behavior and reduce the tendency of motorists to violate red light signals. The proposed IRWL system would serve as a reinforcement to the standard traffic signal control devices. It would not conflict with any existing traffic control device, but would provide an additional visual warning to motorists and pedestrians that a train is approaching the intersection. A single row of lights would be embedded in the pavement parallel to the train tracks in the direct line of sight of the motorists waiting at or approaching the intersection. The lights will be embedded in the pavement at two different angles in order to be visible to all motorists approaching the intersection. In an alternating fashion, the lights will be placed at 90-degree and 45-degree angles. The series of lights that will be angled towards motorist in the eastbound and westbound left turn lanes will be adjusted to the most appropriate angle for maximum visibility. Attachment B illustrates the proposed application of warning lights.

This application would be unique, compared to other applications tested at County of Los Angeles transit crossings. The IRWLs would not be exclusively applied to stop bars as was done on a recent project on the Blue line by LACMTA. In this project, instead of a single row of lights being applied to the left turn stop bar, a row of lights would be applied parallel to the LRT tracks and run the full width of the intersection. The lights would be installed along both sides of the LRT right-of-way to create a visual barrier along the tracks. Additionally, the IRWLs would be synchronized with the active Train Approaching warning signs, so that the lights would be illuminated ONLY when a train

approaches and crosses the intersection. During other red light signal phases, when no trains are detected as approaching the intersection, the warning lights would not be illuminated. Since there are many factors which can limit the effectiveness of IRWL applications, we believe it is critical that the warning lights be linked directly to the train activity rather than the red light signal phase, which may or may not indicate the presence of a train.

The maintenance and reliability of the warning light devices is another key factor that can limit the effectiveness of the warning system. Several agencies, including the City of Santa Monica, have tested multiple applications of IRWLs and documented their best practices with regards to installation and selection of a reliable manufacturer, as well as product maintenance. This proposal will incorporate these lessons learned to select the most durable equipment and to minimize maintenance issues.

3. Supporting Data

There is limited data on the use of IRWLs to increase motorist awareness at at-grade transit crossings. This application summarizes data collected from two transit agencies: Houston METRO and LACMTA. In addition, it cites a study by the City of Santa Monica which evaluated the effectiveness of IRWLS to increase motorist awareness at various pedestrian crossings. While Houston METRO and the City of Santa Monica both demonstrated positive results, LACMTA's tests were inconclusive.

Houston METRO – The transit agency operates a 7.5 mile stretch of light rail transit that runs through the Houston downtown. The rail system experienced several crashes due to motorists running red lights, creeping through intersections, or making prohibited right turns on Red. In 2006, the agency employed an application of IRWLs at one intersection in the downtown area. A double row of in-pavement lights were installed at the stop bar at the Jefferson Street approach to Main Street, in an attempt to reduce both through-traffic red light violations and right-turn-on-red violations. At this location there is no left turn movement available, therefore, reducing left turn violations was not a component of the study. While the trial demonstration was not finalized, preliminary results indicated that the IRWLS reduced right-turn-on-red violations by more than 50%.

LACMTA – LACMTA in coordination with LADOT installed IRWLs at two intersections, located on distinct transit lines, in an attempt to reduce red light violations. The first installation, which aimed to reduce left turn violations at a Metro Blue Line Light Rail Train crossing, applied a single row of in-pavement lights to the stop bars of the eastbound and westbound left turn pockets. The lights were illuminated each time the red light signal phase would occur, for the full red phase interval. Photo enforcement camera data was used to compare the before and after red light violation rates. In addition, the data collected was compared to a similar intersection where no IRWLs had been installed. The data indicated a reduction in left turn violation rates at the test location but also an equal or greater reduction in violation rates at the non-test location. Therefore, it could not be concluded that the lights helped reduce the left turn violations.

A second installation of IRWLS was applied to a Metro Orange Line Bus Rapid Transit crossing to reinforce traffic signal indications and aimed to reduce through-traffic red light violations. The installation was located at Woodman Avenue near Oxnard Street at a place where the Metro Orange Line crosses Woodman Avenue at a slight diagonal angle. A single row of IRWLs was applied to the northbound and southbound stop bars on Woodman. Since there are no left turn or right turn movements for either the northbound or southbound traffic, reduction of left turn violations or right-turn-on-red violations was not a component of this test. The lights were illuminated each time the red light signal phase would occur, for the full red light interval. Photo enforcement camera data was used to compare the before and after red light violation rates. In addition, the data collected was compared to a similar crossing where no IRWLs had been installed. The before and after data indicated an inexplicably large increase in the northbound violation rates and a slight increase in the southbound violation rates for both the test location and the non-test location. Therefore, the test application was not able to conclude any benefit from the application of the IRWLs at the stop bars.

City of Santa Monica – The City has installed IRWLs at seventeen different crosswalk locations in an effort to increase driver awareness of pedestrian crossings. The City performed an evaluation of six test sites to evaluate the effectiveness of the devices in increasing driver's awareness of pedestrians, and also did a comparative analysis of the effectiveness of various manufacturers' devices. Their findings are documented in a report titled *In-Roadway Warning Lights Comparative Study,* dated July 13, 2010. The City evaluated the motorist yielding distances at the test locations when the devices were in operation and again when they were not in operation. The results showed a slight increase in yielding distances at most locations during the daytime and a very notable increase in night-time compliance when the devices were in operation (from 66% to 90%). The night time yielding distances were effectively increased to the level of daytime yielding distances, which are measurably higher. The results suggest that the devices can be particularly effective at increasing driver's awareness at dusk and during the nighttime.

Conclusions

While trials of IRWLs to increase motorist compliance of red light signal indications have been limited, there are applications of IRWLs which have demonstrated the ability to increase motorist awareness and compliance with traffic signal indications or other traffic signs. The proposed trial would specifically target left turn violations at ten intersections on the MGLEE. The existing photo enforcement camera program provides the benefit of continuous and consistent data collection at 8 of 10 trial demonstration intersections. It also provides comparative data for seven other intersections. We believe this would allow for an excellent opportunity to test and document the effectiveness of these devices.

4. No Patent or Copyright

Metro certifies that the concept of the In-Roadway Warning Lights is not protected by patent or copyright. More than one vendor can provide similar devices.

5. Demonstration Schedule and Locations

a.	Design and Engineering	January- February 2013
b.	Installation	March 2013
c.	Experimental and Evaluation Period	May 2013 through May 2015
d.	Bi-annual Progress Reports	After each 6-month period
e.	Final Report	September 2015

The proposed demonstration would include applications of IRWLs at the ten at-grade intersection crossings listed below. All but two of the intersections in the demonstration group have photo enforced left turns.

Demonstration Locations	Photo Enforced Left Turns
1. Temple & Alameda	No
2. 1st & Indiana	No
3. 3rd & Rowan Avenue	Yes
4. 3rd & Gage Avenue	Yes
5. 3rd & Downey Road	Yes
6. 3rd & Ford Blvd.	Yes
7. 3rd & McDonnell Avenue	Yes
8. 3rd & Mednik Avenue	Yes
9. 3rd & Civic Center Way	Yes
10. 3rd & La Verne Avenue	Yes

The following is a list of the MGLEE at-grade crossings which will remain unchanged during the demonstration. This list includes seven intersections with photo enforced left turns, which will serve as the control group.

Non-Demonstration Locations	Photo Enforced Left Turns	
1. 1st & Alameda	No	
2. 1st & Hewitt	No	
3. 1st & Vignes	No	
4. 1st & Mission	Yes	(control group)
5. 1st & Anderson	Yes	(control group)
6. 1st & Utah	Yes	(control group)
7. 1st & Clarence	Yes	(control group)
8. 1st & Lorena	Yes	(control group)
9. 1st & Indiana	No	
10. 3rd & Indiana	No	
11. 3rd & SR-60 Ramps	No	
12. 3rd & Eastern	Yes	(control group)
13. 3rd & Arizona	Yes	(control group)
14. 3rd & Woods & Beverly	No	

6. Evaluation Plan

The evaluation plan will focus around the data collected by Metro's Photo Enforcement Camera program. The strength of the evaluation plan is the consistent and comprehensive monthly tracking reports that are produced as a part of the photo enforcement camera program. The photo enforcement cameras have been recording left turn traffic activity at 15 at-grade intersection crossings (which include 25 separate left turn movements) since the MGLEE opened for operation in November 2009. This provides us with the ability to analyze approximately 2 years of data prior to the installation of IRWLs and to compare it to data collected after the IRWLs are in operation. Additionally, the demonstration will install IRWLs at ten intersections (which include 13 photo enforced left turns and 4 non-photo enforced left turns) and use the other seven photo enforced intersections (which include 12 photo enforced left turn movements) as the control group[1]. This will allow us to analyze before and after data and also compare the performance of the IRWLS to the control group. Specifically, we will analyze average monthly left turn volumes and violations for each of 25 left turn movements and quantify whether there has been a statistically significant change in the number of monthly or annual violations. For the two intersections that are not photo enforced (Temple/Alameda and 1st/Indiana) data will be collected over a series of weekdays while the lights are in operation and again while the lights are not in operation and left turn violation counts will be analyzed. Metro will prepare and submit biannual progress reports (at 6-month intervals) which summarize the photo enforcement data collected for that period and compare it to the pre-IRWL data. Attachment C provides a sample data tracking form, illustrating the type of data that will be collected and analyzed.

At the end of the demonstration period, Metro in coordination with DPW and LADOT will produce a final report of the demonstration project. At that time, if the project shows a significant increase in pedestrian and drivers' awareness of the train at the test locations and meets other project goals, Metro, DPW and LADOT will develop recommendations on the continued use and/or expansion of the program.

7. Evaluation Procedures

Metro in coordination with DPW and LADOT will prepare the design and engineering drawings and provide construction oversight. Field observations will be conducted by Metro to help evaluate the effectiveness of the installation. Metro will be responsible for collecting and evaluating project data, preparing semiannual progress reports for the duration of the experimentation and providing a copy of the final results to the Office of Transportation Operations (HOTO) within six months of the conclusion of the experiment.

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[1] The Photo Enforcement Program contract expires on June 30, 2013 and the Metro Board is expected to make a determination prior to that date on whether to continue or end the program. If the program is discontinued prior to the end of the experiment, staff will utilize data collected by the County and City of Los Angeles traffic signal systems to track left turn violations and statistically evaluate any changes.

8. Restore to Before Conditions

Metro, LADOT and DPW agree to restore the demonstration sites to a condition that complies with the provisions of the MUTCD within 3 months following the completion of the demonstration, if the experiment determines that the IRWLs were ineffective. We will also terminate the demonstration at any time if we determine that the experiment directly or indirectly causes significant safety hazards. However, if the experiment demonstrates an improvement, the devices will remain in place as a request is made to update the MUTCD and an official rulemaking action occurs.

Thank you for considering the request for experimentation. If you have any questions, comments or suggestions, please contact Mr. Eric Carlson of Metro at 213-922-3052.

Sincerely,

Frank Alejandro
Chief Operations Officer
Operations
Los Angeles County Metropolitan
Transportation Authority

Bruce Shelburne
Interim Executive Director, Rail
Operations
Los Angeles County Metropolitan
Transportation Authority

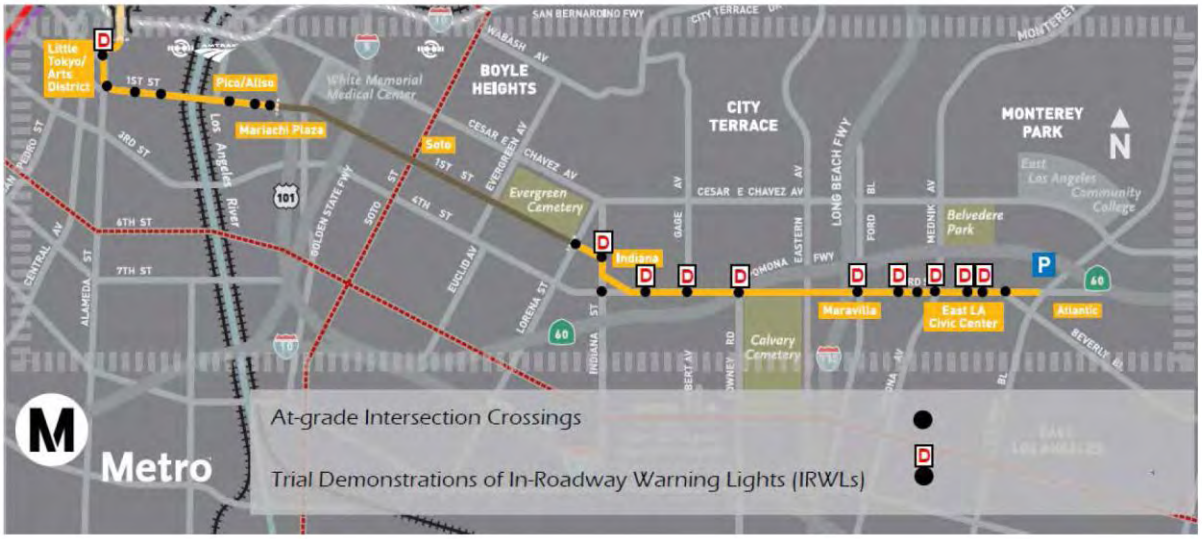
Vijay Khawani
Executive Officer, Corporate Safety
Los Angeles County Metropolitan
Transportation Authority

Zaki Mustafa
Executive Officer
City of Los Angeles
Department of Transportation

John T. Walker
Assistant Deputy Director
County of Los Angeles
Department of Public Works

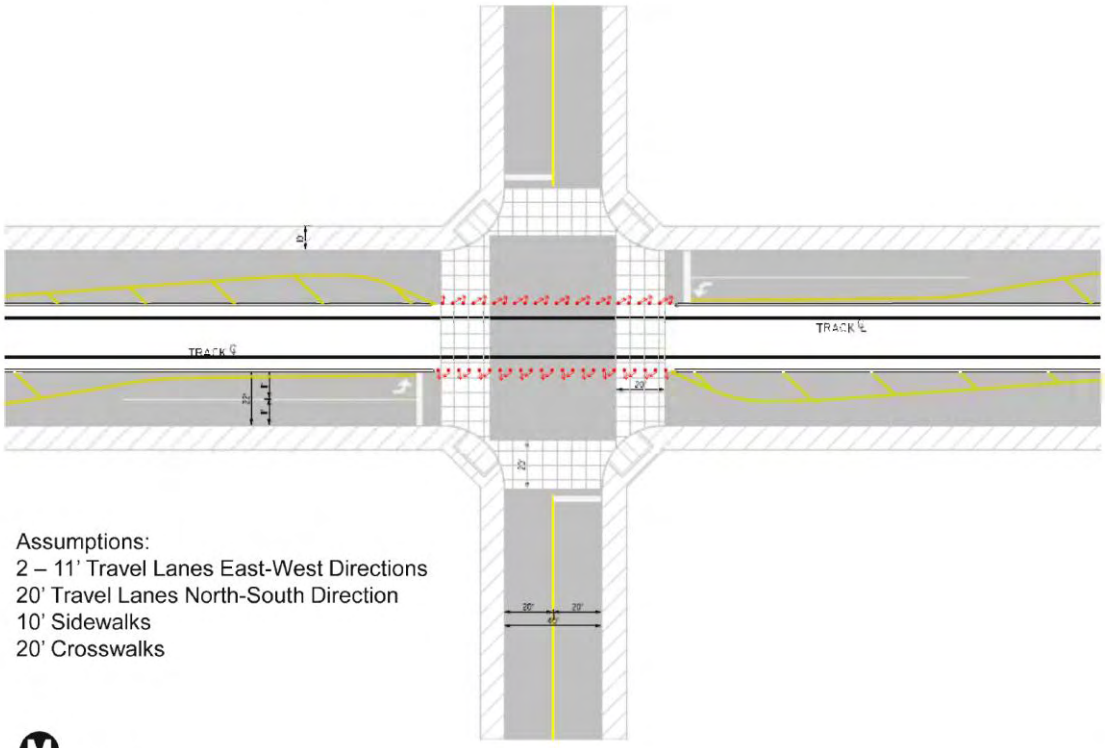
cc: FHWA's District Office in California
650 Capitol Mall, Suite 4-100
Sacramento, CA 95814

Proposed Demonstrations



ATTACHMENT A

Standard Ideal Intersection



Assumptions:
2 – 11' Travel Lanes East-West Directions
20' Travel Lanes North-South Direction
10' Sidewalks
20' Crosswalks

Metro

ATTACHMENT B

MGLEE Performance Tracking Form - SAMPLE

				Pre-Installation Data*			Post-Installation Data		
	Intersections	Turn Movements	IRWL Demonstration Location	Daily Turn Volumes	Avg. Monthly Violations	Emergency Vehicle Violations	Daily Turn Volumes	Avg. Monthly Violations	Emergency Vehicle Violations
	Temple & Alameda**	NB to EB:	Yes	*N/A*	*N/A*	*N/A*			
	Temple & Alameda**	SB to EB:	Yes	*N/A*	*N/A*	*N/A*			
	1st & Indiana**	WB to SB:	Yes	*N/A*	*N/A*	*N/A*			
	1st & Indiana**	NB to WB:	Yes	*N/A*	*N/A*	*N/A*			
Phot Enforced Left Turns	1st & Mission	EB to NB:	No	*1,797*	*86*	*13*			
	1st & Mission	WB to SB:	No	*379*	*41*	*3*			
	1st & Anderson	WB to SB:	No	*121*	*11*	*1*			
	1st & Utah	WB to SB:	No	*80*	*8*	*1*			
	1st & Clarence	EB to NB:	No	*173*	*10*	*2*			
	1st & Clarence	WB to SB:	No	*577*	*36*	*3*			
	1st & Lorena	EB to NB:	No	*920*	*12*	*1*			
	1st & Lorena	WB to SB:	No	*565*	*10*	*1*			
	3rd & Rowan	EB to NB:	Yes	*379*	*84*	*5*			
	3rd & Rowan	WB to SB:	Yes	*504*	*62*	*17*			
	3rd & Gage	EB to NB:	Yes	*574*	*25*	*2*			
	3rd & Gage	WB to SB:	Yes	*1,237*	*78*	*13*			
	3rd & Downey	WB to SB:	Yes	*919*	*64*	*32*			
	3rd & Eastern	EB to NB:	No	*2,188*	*62*	*11*			
	3rd & Eastern	WB to SB:	No	*323*	*9*	*23*			
	3rd & Ford	EB to NB:	Yes	*602*	*57*	*7*			
	3rd & Ford	WB to SB:	Yes	*706*	*22*	*19*			
	3rd & McDonnell	EB to NB:	Yes	*610*	*48*	*4*			
	3rd & McDonnell	WB to SB:	Yes	*389*	*26*	*9*			
	3rd & Arizona	EB to NB:	No	*303*	*27*	*4*			
	3rd & Arizona	WB to SB:	No	*220*	*8*	*6*			
	3rd & Mednik	EB to NB:	Yes	*840*	*35*	*26*			
	3rd & Mednik	WB to SB:	Yes	*525*	*14*	*23*			
	3rd & Civic Center	EB to NB:	Yes	*277*	*45*	*6*			
	3rd & La Verne	WB to SB:	Yes	*804*	*83*	*105*			

* The Pre-installation Data reflects averages recorded as of 8-31-11. This data will be updated prior to commencement of the trial demonstrations

** These intersections do not have photo enforced left turns. Therefore, data will be collected for these intersections over a period of days.

ATTACHMENT C

12-20 FHWA's 2009 MUTCD Revisions 1 and 2 –Engineering Judgment & Compliance Dates

Background:

On May 14, 2012, the FHWA published final rules to revise the MUTCD provisions on engineering judgment and compliance dates. The 2009 MUTCD with Revisions 1 and 2 incorporated (http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm) is now available. The complete text of the Federal Register notices can be accessed at the following links:

- 2009 MUTCD Revision 1 – Engineering Judgment

  PDF: http://www.gpo.gov/fdsys/pkg/FR-2012-05-14/pdf/2012-11712.pdf

  HTML: http://www.gpo.gov/fdsys/pkg/FR-2012-05-14/html/2012-11712.htm

- 2009 MUTCD Revision 2 – Compliance Dates

  PDF: http://www.gpo.gov/fdsys/pkg/FR-2012-05-14/pdf/2012-11710.pdf

  HTML: http://www.gpo.gov/fdsys/pkg/FR-2012-05-14/html/2012-11710.htm

A U.S. Department of Transportation press release (http://www.fhwa.dot.gov/pressroom/fhwa1222.htm) on the adopted revisions is also available.

The National MUTCD 2009 Revisions 1 & 2 are not effective immediately in California, California has a maximum of 2 years from the June 13, 2012 effective date to incorporate these changes into the California MUTCD. The revised California MUTCD 2012 edition (current) incorporating the National MUTCD 2009 Revisions 1 & 2 needs to be issued on or before June 13, 2014.

Caltrans hereby informs and seeks CTCDC's review and input to proceed with future adoption of these National MUTCD 2009 revisions 1 & 2. It is anticipated that pursuant to receiving a formal recommendation from CTCDC in a future CTCDC meeting, Caltrans will incorporate these and other changes recommended by CTCDC since January 13, 2012 and issue a newly revised official California MUTCD sometime in early 2014. The deadline for adopting the National MUTCD 2009 Revisions 1 & 2 is June 13, 2014.

Attachments:

- National MUTCD 2009 Revision 1 pages only
  http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/mutcd2009r1pages.pdf
- National MUTCD 2009 Revision 2 pages only
  http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/mutcd2009r2pages.pdf
- Current California MUTCD 2012 pages affected by National MUTCD 2009 Revisions 1 & 2
  http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd2012/Part1.pdf