AGENDA AMENDED on March 1, 2013

CALIFORNIA TRAFFIC CONTROL DEVICES COMMITTEE (CTCDC)
March 21, 2013 Meeting (Start Time 9 am)
37-500 Cook Street (Room # IW120)
Palm Desert, CA 92211

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 meetings are available at http://www.dot.ca.gov/hq/traffops/signtech/newtech/index.htm

Organization Items

1 Introduction
2 Membership
3 Approval of Minutes of the December 6, 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
Added	13-05	Proposal to amend Sections 2C.37and 4I.03 of the CA MUTCD 2012 to add Activated Blankout METER ON & PREPARE TO STOP sign -Submitted by Caltrans	(Introduction) (Benton) 47-52
	12-20	FHWA's 2009 MUTCD Revisions 1 and 2 –Engineering Judgment & Compliance dates - Submitted by Caltrans	(Continued) (Benton) 8-11

6. Request for Experimentation

13-01	Request to Experiment with Green & Shared Roadway Bicycle Markings – Proposed by the City of Oakland	(Introduction) (Knowles) 12-33
13-02	Request to Experiment with Bike Boxes and Wide Bike Strip Stripe -Proposed by the City of Davis	(Introduction) (Knowles) 34-43

7 Discussion Items

13-03	Bay Area 511 Sign Proposal -Submitted by MTC - SAFE	(Introduction) (Benton) 44-45

8 Information Items

13-04	Option of splitting the material in the MUTCD into two separate Documents Proposed by FHWA– Submitted by Caltrans	(Introduction) (Benton) 46

9 Next Meeting - Suggested dates are July 11, 18, or 25, 2013

10 Adjourn

ITEM UNDER EXPERIMENTATION

06-2 Experiment with Colored Bike Lane (Brown/Wong)
(Proposed by the City of San Francisco)
Status: No New Update.
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 Experimentation with new Warning Sign for Bicyclists (Brown/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.

09-9 Experiment with Steady Red Stop Line Light (Greenwood/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 Experiment with Separated/Protected Bikeway (Greenwood/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) (Greenwood/Fisher)

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

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

11-4 Experiment with Round Rapid Flashing Beacon and RRFB (Greenwood/Fisher)
Status: See report on the following website.
http://www.dot.ca.gov/hq/traffops/signtech/newtech/exp/StatusReportRRFB-SantaMonica021213.pdf

11-12 Experiment with Circular Rapid Flashing Beacon and RRFB (Greenwood/Fisher)

Status: No update.

11-13 Experiment with a Sign "RECKLESS DRIVING PROHIBITED" (Marshall/Mansourian)
Status: No update.

11-19 Experiment with 2nd advance California Welcome Center Destination Sign (Benton)
Status: No update.

12-9 Request to Experiment with Yellow LED Border on Pedestrian Signal (Benton)
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
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Flex your power!
Be energy efficient!

January 11, 2013

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

Status Report No. 2: 4(09)-13 (E) Yellow LED Border on Ped Signal – Caltrans

Since our last correspondence regarding the experiment referenced above, our progress was delayed due to the time-consuming process required to purchase the 16 prototype pedestrian signal modules. As mentioned in the previous status report, we were successful in working with Leotek Electronics in developing a pedestrian signal module modified with a yellow LED border. Our next step was to obtain 16 of these devices and begin the evaluation. Unfortunately, the procurement step took much longer to administer than originally anticipated.

Although the modules are not off-the-shelf items and need to be custom made for the evaluation, our purchasing department expressed concerns about buying them without following a competitive bid process. This required performing additional work to find interested suppliers and obtain quotes. Ultimately, we were successful in obtaining two quotes for the modules and placed an order with the lowest bidder on October 30, 2012. The expected ship date for the order is the first week of February. Considering this step was initiated in early August 2012, the additional processes effectively delayed the project schedule almost three months.

Prior to purchasing the modules, we had hoped to receive the equipment by late summer so that data could be gathered for a couple intersections before the winter weather arrived. The three-month delay in acquiring the equipment eliminated this opportunity and requires that we modify our evaluation plan slightly to stay on schedule. At two locations we are planning to study, pedestrian activity is not greatly affected by inclement weather. These intersections are located in the downtown section of Redding where on-street parking is limited and people need to walk to access the local restaurants and businesses. This will allow us to begin the data collection soon after we receive the prototype modules rather than wait for better weather conditions in the Spring. This adjustment should put us back on track to finish the evaluation plan and submit a final report to FHWA in December.

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

Cc: FHWA California Division Office
Devinder Singh – CTCDC Executive Secretary
Ed Lamkin – Caltrans District 2 Maintenance & Operations
Janice Benton – Caltrans HQ Traffic Operations

Rob,

Thank you for continuing to submit semi-annual progress reports to keep us informed of the status of your official experiment. These reports are appreciated.

I noticed in the approval letter dated 12/11/2011 for this experiment that a two-year limit was placed on the duration of this experiment. This would mean that the experiment should conclude in December 2013. Because of the difficulties and delays that you have incurred in procuring the necessary equipment, it occurs to me that you might not be able to complete the experiment within the two-year limit. I would rather have you conduct a thorough experiment than to rush to meet a previously set deadline. Therefore, you may consider this e-mail message to be a time extension of one year, such that the deadline for completing the experiment would now be December 2014. If you can finish sooner than December 2014, that would be ideal, but it is not necessary.

Thanks,

Bruce

Bruce E. Friedman, P.E.
Transportation Specialist, MUTCD Team
Federal Highway Administration
Office of Transportation Operations, HOTO-1
1200 New Jersey Avenue SE
Mail Stop E86-201
Washington, DC 20590
Phone: 202 366 5012; E-mail: bruce.friedman@dot.gov ; Web Site: http://mutcd.fhwa.dot.gov

12-18	Request to experiment with Red Colored Transit-only Lanes	(Knowles)
12-19	Request to Experiment with Highlighted Shared Lane Markings	(Bahadori)
12-21	Request to Experiment with In-Roadway Warning Lights (IRWL) System that would supplement existing traffic signals along the Metro Gold Line	(Robinson)
12-25	Request for permission to experiment with various Bicycle Treatments	(Robinson)

5. Public Hearing

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

Background:
During the last CTCDC meeting, some Committee members suggested adding California language which states "if an agency not using standards listed in the CA MUTCD, then the agency must document the reasons to deviate from standards and keep it on file".

Other Committee members were not supportive of this statement and stated that agencies are already documenting the reasons when they are deviating from standards.
Finally, the committee asked to bring back the item with some legal clarifications.

Caltrans Legal Branch will be consulted on this issue and Committee will be informed during the meeting.

Recommendation:

Caltrans requests that the Committee recommend adoption of FHWA's final rule on 2009 MUTCD Revisions 1 regarding engineering judgment as per the proposal below.

Agency Making Request/Sponsor: Caltrans

Sponsor: Janice Benton, Voting member, Caltrans

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.

In the interest of brevity, the above web referenced documents have not been included in this agenda item but multiple hard copies of these documents will be made available at the public meeting for public perusal.

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 seeks CTCDC's formal recommendation for adoption of these National MUTCD 2009 revisions 1 & 2. It is anticipated that pursuant to receiving a formal recommendation from CTCDC, Caltrans will incorporate these (and other changes recommended by CTCDC since January 13, 2012) to issue a newly revised official California MUTCD sometime in early 2013. The deadline for adopting the National MUTCD 2009 Revisions 1 & 2 is June 13, 2014.

California MUTCD 2012 Existing Policy (FHWA's 2009 MUTCD Revision 1 – Engineering Judgment):

Section 1A.09 Engineering Study and Engineering Judgment

Support:

01 Definitions of an engineering study and engineering judgment are contained in Section 1A.13.

01a Refer to CVC 627 for definition and requirements of "Engineering and Traffic Survey". It is also abbreviated in this manual as E&TS.

Standard:

02 **This Manual describes the application of traffic control devices, but shall not be a legal requirement for their installation.**

Guidance:

02a *The decision to use a particular device at a particular location should be made on the basis of either an engineering study or the application of engineering judgment.*

Option:

02b When an engineering study or the application of engineering judgment determines that unusual site-specific conditions at a particular location make compliance with a Standard statement in this Manual impossible or impractical, an agency may deviate from that Standard statement at that location.

03 *Early in the processes of location and design of roads and streets, engineers should coordinate such location and design with the design and placement of the traffic control devices to be used with such roads and streets.*

04 *Jurisdictions, or owners of private roads open to public travel, with responsibility for traffic control that do not have engineers on their staffs who are trained and/or experienced in traffic control devices should seek engineering assistance from others, such as the State transportation agency, their county, a nearby large city, or a traffic engineering consultant.*

Support:

05 As part of the Federal-aid Program, each State is required to have a Local ~~Technology~~ Technical Assistance Program (LTAP) and to provide technical assistance to local highway agencies. Requisite technical training in the application of the principles of the MUTCD is available from the State's Local ~~Technology~~ Technical Assistance Program for needed engineering guidance and assistance.

06 In California, Traffic Engineers are classified under a title act and not under a practice act. Traffic engineers can conduct studies but a Civil Engineer must sign plans for traffic control devices that will be placed in the field, per the Professional Engineers Act.

Section 1A.13 Definitions of Headings, Words, and Phrases in this Manual

Standard:

01 **When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be defined as follows:**

A. Standard—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. All Standard statements are labeled, and the text appears in bold type. The verb "shall" is typically used. The verbs "should" and "may" are not used

in Standard statements. Standard statements are sometimes modified by Options. ~~Standard statements shall not be modified or compromised based on engineering judgment or engineering study.~~

B. Guidance—a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate. All Guidance statements are labeled, and the text appears in unbold type. The verb "should" is typically used. The verbs "shall" and "may" are not used in Guidance statements. Guidance statements are sometimes modified by Options.

C. Option—a statement of practice that is a permissive condition and carries no requirement or recommendation. Option statements sometime contain allowable modifications to a Standard or Guidance statement. All Option statements are labeled, and the text appears in unbold type. The verb "may" is typically used. The verbs "shall" and "should" are not used in Option statements.

D. Support—an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements are labeled, and the text appears in unbold type. The verbs "shall," "should," and "may" are not used in Support statements.

California MUTCD 2012 Proposed Policy (FHWA's 2009 MUTCD Revision 1 – Engineering Judgment):

Section 1A.09 Engineering Study and Engineering Judgment

Support:

01 Definitions of an engineering study and engineering judgment are contained in Section 1A.13.

01a Refer to CVC 627 for definition and requirements of "Engineering and Traffic Survey". It is also abbreviated in this manual as E&TS.

Standard:

02 **This Manual describes the application of traffic control devices, but shall not be a legal requirement for their installation.**

Guidance:

03 *The decision to use a particular device at a particular location should be made on the basis of either an engineering study or the application of engineering judgment. Thus, while this Manual provides Standards, Guidance, and Options for design and applications of traffic control devices, this Manual should not be considered a substitute for engineering judgment. Engineering judgment should be exercised in the selection and application of traffic control devices, as well as in the location and design of roads and streets that the devices complement.*

~~02a *The decision to use a particular device at a particular location should be made on the basis of either an engineering study or the application of engineering judgment.*~~

OPTION 1

Option:

~~02b~~ 03a When an engineering study or the application of engineering judgment determines that unusual site-specific conditions at a particular location make compliance with a Standard statement in this Manual impossible or impractical, an agency may deviate from that Standard statement at that location.

OPTION 2

~~Option:~~

~~02b When an engineering study or the application of engineering judgment determines that unusual site-specific conditions at a particular location make compliance with a Standard statement in this Manual impossible or impractical, an agency may deviate from that Standard statement at that location.~~

~~03~~ 04 *Early in the processes of location and design of roads and streets, engineers should coordinate such location and design with the design and placement of the traffic control devices to be used with such roads and streets.*

~~04~~ 05 *Jurisdictions, or owners of private roads open to public travel, with responsibility for traffic control that do not have engineers on their staffs who are trained and/or experienced in traffic control devices should seek engineering assistance from others, such as the State transportation agency, their county, a nearby large city, or a traffic engineering consultant.*

Support:

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C. Option—a statement of practice that is a permissive condition and carries no requirement or recommendation. Option statements sometime contain allowable modifications to a Standard or Guidance statement. All Option statements are labeled, and the text appears in unbold type. The verb "may" is typically used. The verbs "shall" and "should" are not used in Option statements.

D. Support—an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition. Support statements are labeled, and the text appears in unbold type. The verbs "shall," "should," and "may" are not used in Support statements.

6. Requests for Experimentations

13-01 Request to Experiment with Green & Shared Roadway Bicycle Markings

Recommendation:
The City of Oakland requests authorization from the Committee to conduct experiment with Various Bicycle Treatments.

Agency Making Request: City of Oakland

Sponsor: Jeff Knowles –Voting Member, Representing LOCC

Sponsors Comments:

The before and after data collection looks pretty comprehensive. One thing missing from the Long Beach study was "Number of motorists shifting to the inside lane." It looks to me like you are also not proposing to study the effects of the green marking on motor vehicle capacity, travel time and delay, or other factors that can increase GHG emissions. I strongly recommend that the effects on other road users be studied to fill in some of the gaps left by the Long Beach study.

CITY OF OAKLAND

250 FRANK H. OGAWA PLAZA OAKLAND, CALIFORNIA 94612-2033

Public Works Agency
Vitaly B. Troyan, P.E.
Agency Director

(510) 238-3961
FAX (510) 238-6428
TDD (510) 238-7644

October 25, 2012

Mr. Bruce Friedman
Federal Highway Administration
Office of Transportation Operations
1200 New Jersey Avenue, S.E., HOTO-1
Washington, DC 20590

Mr. Jeff Knowles
California Traffic Control Devices Committee
c/o City of Vacaville, Public Works Department
650 Merchant St.
Vacaville, CA 95688

Subject: Request to Experiment with Green & Shared Roadway Bicycle Markings, Oakland, CA

Dear Mr. Friedman and Mr. Knowles:

The City of Oakland requests permission to experiment with green color on the pavement surface as a traffic control device in conjunction with the shared roadway bicycle marking (sharrow). The purpose of the pilot is to confirm whether we may improve traffic operations on multi-lane urban arterials and collectors frequented by bicyclists. The experiment is proposed for 40th Street between Adeline Street and Webster Street in proximity of the MacArthur BART Transit Station and Transit Village development.

Existing traffic control devices do not provide sufficient guidance to roadway users on the safe and legal path of travel for bicyclists in shared lane situations. To date, experiments in Salt Lake City, Long Beach, and Minneapolis have addressed this issue by installing bands of green color pavement in conjunction with sharrows. The Oakland experiment will further develop this knowledge base with a phased implementation of standard traffic control devices plus the experimental treatment. The experiment includes video data collection and statistical analysis to examine behavioral change.

This experiment will advance professional understanding on design solutions for multi-lane urban streets where bicycle lanes are not possible despite significant numbers of bicyclists. We look forward to partnering with the Federal Highway Administration and the California Traffic

Control Devices Committee on this important effort. For questions regarding this request, contact Jason Patton, Bicycle & Pedestrian Program Manager (510-238-7049, jpatton@oaklandnet.com).

Sincerely,

Vitaly B. Troyan, P.E.
Director, Public Works Agency

Encl: Green & Shared Roadway Bicycle Markings, Oakland, CA – Request to Experiment

Cc: Devinder Singh, Caltrans Division of Traffic Operations (CTCDC)
Deborah Lynch, Caltrans Office of Special & Discretionary Programs (CBAC)

Green & Shared Roadway Bicycle Markings Oakland, CA

Request to Experiment

Submitted To:
California Traffic Control Devices Committee
California Bicycle Advisory Committee
Federal Highway Administration, Office of Traffic Operations

Submitted By:
City of Oakland, Public Works Agency,
Department of Engineering and Construction,
Transportation Infrastructure Plans & Programming Division

October 25, 2012

Overview

The City of Oakland requests permission to experiment with green color on the pavement surface as a traffic control device in conjunction with the shared roadway bicycle marking (sharrow). The purpose of the experiment is to improve traffic operations on multi-lane urban arterials and collectors frequented by bicyclists. The experiment is proposed for 40th Street between Adeline Street and Webster Street in proximity of the MacArthur BART Transit Station and Transit Village development. The experiment includes the phased implementation of standard traffic control devices plus the experimental treatment, video data collection, and statistical analysis to examine behavioral change.

As specified by Section 1A.10 of the Manual on Uniform Traffic Control Devices (MUTCD), this request includes the following information: a problem statement, description and use of the proposed traffic control device, evaluation plan, reporting requirements, experiment termination/site restoration, and patent/copyright protection.

Problem Statement

On multi-lane urban arterials and collectors that are too narrow for bicycle lanes, bicyclists typically ride in the "door zone": the area immediately adjacent to curbside parallel parking into which car doors open. Overtaking drivers typically pass such bicyclists without changing lanes, encroaching into the adjoining travel lane, and providing insufficient width for the bicyclist to operate safely.

The California Vehicle Code requires bicyclists to "ride as close as practicable to the right-hand curb or edge of the roadway" (CVC 21202(a)). Exceptions to this requirement include roadways with "a substandard width lane" defined as "a lane that is too narrow for a bicycle and a vehicle to travel safely side by side within the lane" (CVC 21202(a)(3)). This exception is the basis for the "Bicycles May Use Full Lane" sign (R4-11) that is included in the 2012 California Manual on Uniform Traffic Control Devices.

In the City of Oakland, the majority of urban arterials and collectors have lane widths that are too narrow for a bicycle and vehicle to operate side by side in a safe manner. Oakland's design approach provides a minimum of 23' for side-by-side lane sharing where curbside parallel parking is allowed: 9.5' parking lane and door zone, 3.5' bicyclist operating space, 3' passing space for overtaking drivers, 6' width of a large passenger car, and 1' buffer to the travel lane line. Where this width is available, the City is in the process of adding bicycle lanes as per a citywide analysis of roadway widths completed for the City of Oakland's Bicycle Master Plan (2007). Where traffic volumes allow, the City is reducing the number of travel lanes to create space for bicycle lanes.

On multi-lane roadways, CVC 21654(a) requires slow moving vehicles to operate "in the right-hand lane for traffic or as close as practicable to the right-hand edge or curb." Exceptions to CVC 21202(a) allow a bicyclist to use the full extent of the right-hand lane if that lane is too narrow for a bicycle and vehicle to travel safely side by side. Thus the safe and legal behavior for the bicyclist is to "control" the travel lane, riding clear of the door zone with overtaking drivers deliberately changing lanes to pass safely. A minority of bicyclists operates in this manner because the cultural expectation is that bicyclists should "get out of the way" of overtaking drivers. Incidents include drivers honking, yelling, driving aggressively, and physically assaulting bicyclists who were using the travel lane in a manner that inconvenienced drivers.[1]

Traffic operations on multi-lane urban streets frequented by bicyclists are thus prone to the following operational issues:

(1) Bicyclists ride too close to vehicles parked parallel along the street, exposing themselves to collisions with opening car doors.
(2) Overtaking drivers pass bicyclists by "squeezing by," encroaching on the adjoining travel lane, creating conflicts with other drivers, and providing insufficient width for bicyclists to operate safely.
(3) Bicyclists controlling the right-hand lane in a safe and legal manner are subject to intimidation by overtaking drivers.

Existing traffic control devices do not provide sufficient guidance to roadway users on the safe and legal path of travel for bicyclists in shared lane situations. Currently, the City's design options include sharrows, parking edge line stripes or parking Ts to help delineate the door zone, and bicycle-related signage. These treatments are in place on other multi-lane roadways in Oakland but they have been insufficient in addressing the operational issues noted above.

The City seeks to address these operational issues by experimenting with roadway delineation for shared lane situations that may promote: (a) safe and legal lane positioning by bicyclists; and (b) safe and legal passing by drivers.

Location of Proposed Experiment

The City of Oakland's Bicycle Master Plan, part of the Oakland General Plan, calls for the installation of bikeways to improve access to major transit stations. One of the busiest stations is MacArthur BART, located in North Oakland and operated by the Bay Area Rapid Transit District. As of 2008, 8.2% of BART patrons accessed the station by bicycle despite there being no bikeways serving the station. The station has the fourth largest number of bicyclists accessing the station out of the 43 BART stations in the San Francisco Bay Area. The station entrance is on

[1] Peter G. Furth, Daniel M. Dulaski, Dan Bergenthal, and Shannon Brown. "More Than Sharrows: Lane-Within-A-Lane Bicycle Priority Treatments in Three U.S. Cities." Transportation Research Board Annual Meeting, 2011.

40th Street, a four-lane urban arterial with two travel lanes in each direction, a 16-foot raised median with turn pockets at the intersections, and parallel parking lanes on both sides of the street. Average daily traffic is approximately 16,000 vehicles and there are seven traffic signals on this 1.0 mile segment of roadway. **Figure 1** is a context map showing the location of the proposed experiment and Oakland's bikeway network in the vicinity of MacArthur BART. **Figure 2** presents photographs of the existing conditions.

The City has made multiple efforts to develop a bikeway in the 40th Street corridor to serve MacArthur BART. In 2006 and 2008, the City completed two studies on the removal of travel lanes and the installation of bicycle lanes. The City is not implementing the "road diet" option because of (1) concerns from the public transit agency – Alameda-Contra Costa Transit District (AC Transit) – regarding delays to bus operations; and (2) future year traffic forecasts whereby the road diet would create significant and unavoidable impacts to motor vehicle delay under the California Environmental Quality Act. The City then studied the feasibility of maintaining the four travel lanes and adding bicycle lanes by narrowing the raised medians. This proposal was opposed by neighborhood groups who, over the duration of the City's studies have adopted and landscaped the medians. Given these constraints, the City seeks an additional design treatment that will improve the positive effects of sharrows in delineating the safe and legal path of travel for bicyclists.

Description and Use of the Proposed Traffic Control Device

The City will install a five-foot wide band of green color, applied to the surface of the pavement, and centered in the #2 travel lane. The green band will extend the length of the shared lane condition in the project area, excluding intersections and crosswalks. This experimental traffic control device will provide continuous guidance in delineating the safe and legal path of travel for bicyclists. It will be used in conjunction with the following standard traffic control devices:

- Sharrows spaced at intervals of approximately 135 to 200 feet with a minimum of two sharrows in each direction on each block;
- Parking edge line stripes (Detail 27B) delineating the right edge of the #2 (outside) travel lane along the length of the project, excluding intersections, crosswalks, and bus stops; and
- "Bicycles May Use Full Lane" (R4-11) signs on the far-side of each intersection with a collector or arterial roadway (6 intersections total).

Figures 3 and 4 present a conceptual section and striping plan for the experimental treatment. It is proposed for 0.8 miles of 40th Street from Adeline Street to Martin Luther King, Jr Way and from Telegraph Avenue to Webster Street. No change is proposed on the connecting 0.2 miles of 40th Street from Martin Luther King, Jr Way to Telegraph Avenue. Bicycle lanes were installed along this segment at the MacArthur BART station entrance (and under State Highway 24) as

part of a streetscape project in 2009. Bicycle Route Signs (D11-1) were installed along the length of the corridor in May 2010 and will remain throughout the project.

With this experiment, the City of Oakland seeks to deepen and clarify professional understanding of green color pavement for bikeways. The green band will delineate the bicyclists' path of travel in a shared lane condition. It does not denote a zone for the preferential or exclusive use of bicyclists. To date the use of green color pavement on bikeways has this underlying consistency: to indicate the bicyclists' path of travel to drivers and bicyclists. The green color is used to enhance the delineation established by standard traffic control devices: bike lane stripes and sharrow markings. This underlying consistency creates an overall condition that is understandable to roadway users. Standard lane lines and markings allocate the roadway width for established purposes while the green band clearly indicates where to expect bicyclists. This experiment will help focus professional discussion on green color pavement to the design challenges of multi-lane urban streets where bicycle lanes are not possible despite significant numbers of bicyclists.[2]

The green band will be five feet wide to: (1) match established practice on bicycle operating and facility widths; (2) align with the center of the travel lane over a range of urban lane widths; and (3) ensure a prominent visual presence. The five-foot (60") green band is comparable to the width of sharrows (39"), bike lane symbols (40"), AASHTO's minimum width to operate a bicycle (40"), and bike lane widths (≥60"). In particular, the sharrow at 39" in width and the green band at 60" in width will allow 10.5" of green on either side of the sharrow. This overlap will improve the visibility of the sharrow and create a consistent appearance for the green band. A five-foot band can be located in the effective center of a travel lane and remain clear of the door zone over the range of typical urban lane widths: 17 feet to 20+ feet (measured from face of curb to lane line). In communicating the bicyclists' path of travel, a five-foot green band is thus narrow enough to center in the lane, remain clear of the door zone, and be visually prominent.

State of the Practice

To date, four projects have installed continuous bands of green color pavement in conjunction with sharrows: 200 South in Salt Lake City, 2nd Street in Long Beach, Hennepin Avenue in Minneapolis, and Bryant Avenue South in Minneapolis. Two additional experiments are closely related: Philadelphia's sharrows on rectangular patches of green color pavement on South 59th Street; and sharrows flanked by dashed white lines on Longwood Avenue in Brookline, MA.

[2] If the proposed experimental treatment is successful, we anticipate that it would be applicable to 5.0 miles of multilane arterial and collector roadways in Oakland. This figure is based on a citywide analysis of such roadways where bicycle lanes are likely to be infeasible. In comparison, Oakland is in the process of installing 105 miles of bike lanes, 40 miles of which are currently complete.

Figure 5 provides citations for these experiments. **Figure 6** presents selected photographs of the projects.

The projects with sharrows and green color pavement share the following characteristics:

- Sharrows typically centered on the effective width of the outside travel lane;
- Continuous green bands of four to six feet in width, underneath the sharrows and also centered on the effective lane width of the outside travel lane;
- Signs communicating shared lane messages (e.g., "bikes may use full lane," "share the road," and experimental alternatives); and
- Locations where bicycle lanes are infeasible due to insufficient width.

The projects in Salt Lake City, Long Beach, and Minneapolis (Hennepin Avenue) were implemented on four-lane urban arterials. **Figure 7** summarizes the specific characteristics and evaluation methodologies for these six experiments.

Across the studies, the green shared lane was found to shift a substantial percentage of bicyclists away from the door zone (or curb) and closer to the center of the lane. The changes in lateral positioning were more pronounced than those found in studies of sharrows without the green color pavement. The green shared lane experiments in Long Beach and Minneapolis (Hennepin Avenue) both documented corresponding decreases in auto-bicycle collision rates.

Figure 8 summarizes the findings of the four completed projects and identifies outstanding issues to be addressed by the City of Oakland's experiment:

- Comparative effects of sharrows versus sharrows plus the green band;
- Changes in passing distance between overtaking drivers and bicyclists;
- Changes in auto lane utilization; and
- Effects on transit (including passing distance, leap-frogging, and delay).

Evaluation Plan

The City of Oakland will complete a phased before/after study to evaluate the effectiveness of the experimental treatment and to monitor safety. The implementation phases are as follows:

(1) existing condition;
(2) sharrows, parking edge line stripes (Detail 27B), and "Bicycles May Use Full Lane" (R4-11) signs; and
(3) above plus five-foot wide green band.

The study is deliberately phased to use standard treatments first and then add the experimental device. The green band is introduced last in order to compare its efficacy with the standard and simpler treatments.

Each phase will remain in place for a minimum of eight weeks. Data collection will occur in the final two weeks of each phase, allowing six weeks for traffic operations to adjust to the newly introduced treatments. Each phase will include two-hour data collection windows: weekday AM and PM peak (7:00-9:00AM and 4:00-6:00PM on Tuesdays, Wednesdays, or Thursdays); and off-peak (Saturday afternoons, 2:00-4:00PM). Each phase will collect approximately 50 hours of data. For each phase, the study will measure the following:

- bicyclist volumes on 40th Street and parallel streets;
- bicyclist lane positioning relative to parked cars;
- motorist passing distance when overtaking bicyclists;
- frequency of motorists changing lanes to pass bicyclists;
- frequency of gaps in traffic that allow overtaking drivers to change lanes to pass;
- vehicle speeds in both lanes;
- bus driver behavior at mid-block and intersection locations; and
- collisions involving all roadway users.

The collision analysis will be completed for the entire corridor, ultimately comparing one year of before data to one year of after data using Oakland Police Department and California Highway Patrol collision reports. For all other measures, data will be collected for both directions of travel between Market Street and West Street, the midpoint of the corridor.

Reporting Requirements (MUTCD Section 1A.10.11.I)
The City of Oakland will provide semi-annual progress reports for the duration of the experiment, and will provide a copy of the final results within three months following the completion of the experiment.

Experiment Termination/Site Restoration (MUTCD Section 1A.10.11.H)
The City of Oakland will restore the site of the experiment to a condition that complies with the provisions of the MUTCD within three months following the end of the time period of the experiment. The City agrees to terminate the experiment if the City or the California Traffic Control Devices Committee (CTCDC) or the FHWA determines that significant safety concerns are directly or indirectly attributable to the experiment. The City understands that if, as a result of the experiment, a request is made that the MUTCD be changed to include the treatment being experimented with, the treatment will be permitted to remain in place until an official rulemaking action has occurred.

Patent/Copyright Protection (MUTCD Section 1A.10.11.E)

To the best of our knowledge based on the comparable experiments in Long Beach, Salt Lake City, and Minneapolis, the use of green color on the pavement surface in conjunction with the shared roadway bicycle marking is not protected by patent or copyright.

Conclusion

The City of Oakland seeks approval from the CTCDC and FHWA to contribute research on green color pavement and shared roadway bicycle markings. The experiment addresses multi-lane urban streets where bicycle lanes are not feasible despite significant numbers of bicyclists. Common issues on such streets include: bicyclists riding too close to vehicles parked parallel along the street; overtaking drivers "squeezing by" bicyclists and encroaching on the adjoining travel lane; and drivers intimidating bicyclists who are riding outside of the door zone in a safe and legal manner. The experiment will evaluate if this treatment promotes: (a) safe and legal lane positioning by bicyclists; and (b) safe and legal passing by drivers in shared lane situations. We look forward to partnering with the CTCDC and the FHWA on this experiment.

List of Figures

1. Context Map
2. Existing Conditions Photographs
3. Green Shared Lane Conceptual Cross-Section
4. Striping Plan: 40th Street (Adeline Street to Webster St)
5. References for Similar Experiments
6. Photographs of Similar Experimental Treatments
7. Characteristics of Similar Experiments
8. Outcomes of Similar Experiments

Figure 1 Context Map

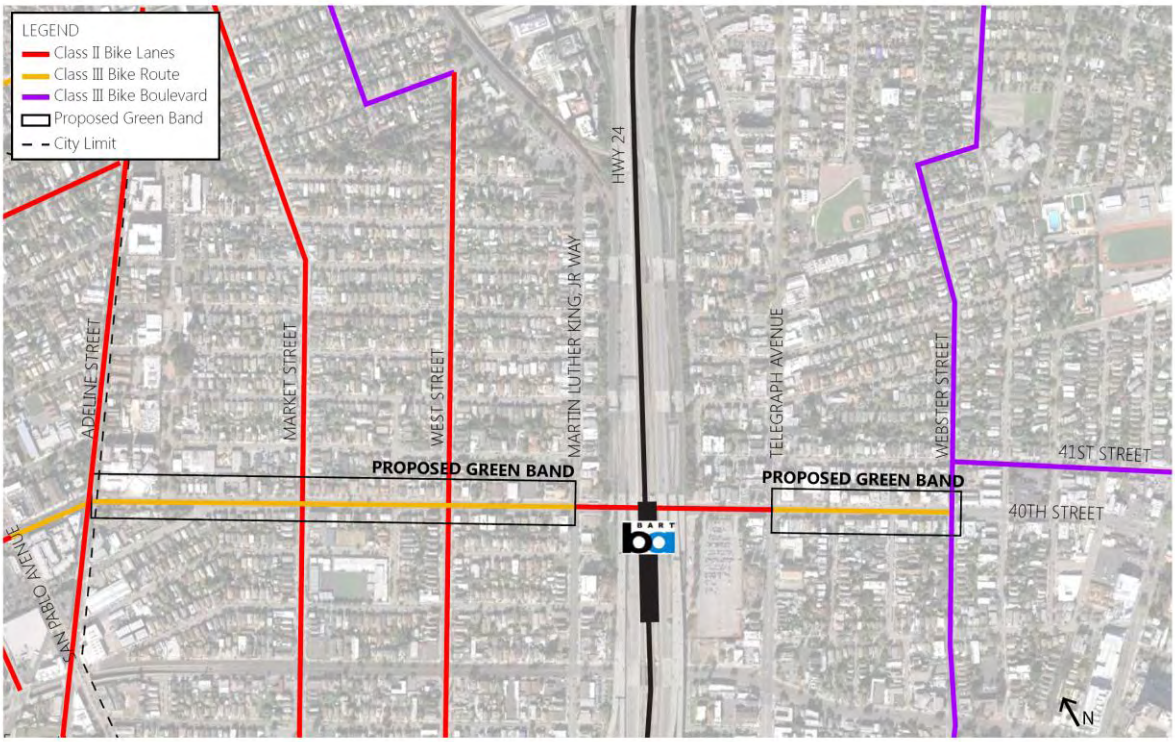


Figure 2 Existing Conditions Photographs

40th Street Existing Conditions

Looking east toward BART, cyclists on 40th Street ride within the door-zone even with no autos present in the #2 lane.

Looking west, travel lanes appear wide from motorist's view-point, which may increase "squeeze-by" passing behavior.

Looking east toward BART, multiple transit routes exist on the corridor, including near-side and far-side bus stops.

Looking west, Class II Bicycle Lanes in front of the MacArthur BART Station end at Martin Luther King, Jr Way.

Adjoining Bikeways

Class II Bicycle Lanes on West Street

Class II Bicycle Lanes on Adeline Street

Class II Bicycle Lanes on 40th Street, near BART

Figure 3 Green Shared Lane Conceptual Cross-Section

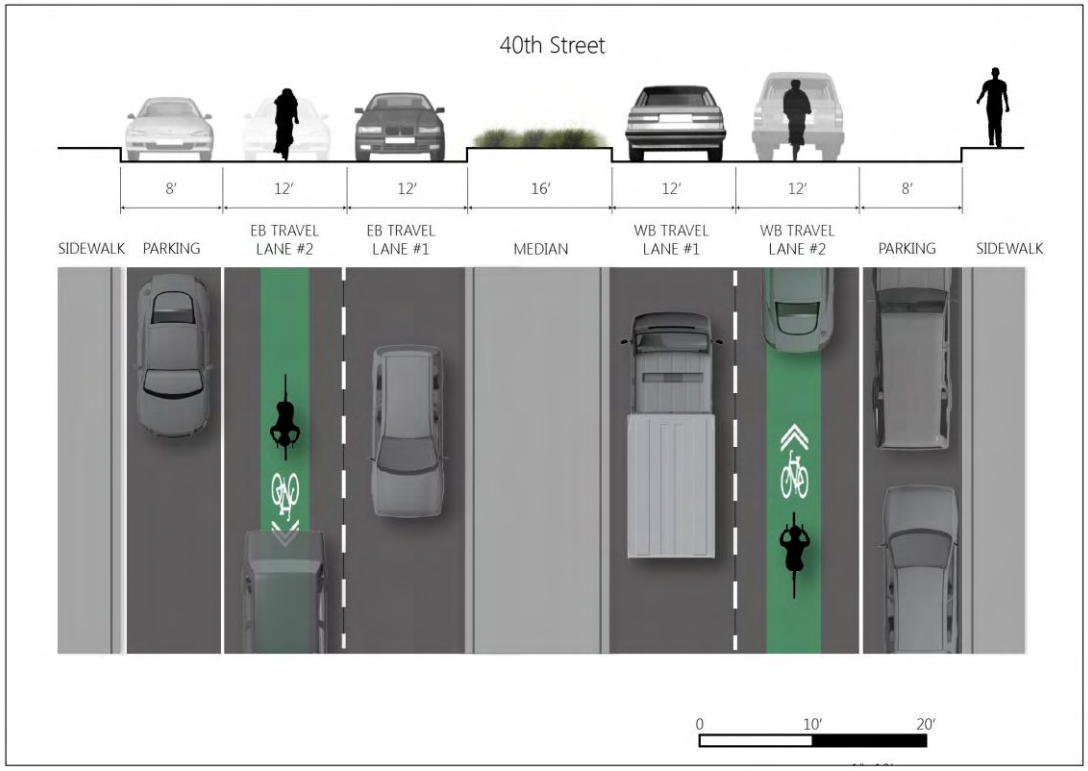


Figure 4 Striping Plan

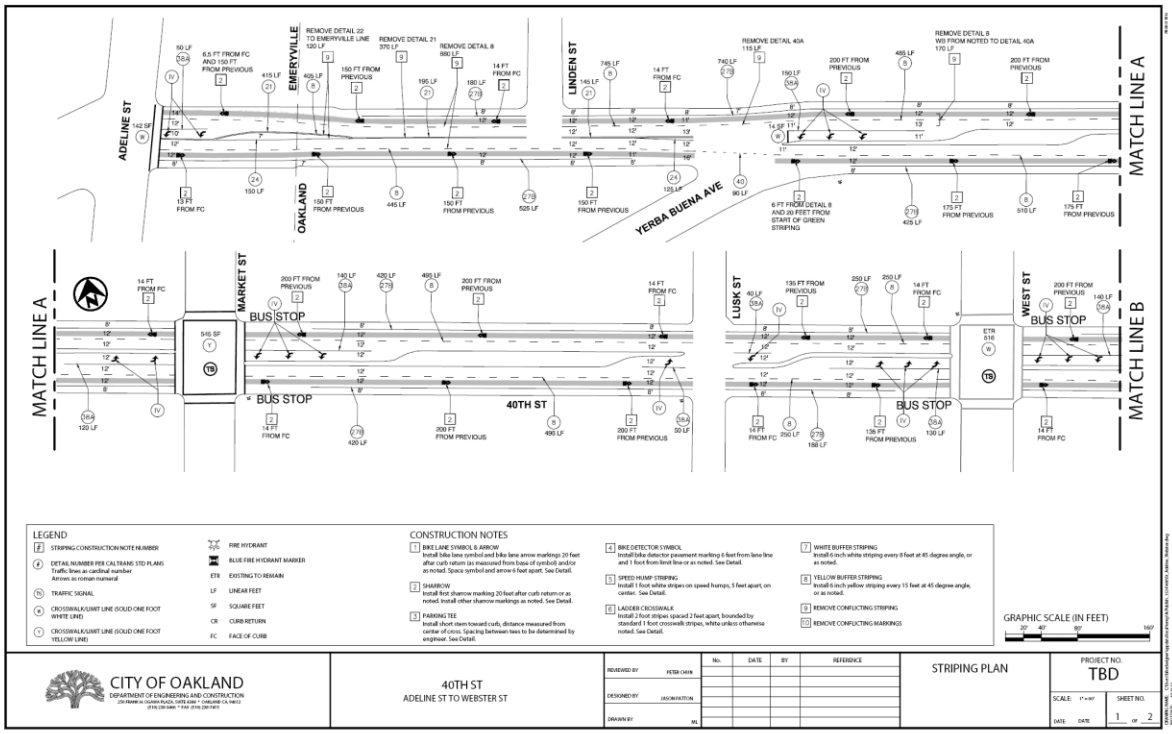


Figure 4 (continued) Striping Plan

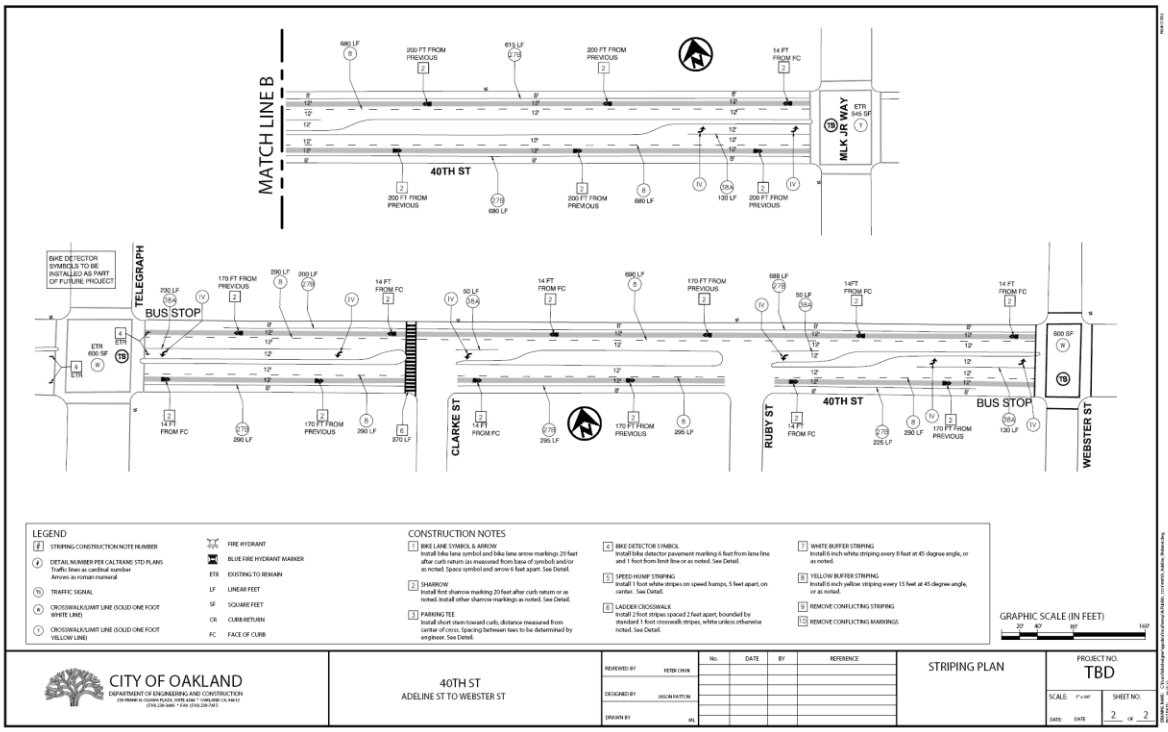


FIGURE 5: REFERENCES FOR SIMILAR EXPERIMENTS

Project	Citation
2nd Street Long Beach, CA	• Experimental Authorization No. 9-113 Green & Shared Lane Markings and Bikes in Lane Symbol Sign on 2nd Street between Livingston Avenue and Bay Shore Drive in the City of Long Beach, California. City of Long Beach Department of Public Works. Progress Report (USDOT file HOTO-1). December, 2009.
Hennepin Ave. Minneapolis, MN	• Hennepin Avenue Shared Green Lane Study, City of Minneapolis Department of Public Works Traffic and Parking Services Division. August, 2011.
200 South Salt Lake City, UT	• More Than Sharrows: Lane-Within-A-Lane Bicycle Priority Treatments in Three U.S. Cities. Peter Furth el al. Transportation Research Board. July, 2010.
Longwood Ave. Brookline, MA	• More Than Sharrows: Lane-Within-A-Lane Bicycle Priority Treatments in Three U.S. Cities. Peter Furth el al. Transportation Research Board. July, 2010.

Figure 6 Photographs of Similar Experimental Treatments

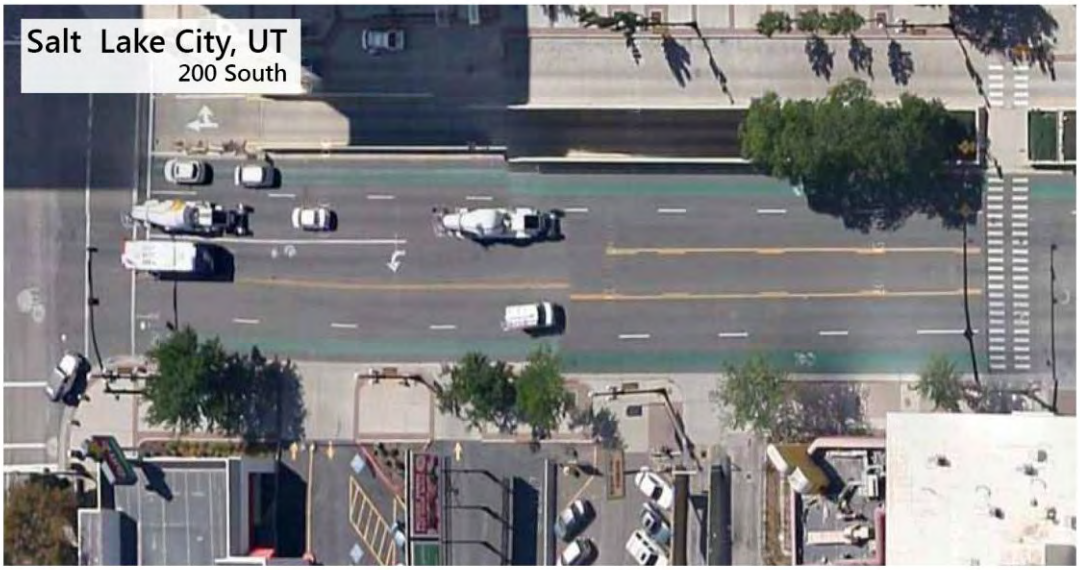


Figure 6 (continued) Photographs of Similar Experimental Treatments

Figure 6 **(continued)** Photographs of Similar Experimental Treatments

FIGURE 7: CHARACTERISTICS OF SIMILAR EXPERIMENTS

Location	Design	Signage	Adjacent Bicycle Network	Project Characteristics	Methodology
Second Street Long Beach, CA	• 6' green band centered on effective lane width with sharrows • Mixed flow lanes • Continuous	Modified "Share the Road" signs	Connects to Class II and III segments of Downtown bicycle network	• 4-lane commercial arterial with on-street parallel parking • 1,200 bicyclists over 3-day count • 12-foot outside travel lane	• Before and after crash history • Before and after general bicyclist position in roadway (sidewalk, door zone, green band, travel lane) • Anecdotal observations on transit bus interaction
South 200 Salt Lake City, UT	• 4' green band 3' from curb face with sharrows • Mixed flow lanes • Continuous	None identified	Connects Class II bike lanes through two-block long constrained area	• 4-lane commercial arterial with no on-street parking • Carries 20,000 vehicles and 200 bicyclists per day • 12-foot outside travel lane	• Analysis of bicycle positioning for 3 days before and 3 days after striping, including on-street and sidewalk riding • Anecdotal observation of motorists' use of shared lane • Data collection on crashes after shared lane installed
Hennepin Avenue Minneapolis, MN	• 4' green band, 3.5' from curb with sharrows • Bus/Bicycle/Right-Turn lanes • Continuous	"Bus Bikes & Right Turns" and "Share the Road" signs plus variable overhead signs	Key cross town spine route connecting multiple facilities	• 4-lane commercial arterial with no on-street parking • Carries 20,000 vehicles and 1,000 bicyclists per day and 20 to 30 buses per peak hour. • Outside travel lane varies from 13.5 to 18 feet across the corridor.	• Measured bicyclist, motor vehicle, and bus positioning at 3 points along the green shared lane using hatch marks and compared against a control location on Hennepin Avenue with Class II bicycle lanes • Survey-based analysis of driver and bicyclist education on positioning in the shared lane • Before and after reported crash history • Before and after reported bicycle volumes
Bryant Avenue South Minneapolis, MN	• 4' green band with sharrows centered on effective lane width • Mixed flow lane • Discontinuous: 100' green strip every 100'	"Bikes May Use Full Lane" signs	Connects two segments of Class III bike boulevard	• 2-lane residential collector • 20-foot outside lane including parallel parking	No evaluation study completed to date
Longwood Avenue Brookline, MA	• "Bicycle Priority Lane" • 2 dotted 4" lines with sharrows • Outside edge of priority lane line marked 10.33' from curb • Discontinuous: 80' gaps in between modules	None identified	East-west connection between commercial centers	• 2-lane residential collector with on-street parking • Carries 8,000 vehicles • 20-foot outside travel lane including parallel parking, plus eastbound bicycle lane only.	• Phased installation of bicycle priority lane: (1) striped outside dashed priority lane lines; (2) marked shared use lane markings 6 months later; • Analysis of bicycle positioning based on chalked hatch lines only when parking lane was unoccupied for 75 feet or less. (3 days of data for dashed priority lane lines, 3 day for dashed priority lane lines and shared use pavement markings) • Survey data of bicyclist and driver understanding of treatment
S 59th St Philadelphia, PA	• Rectangular patch of green pavement with sharrow • Discontinuous	Not implemented	On-street connection to regional multi-use path	• 2-lane residential collector with on-street parking • 20-foot outside lane including parallel parking	Project not yet implemented—Goal of the project is to provide wayfinding to multi-use path

FIGURE 8: OUTCOMES OF SIMILAR EXPERIMENTS

Location	Key Findings/Measures of Effectiveness	Factors Not Addressed in Evaluation Study
Second Street Long Beach, CA	• Doubling of bicycle usage over year of existence • After installation, the majority of cyclists positioned in the green band • Sidewalk riding decreased by 20% • Bicyclists familiar with standard sharrows noted that the additional emphasis resulting from the green pavement appears to be creating a heightened awareness by the motorists of bicycle usage in the lane • Special share the road signage was added approximately 2 months after the striping to enhance bicyclist understanding but only spot observations were made of effects • Crash experience involving bicyclists is largely unchanged, while the crash rate per bicyclist is reduced from pre-project levels • Crash rate not involving bicyclists was higher than in the previous year but does not appear to be related to the installation of the green band	• Analysis of passing distance/separation when motorists overtake bicyclists • Effect of green shared lane and increased presence of bicyclists on transit operations, where bus transit exists • Number of motorists shifting to the inside lane • Comparative analysis of shared-use pavement arrows versus the complete shared-green lane package of treatments (raised by CTCDC)
200 South Salt Lake City, UT[1]	• Before installation, 31% of bicyclists rode 0 to 4 feet from the curb; after installation, 41% of bicyclists (92% of in-road riders) traveled in the remaining 8 feet of the shared lane, including on the green band • 46% of bicyclists continued to use the sidewalk both before and after the shared lane installation	• Analysis of passing distance when motorists overtake bicyclists • Comparative analysis of sharrows versus the complete shared green lane package of treatments (raised by CTCDC) • Analysis of any increase in bicycle ridership • Effect of oversized sidewalks in relation to sidewalk riding • Effect of green shared lane on transit operations
Hennepin Avenue Minneapolis, MN	• Most bicyclists (79-93%) use the green band • On the 13.5-foot travel lane, vehicles typically positioned themselves 4.4-feet from the curb on average, with approximately half the vehicles on the green band; vehicles traveled to the left of the green band in the 18-foot lane. • Buses positioned on top of the green band • Measured data on motor vehicles passing bicyclists and bicyclists passing stopped buses was inconclusive due to small sample size • Bicycle volumes decreased though this was attributed to new or improved facilities on parallel corridors • Reported bicycle crash rates decreased from 1.03% to 0.4%, and survey results indicated that 1/3 of bicyclists felt safer with the green band • Survey results indicated that motorists think vehicles should position to the left of the green band; however, the graphic on the survey and the actual lane width may sway that understanding	• Analysis of passing distance/separation when motorists overtake bicyclists • Effect of green shared lane and increased presence of bicyclists on transit operations • Comparative analysis of shared-use pavement arrows versus the complete shared-green lane package of treatments (raised by CTCDC)
Longwood Avenue Brookline, MA	• Before, bicyclists positioned 10.4 feet from the curb, which increased to 11.1 feet 5 weeks after the installation of the bicycle priority lane, both with and without the presence of passing cars • Of surveyed drivers, 50% said the markings had made them more considerate of how they passed bicyclists; 21% of drivers noticed the markings; 70% were confident that the markings indicated a preferred zone for bicycling	• Analysis of passing distance/separation when motorists overtake bicyclists • Analysis of increase in bicycle ridership • Comparative analysis of shared-use pavement arrows versus the complete bicycle priority lane package of treatments

1. Additional study information requested from Dan Bergenthal, Salt Lake City Transportation

FHWA Approval Letter:

U.S. Department of Transportation
Federal Highway Administration

JAN – 2 2013

1200 New Jersey Avenue, SE
Washington, D.C. 20590

In Reply Refer to:
HOTO-1

Jason Patton, PhD
Bicycle and Pedestrian Program Manager
250 Frank H. Ogawa Plaza
Suite 4344
Oakland, CA 94612

Dear Mr. Patton:

Thank you for your electronic transmission of October 25 your request to experiment with green colored pavement to supplement Shared Lane Markings on 40th Street between Adeline Street and Webster Street in the City of Oakland.

We have reviewed your request to experiment and it is approved. We look forward to receiving your semi-annual status update reports and your final evaluation report at the end of the study period in accordance with Item I of Paragraph 11 in Section 1A.10 of the 2009 *Manual on Uniform Traffic Control Devices for Streets and Highways*.

For recordkeeping purposes, we have assigned the following Official Ruling number and title: "9(09)-38 (E) – Green Colored Pavement for Shared Lane Marking – City of Oakland, CA." Please refer to this number and title in future correspondence.

Thank you for your interest in improving traffic safety for bicyclists.

Sincerely yours,

Mark R. Kehrli
Director, Office of Transportation Operations

13-02 Request for Experiment with Bike Boxes and Wide Stripe

Recommendation:

The City of Davis requests authorization from the Committee to conduct experiment with Bike Boxes and Wide Bike Stripe

Agency Making Request: City of Davis

Sponsor: Jeff Knowles –Voting Member, Representing LOCC

PUBLIC WORKS DEPARTMENT
1717 Fifth Street – Davis, California 95616
530/757-5686 – FAX: 530/758-4738 – TDD: 530/757-5666

February 12, 2013

Mr. Bruce Friedman
Federal Highway Administration
Office of Transportation Operations
1200 New Jersey Avenue, SE, HOTO
Washington DC 20590

Mr. Jeff Knowles
California Traffic Control Devices Committee
c/o City of Vacaville Public Works Department
1650 Merchant Street
Vacaville CA 95688

Subject: **Request for Experiment - Fifth Street Corridor Improvements (Bike Boxes and Wide Stripe)**

Mr. Friedman and Mr. Knowles:

The City of Davis is requesting permission to experiment with Bike Boxes and a 12-inch Wide Bike Lane Stripe as part of the Fifth Street Corridor Improvements project. The project will improve connectivity to downtown Davis, the University of California, Davis campus, and residential and business locations throughout the community. Construction is scheduled for summer 2013.

Enclosed is our statement in support of the experiment. If you have any questions, please contact Senior Civil Engineer Roxanne Namazi at (530)757-5675 or rnamazi@cityofdavis.org, or Active Transportation Coordinator Dave "DK" Kemp at (530)757-5669 or dkemp@cityofdavis.org. City staff presented this item at its February 7, 2013 California Bicycle Advisory Committee meeting.

Sincerely,

Roxanne Namazi

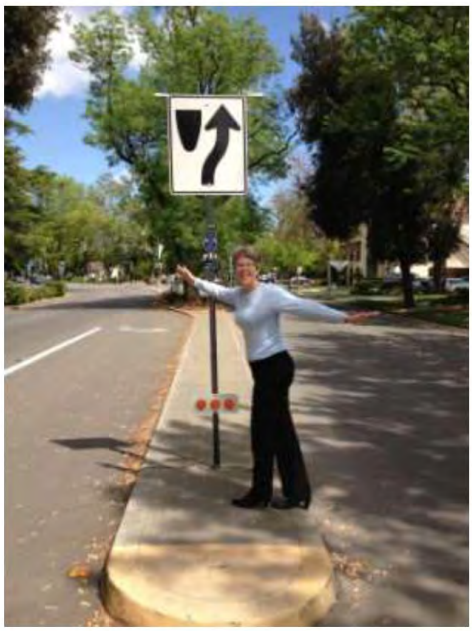
for Robert A. Clarke
City Engineer / Interim Public Works Director

Request to Experiment
Fifth Street Corridor Improvements
Page 1

1. The Nature of the Problem

The Fifth Street / Russell Boulevard corridor is a major east-west arterial running adjacent to downtown Davis and the University of California, Davis. This section of Fifth Street / Russell Boulevard is one of only two arterials in the City of Davis that does not have bike lanes or an off-street bicycle path.

The Fifth Street Corridor Improvements Project will convert a four lane major arterial to a complete street by eliminating two travel lanes and adding bike lanes. The project has received funding commitments from the Sacramento Area Council of Governments (SACOG) Community Design and the Caltrans HSIP grant programs. We have completed CEQA/NEPA review and will release the project to bid in April 2013.



Fifth Street / Russell Boulevard are part of the original 1917 road system. The majority of the roadway width from curb to curb is 50 feet, with two blocks as narrow as 48 feet. Accommodating vehicle lanes, bicycle lanes with buffers, turn lanes/pockets and medians in the dimensions we prefer is difficult considering the existing conditions. Moving curb and gutter requires removal of several dozen mature trees is cost prohibitive. In essence, we are challenged with balancing the needs of bicyclists, pedestrians, and motor vehicles.

The intersections of Russell/A Street and Fifth/B Street are heavily travelled by cyclists as these streets serve as primary bikeways. . We currently observe as many as five to ten cyclists at a time queuing at A Street and B Street to cross southbound over Russell Boulevard/5t Street. We expect more bicycle traffic as bike lanes are added as part of the 5th Street Corridor project. Cyclists travelling A Street and B Street often have to compete with right turning vehicles turning onto Russell Boulevard/5th Street.

2. The Proposed Change

The Fifth Street Corridor Improvements Project includes the following components that are consistent with the California Manual of Uniform Traffic Control Devices (MUTCD):

- Bicycle lanes from A Street to L Street;
- Bike detection and pedestrian actuation at the traffic signals located at A, B, F, G, and L Streets. Currently, F and G signals do not have bike detection or pedestrian actuation and are on fixed time;
- Green pavement markings at conflict areas;
- Bike lane continuation marking through signalized intersections;
- Enhanced street lighting throughout the corridor;
- ADA-compliant ramps and marked crosswalks on all links at all intersections.

The City of Davis is requesting permission to experiment with two improvements:

- One bike box on A Street and two bike boxes at B Street at the intersections with Russell Boulevard/Fifth Street; and
- 12-inch bike lane stripe for the bicycle lane marking throughout the corridor (3,900 feet long corridor), in lieu of the standard "6-inch white line (Detail 39)

3. Supporting Statements

Bike boxes are identified in the National Association for City Transportation Officials' (NACTO) Urban Bikeway Design Guide for signalized intersections and provide bicyclists with a highly visible positioning ahead of queuing traffic during the red signal phase. The City is requesting approval to experiment with bike boxes on A and B Streets where they intersect Russell Boulevard/ Fifth Street. Typical application of a bike box facility is a signalized intersection with high volumes of bicycles and/or motor vehicles, especially those with potential bicyclist left turns and/or frequent motorist right turns. The intersections of A Street at Russell Boulevard and B Street at Fifth Street meet the criteria.

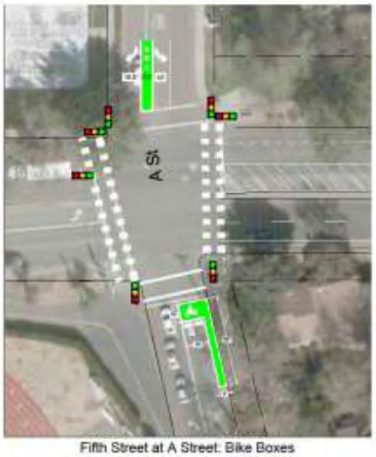
B Street – Bike Boxes
B Street is a north/south arterial and a primary bikeway. To the south, it connects to South Davis via grade-separated I-80 and UPRR crossings. To the north, it connects to North Davis Elementary School, a public library, Davis High School, and other community activity centers.

Fifth Street at B Street: Bike Boxes

The B Street corridor continues via a grade-separated crossing to the North Davis Greenbelt. The signal at B/Fifth is a fully actuated eight-phase signal, with protected left turns preceding the through movement in each direction. The City of Davis is proposing two bike boxes on B Street, across the through lanes and the left-turn lanes.

Installing bike boxes on B Street will help prevent "right hook" conflicts with turning vehicles at the start of the green indicator light. It also provides room to accommodate high numbers of cyclists travelling through the intersection and allow cyclists better positioning to make left turns onto Fifth Street.

A Street – Bike Box
A Street connects to the campus of the University of California, Davis. A Street is two-way street north of Russell Boulevard, and one-way northbound south of Russell. There are off-street shared-use paths leading southbound and westbound at the northeast edge of the campus. The signal at A Street does not have protected left turns for the A Street or the Russell Boulevard approaches.



Fifth Street at A Street: Bike Boxes

The City of Davis is proposing a bike box in the northbound lane of A Street. The bike box will extend across the through lane only because there are no bicycle lanes on westbound Russell Boulevard to attract left-turning cyclists at this time. As with the bike boxes on B Street, installing a bike box on A Street will also help prevent "right hook" conflicts with right turning vehicles at the start of the green indicator, provide room to accommodate the high number of cyclists travelling through the intersection.

In both cases, the bike boxes will be marked with solid bike lane stripes with the intention of prohibiting motor vehicles from entering the bike lane to make right hand turns. Motor

vehicles will be required to yield to all bicycles both approaching and within the bike box.

12-inch Bike Lane Stripe
12-inch Bike Lane Stripes are proposed as an alternative to buffered bike lanes. Buffered bike lanes are approved with federal MUTCD standards, but the Fifth Street corridor is not wide enough to allow buffers in addition to the bicycle and vehicle lanes, left turn lane/pocket, and medians.

The proposed application of the 12 inch bike lane stripe to serve as a modified buffer will provide cyclists with a greater sense of separation between the travel lane and the bike lane.


Example of 12 inch Stripe, Boise, ID

Figure 9C-3and 9C-101 (CA) call for 6" normal white lines between the bike lane and the vehicle lane (Detail 39). This is the standard used throughout Davis. Fifth Street is a major arterial with approximately 14,000 to 17,000vehicles per day. It is a truck route and a bus route.

The proposed 10'-9" through lanes are narrower than preferred for this corridor, we are proposing to experiment with a 12" wide bike lane stripe instead of the normal 6" strip. To reiterate, the primary goals of the wider bike lane stripe is to increase distance between bicyclists and passing vehicles, and increase comfort levels for all users of the corridor.


Fifth Street - 1' Bike Lane Stripe

4. Time Period and Location of the Experiment

We propose to install the wide longitudinal stripe (12-inch) on Russell Boulevard / Fifth Street between A and L Streets. The bike boxes would be installed on the north- and southbound A and B Streets at the intersections with Russell Boulevard / Fifth Street. The experiment will be for a one-year period.

5. Evaluation Plan

The bike boxes will be evaluated by measuring the following:

- Proportion of motor vehicles encroaching into the bike box
- Vehicle compliance with right-on-red prohibition

- Appropriate cyclist position for left-turn movements from southbound A Street to Russell Boulevard and from northbound onto 5th Street.
- Effectiveness of cyclists able to travel through the intersection in a timely manner.
- Observe potential impediments to motor vehicle traffic flow.
- Crash and vehicle speed data analysis
- Traffic counts (vehicles and bicycles).

The 12-inch bike lane stripe will be evaluated by measuring the following:

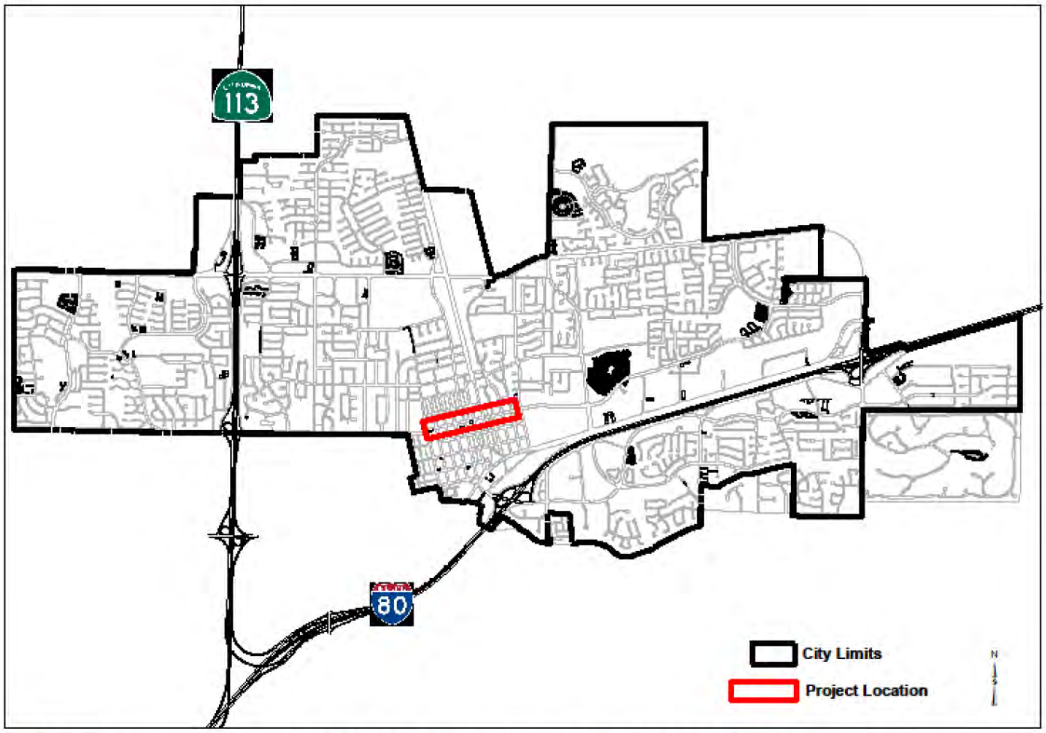
- Shy distance between cyclists and passing vehicles
- Appropriate vehicle positioning during right-turn movements onto and off of Fifth Street
- Appropriate cyclist position through intersections
- Crash & speed data
- Traffic counts (vehicles and bicycles)

6. Agreement to Restore

The City of Davis will restore the site of the experiment to a condition that complies with the provisions of the California MUTCD, e.g. remove the bike boxes and reduce the width of the stripe within three months following the end of the time period of the experiment. The City agrees to terminate the experiment if the City or the California Traffic Control Devices Committee (CTCDC) or the FHWA determines that significant safety concerns are directly or indirectly attributable to the experiment. The City understands that if, as a result of the experiment, a request is made that the California MUTCD be changed to include the treatment being experimented with, and the treatment will be permitted to remain in place until an official rulemaking action has occurred.

7. Reporting Requirements

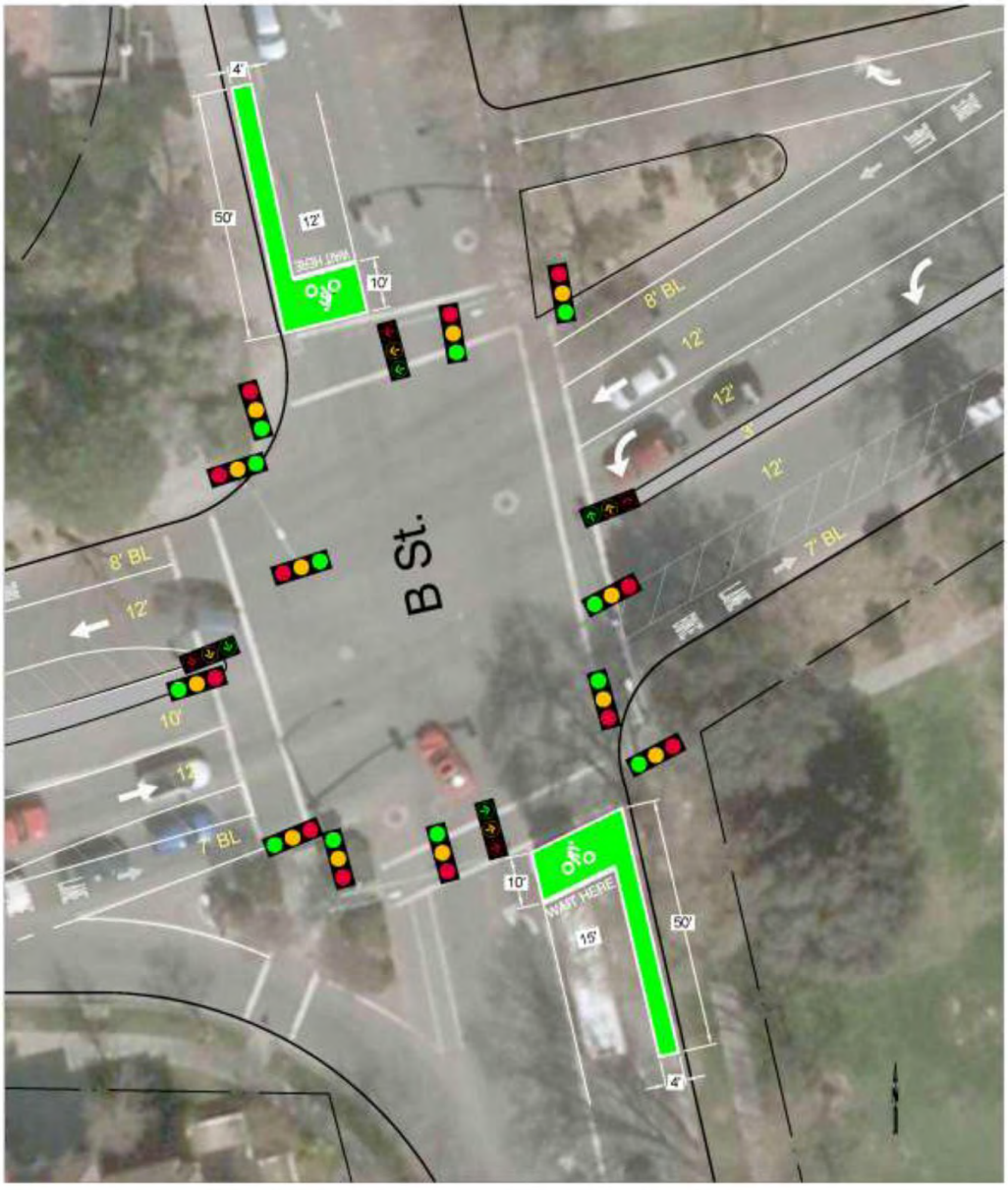
The City of Davis will provide biannual progress reports for the duration of the experiment for one year and will provide a copy of the final results within three months following the completion of the experiment.



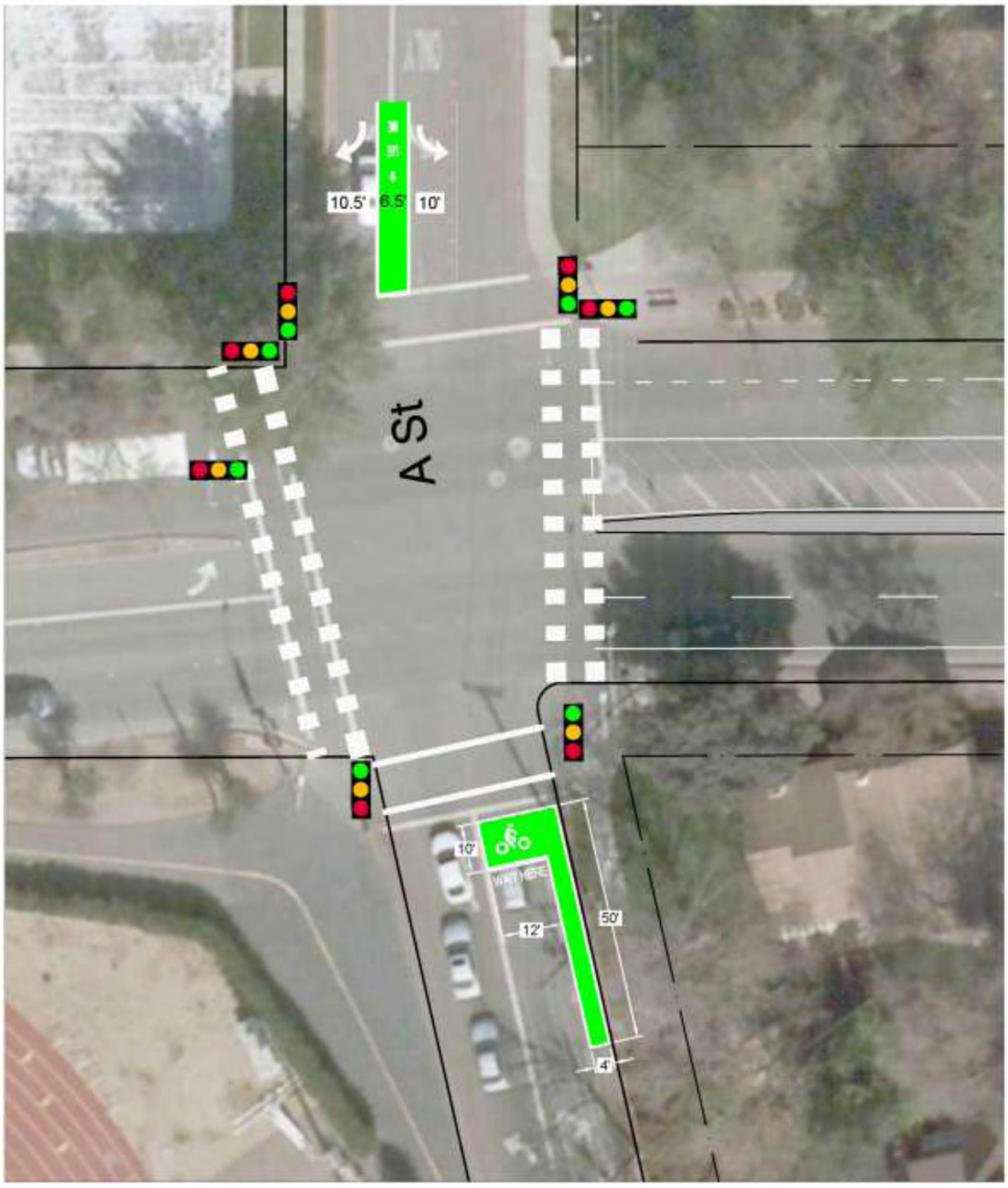
Davis

Fifth Street Corridor Improvements: Request for Experiment
Vicinity Map

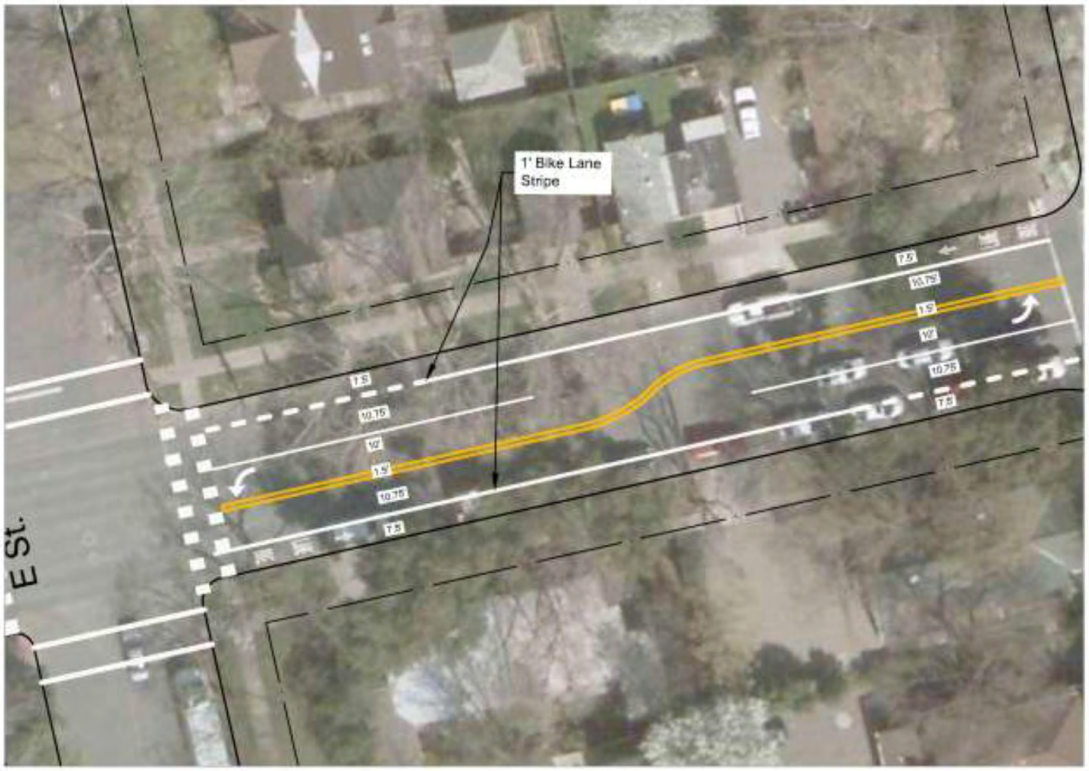
1/30/2013



Fifth Street at B Street: Bike Boxes



Fifth Street at A Street: Bike Boxes



Fifth Street - 1' Bike Lane Stripe

13-03 Bay Area 55 Sign Proposal

MTC SAFE

METROPOLITAN TRANSPORTATION COMMISSION

SERVICE AUTHORITY FOR FREEWAYS AND EXPRESSWAYS

February 14, 2013

Devinder Singh
Senior Transportation Engineer
Office of Signs, Markings & Ext. Support
Division of Traffic Operations
1120 N St, Sacramento, CA 95814

RE: March 21 2013 CTCDC Discussion Item- Bay Area 511 sign installation proposal

Dear Mr. Singh:

In December 2011, The Metropolitan Transportation Commission (MTC) Operations Committee approved a Call Box Evaluation Report which called for reducing the number of call boxes throughout the 9 County Bay Area to due reduced call volumes. To offset the negative impact of a reduced call box system, MTC intends to implement a strategy to replace them with signs informing the public of 511, a service that, in part, aids the public with information on how to call for non-emergency help using their mobile phone. This service is currently called "Freeway Aid" within the Bay Area.

Staff's plan is to remove every other call box set (call box, call box sign, solar panel, pedestrian pad.) In summary, 432 urban call boxes will be removed from a total of approximately 2086 within the Bay Area. These sites will be replaced with a sign similar to Sign Specification SG49A, with the exception of an alternate wording that informs the public of call box services. Staff is working with a marketing research firm to develop the most appropriate nomenclature (i.e. "Call 511, Roadside Assistance" or "Call 511, Freeway Assistance" etc.) through the use of focus groups and surveys. Staff intends to present the results during the next CTCDC and request permission to proceed with installing these signs within the Bay Area. Fabrication and installation of the signs will be paid for, and managed by, MTC SAFE.

SAFE staff requests any comments and other feedback in an effort to address them for our upcoming sign proposal.

Sincerely,

Sze Lei Leong
Call Box Program Coordinator, MTC SAFE

JOSEPH P. BORT METROCENTER | 101 EIGHTH STREET | OAKLAND, CA 94607-4700
TEL 510.817.5700 | TTY/TDD 510.817.5769 | FAX 510.817.5848 | E-MAIL info@mtc.ca.gov | WEB www.mtc.ca.gov

Section 2I.10 TRAVEL INFO CALL 511 Signs (D12-5 and D12-5a)

Option:

01 A TRAVEL INFO CALL 511 (D12-5 or SG49A(CA)) sign (see Figure 2I-8 and 2I-8(CA)) may be installed if a 511 travel information services telephone number is available to road users for obtaining traffic, public transportation, weather, construction, or road condition information.

02 The pictograph of the transportation agency or the travel information service or program that is providing the travel information may be incorporated within the D12-5 sign either above or below the TRAVEL INFO CALL 511 legend.

Standard:

03 **The logo of a commercial entity shall not be incorporated within the TRAVEL INFO CALL 511 sign.**

04 **The TRAVEL INFO CALL 511 sign shall have a white legend and border on a blue background.**

Guidance:

05 *If the pictograph of the transportation agency or the travel information service or program is used, the pictograph's maximum height should not exceed two times the letter height used in the legend of the sign.*

* The pictograph of the transportation agency or the travel information service or program may be used in place of the 511 pictograph (see Section 2I.08)

D12-5*

D12-5a

8 Information Items

13-04	Option of splitting the material in the MUTCD into two separate Documents Proposed by FHWA– Caltrans	(Introduction)

9. Next Meeting: Suggested dates are March 21, 28 or April 4, 2012.

10. Adjourn:

13-05 Proposal to amend Sections 2C.37and 4I.03 of the CA MUTCD 2012 to add Activated Blankout METER ON & PREPARE TO STOP signs

RECOMMENDATION: Caltrans requests that the Committee recommend for the adoption of the amendment to Section 2C.37 and Section 4I.03 as proposed to include MOCK-UP for the "METER ON" and "PREPARE TO STOP" signs for ramp metering.

AGENCY MAKING REQUEST/SPONSOR: Caltrans, Janice Benton, Voting Member

BACKGROUND: In California, activated blankout signs, as shown in Figure 1, 2, and 3, are used for ramp and connector metering advance warning purposes. These signs are also known as internally illuminated signs and/or extinguishable message signs. For ramp metering applications, the one shown in Figure 1 is typically used. This sign is in fact a pedestrian signal head, but modified to display the METER ON message. For connector metering applications, the sign shown in Figure 2 is typically used, installed either on a mast arm (cantilever) structure or a double wood post structure on the roadside. For connector metering applications, the activated blankout PREPARE TO STOP sign as shown in Figure 3, is also used downstream of the activated blankout METER ON sign to warn the possible presence of downstream queues due to metering operations. For the existing 2341 locations of ramp meters across California as of 2011, there are more than 1000 locations of such activated blankout METER ON signs, and more than 30 activated blankout PREPARE TO STOP signs. Over the years, these advance warning devices worked fine with little public complaint.

The pedestrian signal head activated blankout METER ON sign has been incorporated into the January 2000 version of the Ramp Meter Design Manual (RMDM), which is part of the Caltrans Highway Design Manual. See Figure 4. The RMDM is a listed reference for the CA MUTCD since 2004. In addition, the activated blankout METER ON sign was incorporated in the Caltrans 2006, and 2010 version Standard Plans (ES-4B) as shown in Figure 5. The activated blankout PREPARE TO STOP sign was also incorporated in the Caltrans 2006, and 2010 version Standard Plans (ES14-A, and ES14-C) as shown in Figures 6 and 7.
In the preparation of the 2011 version of the CA MUTCD, these activated blankout signs were mentioned in Sections 2C.37, and 4I.03 briefly by their text messages only, but no mock-ups was shown. No sign numbers was assigned, either.
Inclusion of these activated blankout signs into the CA MUTCD was also a suggestion received from the Federal Highway Administration field office in Sacramento.

Fig

Figure 1 The pedestrian signal head activated blankout METER ON sign at the entrance gore of metered on-ramps

Figure 2 The activated blankout (210 WEST) METER ON sign installed on mast arms.

Figure 3. The activated blankout PREPARE TO STOP sign installed on mast arms.

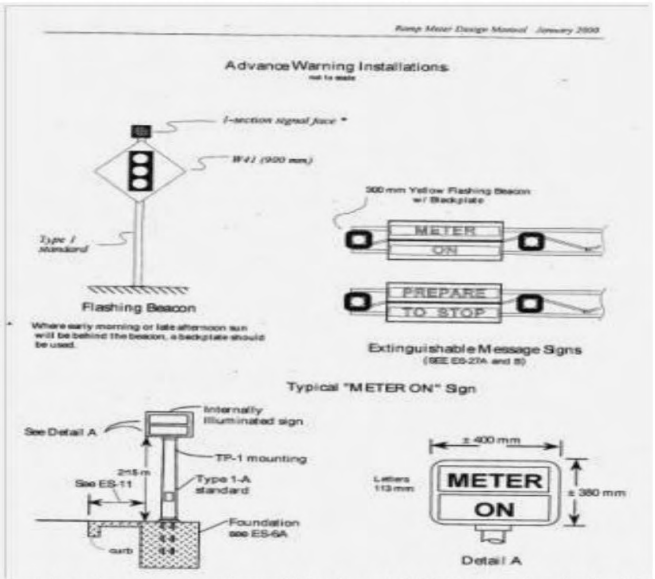


Figure 4. The pedestrian signal head activated blankout METER ON sign in the RMDM.

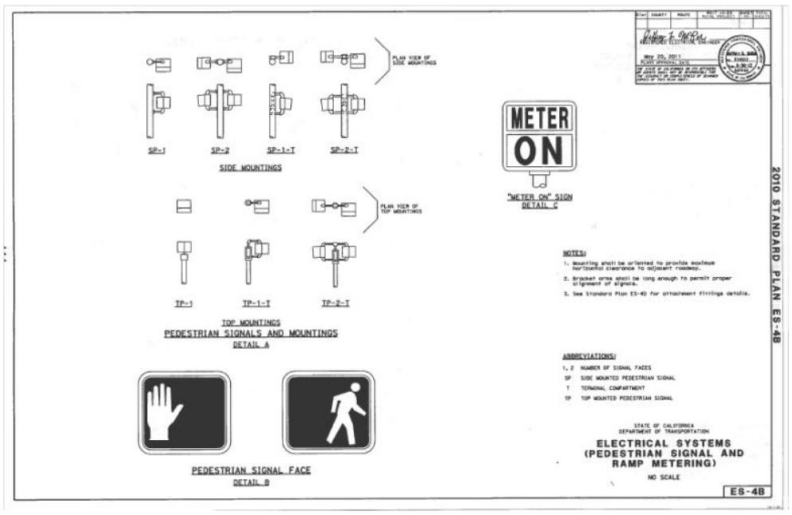


Figure 5. The pedestrian signal head activated blankout METER ON sign in the Standard Plans (ES-4B).

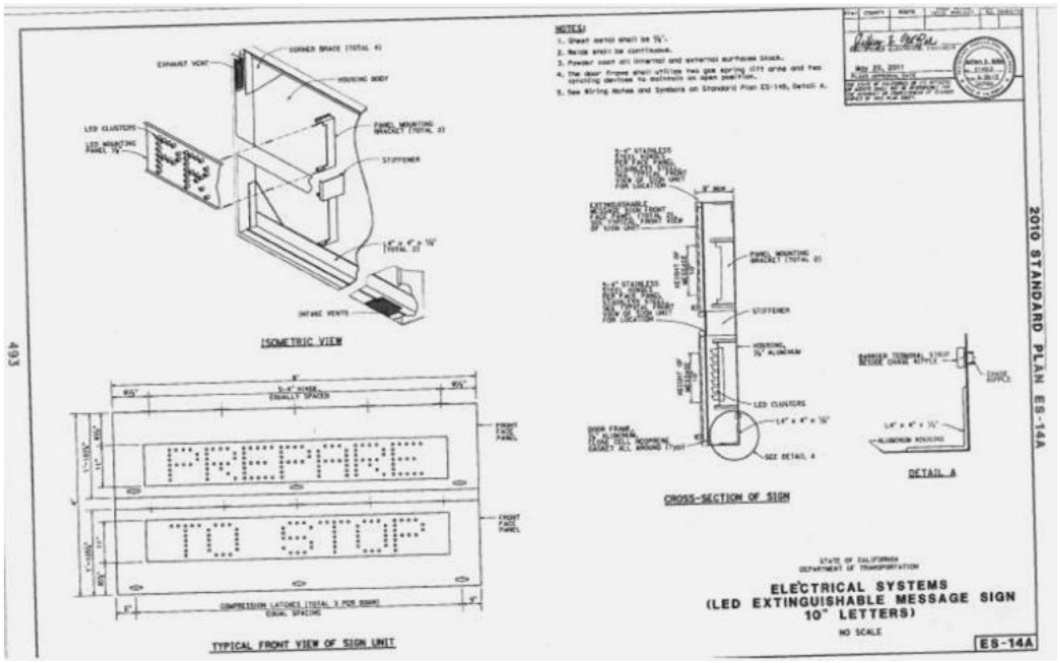


Figure 6. The activated blankout PREPARE TO STOP sign in the Standard Plans (ES-14A).

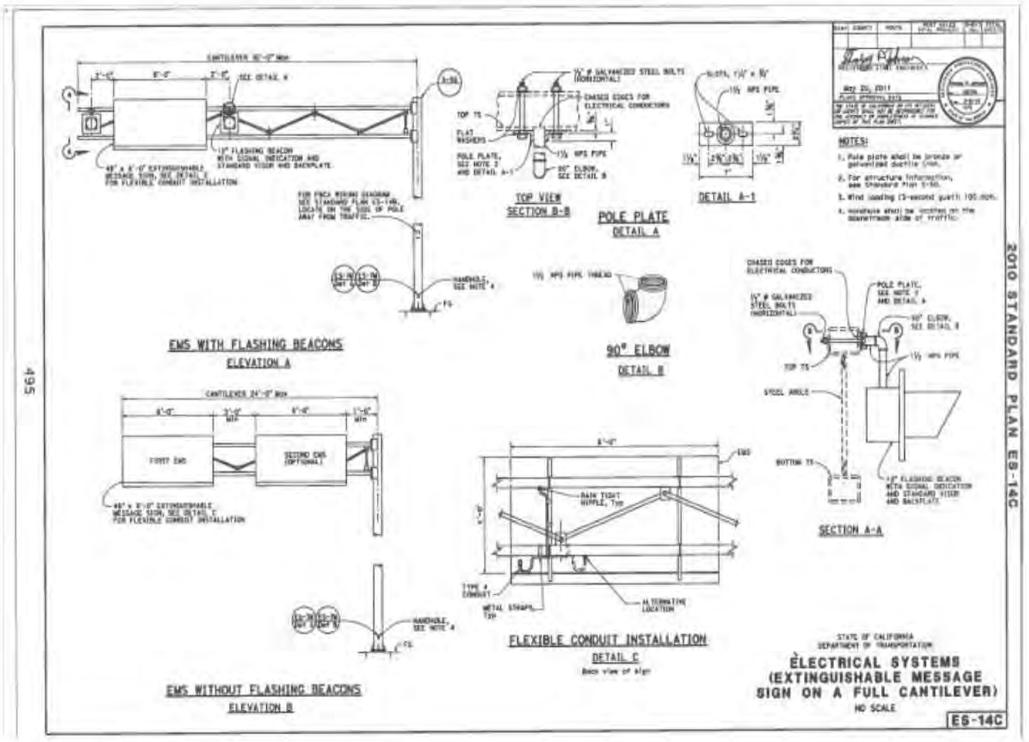


Figure 7. The activated blankout PREPARE TO STOP sign in the Standard Plans (ES-14C).

Proposal: (additions are shown in red color)

Include the mock-ups of the METER ON and PREPARE TO STOP signs, and assign sign number for these activated blank-out signs in Section 2C.37 and Section 4I.03.

Section 2C.37 Advance Ramp Control Signal Signs (W3-7 and W3-8)

Option:

01 A RAMP METER AHEAD (W3-7) sign (see Figure 2C-6) may be used to warn road users that a freeway entrance ramp is metered and that they will encounter a ramp control signal (see Chapter 4I).

Guidance:

02 *When the ramp control signals are in operation ~~operated only during certain periods of the day~~, a RAMP METERED WHEN FLASHING (W3-8) sign (see Section 2C.37), or an ~~internally illuminated~~ activated blankout "METER ON (WXX-1 (CA), WXX-2(CA), and WXX-3(CA))" ~~indication~~, and/or an activated blankout "PREPARE TO STOP (WXX(CA))" ~~message~~ sign should be installed in advance of the ramp control signal near the entrance to the ramp, or on the arterial on the approach to the ramp, to alert road users to the presence and operation of ramp meters.*

Standard:

03 **The RAMP METERED WHEN FLASHING sign shall be supplemented with a warning beacon (see Section 4L.03) that flashes when the ramp control signal is in operation.**

Section 4I.03 Operation of Freeway Entrance Ramp Control Signals

Guidance:

01 *Operational strategies for ramp control signals, such as periods of operation, metering rates and algorithms, and queue management, should be determined by the operating agency prior to the installation of the ramp control signals and should be closely monitored and adjusted as needed thereafter.*

02 *When the ramp control signals are in operation ~~operated only during certain periods of the day~~, a RAMP METERED WHEN FLASHING (W3-8) sign (see Section 2C.37), or an activated blankout "METER ON (WXX-1 (CA), WXX-2(CA), and WXX-3(CA))", and/or an activated blankout ~~extinguishable~~ "PREPARE TO STOP (WXX(CA)" ~~message~~ sign should be installed in advance of the ramp control signal near the entrance to the ramp, or on the arterial on the approach to the ramp, to alert road users to the presence and operation of ramp meters.*

Standard:

03 **The RAMP METERED WHEN FLASHING sign shall be supplemented with a warning beacon (see Section 4L.03) that flashes when the ramp control signal is in operation.**

The recommended mock-ups are as shown in Figure 8, 9, 10, and 11.

Figure 8. Activated Blankout METER ON WXX-1 (CA) Sign

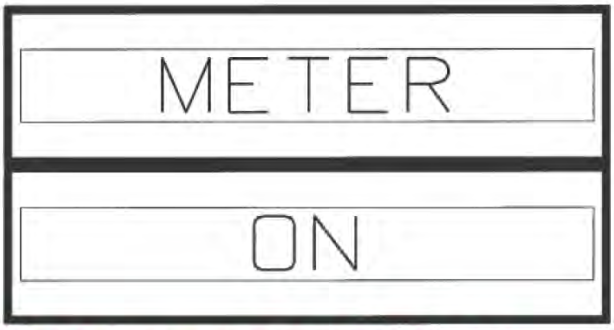


Figure 9. Activated Blankout METER ON WXX-2 (CA) Sign

Figure 10. Activated Blankout (210 WEST) METER ON WXX-3 (CA) Sign

Figure 11. Activated Blankout PREPARE TO STOP WXX (CA) Sign