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November 24, 2009

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Mr. Devinder Singh
Senior Transportation Engineer
Executive Secretary, CTCDC
1120 N Street, MS36
Sacramento, CA 95814

RE: Traffic Operations Policy Directive 09-06, Request to Suspend and/or
Revise Table 4D-109 (CA) Signal Operation – Minimum Bicycle Timing

Dear Mr. Singh:

As you are aware, the Southern California traffic engineering community has raised serious concerns regarding the Department of Transportation's (Caltrans) implementation of AB1581. Now a state law, AB1581 requires cities and counties to install signal system elements that detect motorcycle and bicycle traffic on a roadway to the extent feasible.

Unfortunately, Caltrans has specified detailed placement of loop detectors and bicycle timing green clearance intervals through the issuance of Traffic Operations Policy Directive (TOPD) 09 – 06. The directive is very restrictive, hampers the ability of traffic engineers to use sound engineering judgment on the installation of these devices, and ignores the impact the new clearance interval will have on traffic operations, signal coordination, vehicular delay, and air quality impacts including the production of green house gases.

Our agency is strongly recommending that Caltrans, through the California Traffic Control Devices Committee, re – address, review, and discuss the unintended consequences resulting from this Policy Directive. We believe that with the current TOPD 09 – 06, Caltrans has moved well beyond the legislative intent of AB 1581 and has created a new set of issues that may hamper other state policy goals. Additionally, we would recommend a review of the assumptions made in developing the reference rider and the calculations used in developing the timing in Table 4D – 109(CA). We have attached a technical analysis of the Policy Directive that addresses these issues for your review, and look forward to meeting with you on this matter. In the interim, we recommend that the timing parameters set forth in Table 4D – 109(CA) of TOPD 09 – 06 be suspended or revised per the suggested table in the technical analysis attachment to this letter pending further analysis, research, and reporting in resolution to these conflicting issues.

Additionally, we are including letters of support of our position from several organizations and agencies.

Sincerely,

Ron Keith
Principal Traffic Engineer



November 19, 2009

Mr. Ron Keith
Principal Traffic Engineer
Orange County Transportation Authority
550 S Main St
Orange, CA 92863-1584

RE: Traffic Operations Policy Directive 09-06, Request to Revise Table 4D-109 (CA) Signal Operation – Minimum Bicycle Timing

Dear Ron:

Upon extensive review of the Bicycle Timing equation and the resulting table, I have determined that revisions should be made in order to simplify the process; account for distance traveled during bicycle start-up/acceleration; and to recognize that the bicyclist (traveling in excess of 10 mph) can still legally and safely be within the intersection at the end of all red, but at least in front of or past the opposing drivers' view. During the opposing drivers' start-up time, the bicyclist will safely clear the intersection.

Arguments have been given that the 6 seconds for start-up is really extra time compared to a bicyclist entering the intersection at 10 mph. Unfortunately, that theory is based on an extremely low acceleration rate of only 1.5 feet/second/second. The "design bicyclist" should be an adult, with a licensed driver's abilities and should be assumed to be able to accelerate at least 3 feet/second/second. Therefore the equation needs major revisions. Because there are significant oversights in Policy Directive 09-06, I recommend that either:

- A) Traffic Operations Policy Directive 09-06 be rescinded until a new public traffic hearing by the CTCDC on bicycle timing; or
- B) Table 4D-109 (CA) be revised using the following modified equation (see Figure 1):

$$G_m + Y + R + L_o = \text{bicycle start-up time plus cruising time}$$

$$G_m + Y + R + L_o = 6 + [W - (5 * 15 / 2) - 6] / 15, \text{ where}$$

TRANSPORTATION CONSULTING ENGINEERS

G_m	Length of minimum green interval (seconds)
Y	Length of yellow interval (seconds)
R	Length of red clearance interval (seconds)
L_o	Opposing vehicle start-up lost time (1 second reaction time)
W	Distance from limit line to far side of last conflicting lane (ft)

The attached Figure 1, "Intersection Bicycle Timing," illustrates how the equation factors apply with the following key assumptions:

- For end user convenience, the bicycle cruising speed is assumed to be 15 fps (10.2 mph instead of 10 mph).
- The CTCDC approved start-up time of 6 seconds is equivalent to 1 second reaction time plus 5 seconds of start-up/acceleration time from zero to 15 fps. The average speed during acceleration is $15 \div 2$ or 7.5 feet per second. The distance traveled during start-up is $5 * 7.5$, or approximately 37 feet. Going from 0 to 15 fps in 5 seconds is equivalent to an acceleration rate of 3 feet/second/second.
- Once a vehicle or bicycle is in the intersection, it has the right-of-way (per the CVC). Therefore, it is deemed reasonable that for safe intersection departure, the bicycle needs only to be within 6 feet of the far side of the last conflicting lane at the end of the red clearance interval, as illustrated in Figure 1 (i.e., in direct view of the opposing vehicle's driver, but still at least 15-20 feet away from the opposing vehicle, which easily allows for an additional second to be included, thus L_o could be 2 seconds rather than 1 second).
- Distance traveled at bicycle cruise speed of 15 fps = $W - 37 - 6 = W - 43$.
- Simplification of the recommended equation becomes:

$$G_m = 6 + [(W - 43) / 15] - Y - R - L_o$$

e.g., if $G_m = 5$, $Y = 3$, $R = 1$, then no additional time is required, unless $W > 100$ feet. Then, for each additional 15 feet of street width, G_m needs to be increased by 1 additional second.

- For left turns (see attached Figure 2, Intersection Bicycle Timing Throughs and Left Turns, which shows the layout of a typical critical intersection), the approximate travel distance will be close to 130 feet, requiring 2 additional seconds (i.e., $G_m = 7$). This time is not a problem because left turn phases typically have a minimum split time of at least 12 seconds.

Table 4D-109 (CA) Signal Operations – Minimum Bicycle Timing (English Units)

- G_m Length of minimum green interval (seconds). Use G_m for closest distance value.
- Y Length of yellow interval (seconds)
- R Length of red clearance interval (seconds)
- L_o Opposing vehicle start-up lost time (1 second reaction time)
- W Distance from limit line to far side of last conflicting lane (ft)

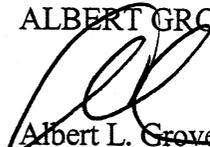
Distance, W (Feet)	Minimum Green Phase Length (Seconds) *			
	if 3 seconds yellow:	if 4 seconds yellow:	if 5 seconds yellow:	if 6 seconds yellow:
85	4	–	–	–
100	5	4	–	–
115	6	5	4	–
130	7	6	5	4
145	8	7	6	5
160	9	8	7	6
175	10	9	8	7
190	11	10	9	8

* Table assumes 1 second all red (for each additional second of all red, reduce G_m by 1 second).

It can be concluded that the guidance provided in Policy 09-06 is misleading and too conservative, causing unnecessary negative impacts to the driving public. This guidance should be eliminated. Typically, the normal minimum green times will be adequate for bicyclists.

Respectfully submitted,

ALBERT GROVER & ASSOCIATES



Albert L. Grover, P.E.
 President & CEO

Attachments

CRUISE TIME PLUS START UP TIME = $G_m + Y + R + L_o$, WHERE
 G_m = MIN GREEN
 Y = YELLOW
 R = ALL RED
 L_o = OPPOSING VEHICLE START UP TIME (1 SEC REACTION TIME)

$$G_m = 6 + (W-43)/15 - Y - R - L_o$$

TIME

CRUISE TIME = $(W-43)/15$

(TOTAL START UP TIME) 6 SEC

5 SEC ACCELERATION TIME

(REACTION TIME) 1 SEC

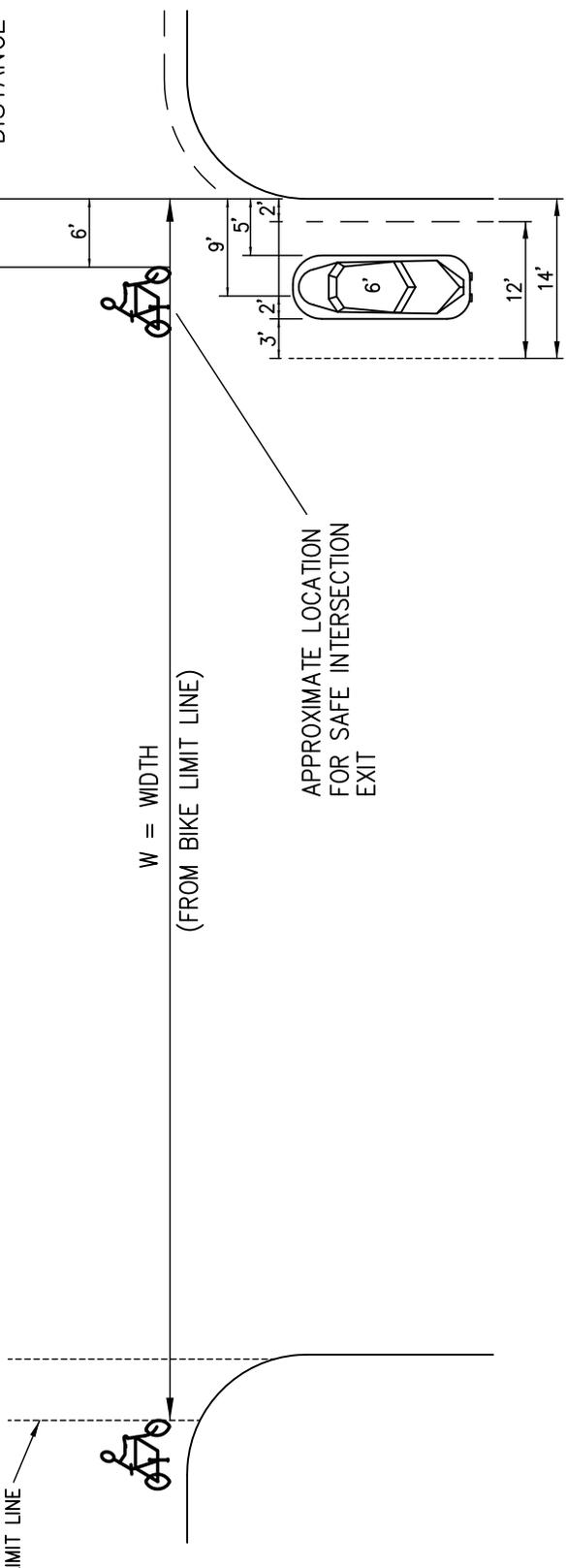
W-43

15 fps

37'

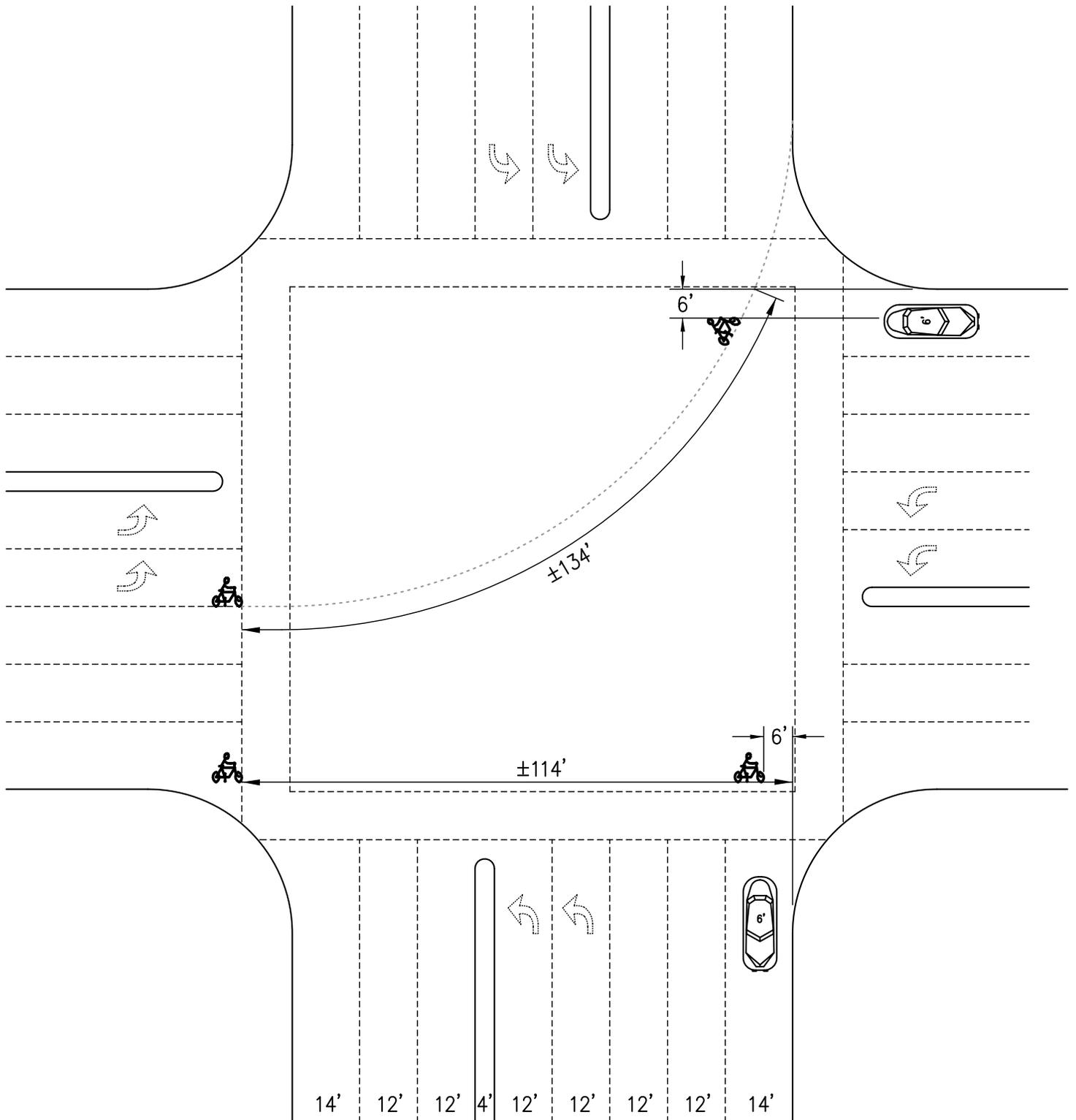
ACCELERATION
7.5 fps

DISTANCE



W = WIDTH
(FROM BIKE LIMIT LINE)

APPROXIMATE LOCATION FOR SAFE INTERSECTION EXIT





November 20, 2009

Mr. Ron Keith
Principal Traffic Engineer
Orange County Transportation Authority
550 South Main Street
Orange, CA 92863-1584

SUBJECT: CALTRANS POLICY DIRECTIVE 09-06

Dear Mr. Keith:

The purpose of this letter is to notify you of the full support of the City of Dana Point with regard to the concerns voiced by the Orange County Transportation Authority (OCTA) and the Southern California Traffic/Transportation Engineering Community on Caltrans Policy Directive Number 09-06 (Directive) and the consequences of its implementation. While accommodating our bicyclists is an important aspect of traffic circulation, the City of Dana Point is concerned about the overall impacts the Directive will have on traffic circulation throughout the County of Orange. Further, the specific requirements of the Directive will result in significant traffic delays, negative air quality impacts, and possible safety and liability issues.

Another key concern for the City of Dana Point is the requirement to place bike detection in all traffic lanes. In a number of cases, placing detection in that manner may create safety issues for a number of our recreational bicyclists. In addition, the associated delays in traffic circulation will be significant.

We respectfully request that you take whatever steps necessary to encourage Caltrans to reevaluation the Directive and its ramifications on our community.

Thanks in advance and we look forward to working with you on this topic.

Sincerely,

Matthew Sinacori, P.E.
City Engineer

cc: File



ENGINEERING DEPARTMENT

303 West Commonwealth Avenue, Fullerton, California 92832-1775

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Website: www.ci.fullerton.ca.us

November 20, 2009

Mr. Ron Keith
Principal Traffic Engineer
Orange County Transportation Authority
550 South Main Street
Orange, California 92863-1584

RE: Caltrans Policy Directive 09-06

Dear Mr. Keith:

The purpose of this letter is to formally notify you of the full support of the Engineering Department of the City of Fullerton with the concerns voiced by OCTA and the Southern California traffic/transportation engineering community relative to the consequences of implementing the provisions of Caltrans Policy Directive 90-06 pertaining to bicycle detection and timing. While this directive may have been well meaning in intent, the fact is that the overly conservative assumptions utilized in developing the specifics of the directive will result in significant (and totally unnecessary) additional delay and resultant negative air quality impacts for the public.

We urge you to take whatever steps are necessary to convince Caltrans to revisit this issue as soon as possible.

Sincerely,

A handwritten signature in blue ink, appearing to read "DK Hoppe", is written over a horizontal line.

Donald K. Hoppe
Director of Engineering
City of Fullerton





City of Mission Viejo

Public Works Department

Frank Ury
Mayor

Lance R. MacLean
Mayor Pro Tem

Trish Kelley
Council Member

John Paul "J.P." Ledesma
Council Member

Cathy Schlicht
Council Member

November 24, 2009

Mr. Ron Keith
Principal Traffic Engineer
Orange County Transportation Authority
550 South Main Street
Orange, California 92863-1584

Subject: Caltrans Policy Directive 09-06

Dear Mr. Keith,

The City of Mission Viejo supports efforts of OCTA and other Southern California traffic and transportation engineering representatives to raise concerns regarding the consequences of implementing the provisions of the Caltrans Policy Directive 90-06 that pertain to bicycle detection and timing requirements for signalized intersections. While we support efforts to safely accommodate bicyclist along with all of the other roadway users, we feel there needs to be further discussion and research to develop viable solutions for bicyclist at traffic signals that do not require actions that result in significant delays and disruption of other roadway users.

We would suggest that you encourage Caltrans to suspend this directive until more effort is made to consult the "cities and counties" in developing revised standards as first recommended in the enabling legislation.

Sincerely,


Shirley Land
Transportation Manger





November 20, 2009

Mr. Ron Keith
Principal Traffic Engineer
Orange County Transportation Authority
550 S Main St
Orange, CA 92863-1584

RE: Caltrans Policy Directive 09-06

Dear Mr. Keith:

The Orange County Traffic Engineering Council (OC TEC) Board and approximately 100 members met on October 22, 2009 for the organization's monthly meeting to discuss the issues and consequences of implementing the provisions of Caltrans Traffic Operations Policy Directive 09-06 to provide bicycle and motorcycle detection on all new and modified approaches to traffic-actuated signals. We understand the intention of the directive, but the OC TEC membership is in concert with the concerns presented by OCTA that implementing the directive will result in air quality impacts due to additional significant delays to motorists and detract from signal timing and coordination efforts within the County.

The OC TEC membership voted unanimously to support OCTA and their efforts in working to convince Caltrans to re-evaluate this policy directive.

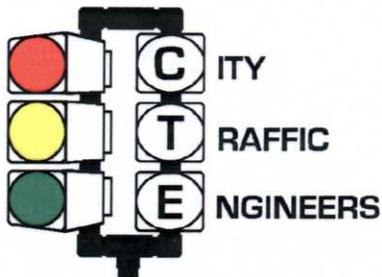
Sincerely,

A handwritten signature in blue ink that reads "Jason Melchor".

Jason Melchor
OC TEC Co-President

A handwritten signature in blue ink that reads "Ramin Massoumi".

Ramin Massoumi
OC TEC Co-President



November 24, 2009

Mr. Ron Keith
Principal Traffic Engineer
Orange County Transportation Authority
550 South Main Street
Orange, California, 92863-1584

Subject: Caltrans Policy Directive 09-06

The City Traffic Engineers (CTE) Association is an organization representing professional traffic engineers of government agencies throughout southern California including Cities, Counties, State and affiliates such as the Automobile Club of Southern California. One of the Association's several goals is to exchange views and opinions relating to matters of mutual concern to the practice of municipal traffic engineering, including proposed legislation and policies which may affect the operations of public agencies concerning the circulation and safety of goods, people and services.

The members of CTE are concerned about the potential impacts which the subject Caltrans Policy Directive will have on the traffic signal operations of public agencies in the state of California and, therefore, fully support the position taken by OCTA, other public agencies and several other traffic engineering organizations and professionals on this matter. Specifically, the increases in required minimum "green" time to the minor street approaches at signalized intersections as mandated by this directive will inevitably result in increased unnecessary delay and stops and, potentially, additional rear-end collisions involving vehicles on the main street approaches to the intersections. In addition, the implementation of this directive will adversely affect overall intersection efficiency and the environment through additional vehicle emissions and fuel consumption.

CTE urges you to persuade Caltrans to either rescind the directive or provide a test period to thoroughly evaluate the long-term affects of this directive and, pending the outcome, make adjustments to the directive as necessary.

Sincerely,

Edwin J. Norris
2009 CTE Chair