

# **STOP SIGN TRAFFIC STUDY FOR DUNCAN AVENUE & TRIGGS STREET**



**CITY OF COMMERCE, CALIFORNIA  
PUBLIC WORKS AND DEVELOPMENT SERVICES  
DEPARTMENT**

## **APPENDIX "A"**

**MONDAY, AUGUST 15, 2016**

## **INTRODUCTION:**

A request was made from Councilmember Oralio Rebollo regarding reports of traffic incidents and speeding near the intersection of Duncan Avenue and Triggs Street in the City of Commerce. This intersection is located in the Bristow area in the northwest corner of the City. This study is an initial effort to consider and examine the circumstances surrounding these traffic incidents and speeding.

## **EXISTING CONDITIONS:**

The intersection of Duncan Avenue and Triggs Street is within a residential area. *Please see "Exhibit 1."* Duncan Avenue is categorized as a local street, while Triggs Street is classified as a collector street. *Local* streets are roadways that primarily provide access to nearby homes or residences and are characterized by slower speeds. *Collector* streets are those roadways which connect residential streets and "funnels" traffic to adjoining higher capacity roadways.

During June 2016, Public Works staff performed a site investigation and observed the following street conditions: Triggs Street measures forty feet (40 ft.) in width with a posted speed limit of twenty-five miles per hour (25 mph), whereas Duncan Avenue measures thirty-three feet (33 ft.) in width with a prevailing, non-posted *prima facie* speed of twenty-five miles per hour (25 mph).

A city-commissioned speed study conducted by the Los Angeles County Department of Public Works in September 2008 reflects that the speed limit on Triggs Street, to the west of McDonnell Avenue was posted at, and remained set at, twenty-five miles per hour (25 mph).

The level of traffic on both streets is considered average during peak hours. Based on the aforementioned 2008 speed study, the capacity on Triggs Street within that residential area averages approximately 4,500 vehicles per day (vpd), which is equivalent to about 188 vehicles per hour (vph). For Duncan Avenue, which is a local street, the estimated capacity is deemed to be approximately 30 vehicles per hour (vph).

Both Duncan Avenue and Triggs Street accommodate traffic in both directions, and neither is a one-way street.

The intersection is a two-way stop controlled intersection with stop signs posted on Duncan Avenue. There are no stop signs on Triggs Street, which traverses east to west.

## ANALYSIS AND DISCUSSION:

Public Works & Development Services staff first examined and analyzed traffic collision data provided by the *Statewide Integrated Traffic Records System* (SWITRS) compiled by the *California Highway Patrol* (CHP) between the years of 2010 through 2015.

The data shows that between 2010 to 2015, there were four (4) recorded accidents at the intersection of Duncan Avenue and Triggs Street:

- September 19, 2010           ~ Rear-end collision
- August 14, 2012             ~ Rear-end collision
- December 22, 2012         ~ Sideswipe collision
- September 8, 2013         ~ Sideswipe collision

None of the above accidents resulted in serious injury or death to the collision participants or to the surrounding parties. *Please see "Exhibit 2."*

Field observations were made by staff on March 14, 2016; on April 18, 2016; and on June 6, 2016. On these distinct occasions, staff observed the following:

1. No vehicle was speeding significantly above (over 5 mph) the *prima facie* speed limit.
2. Not all vehicles made a complete stop when approaching the intersection coming from Duncan Avenue.
3. Some drivers actually passed through the stop sign without stopping at all.
4. Sight visibility is adequate but can be improved. Suggestions for improvement are detailed below.
5. During the time of the field observations, there was no significant commercial truck traffic volume in the area.

Duncan Avenue and Triggs Street is a two-way stop-controlled intersection. Per California Vehicle Code (CVC) Section 21804(a) [*i.e., Entry onto Highway*], motorists entering a highway (*such as a street*) from public or private property shall yield the right-of-way to all traffic on the highway and shall continue to do so until he or she can proceed with reasonable safety.

Therefore, motorists should move forward toward the edge of the stop bar line on Duncan Avenue, thus gaining more visibility to safely exit the street. Driver behavior and overall driving habits of the motoring public is the most controlling factor in regards to roadway safety. Driver error is typically the most salient factor when it comes to traffic accidents and collisions.

Staff analyzed and reviewed the CHP's SWITRS data and has concluded that the data is inconclusive in determining that the cause of any recent accidents were due to intersection geometry, site visibility, or anything else related to the public right-of-way. It should be noted that from the years of 2010 through 2015, the SWITRS data indicate

that four accidents occurred (see page 3), two of which happened in 2012. All four of these collisions were largely due to driver error, as evidenced by the fact that the officers or deputies on scene determined that CVC Sections 22106 [*Starting Parked Vehicles or Backing*], 22107 [*Turning Movements and Required Signals*], and 23152 [*Driving under the Influence of Alcohol or Drugs (DUI)*] were violated. The paucity of traffic collisions within this five-year time span suggests that these traffic “incidents” are largely infrequent.

#### **STOP SIGN WARRANT ANALYSIS ON TRIGGS STREET:**

The justification of installing a STOP sign or signs at an intersection is detailed and defined in the *California Manual on Uniform Traffic Control Devices* (CA MUTCD), 2014 Edition. The CA MUTCD is a joint publication between the *Federal Highway Administration* and the *California Department of Transportation* (Caltrans), and this manual details engineering measures for the installation of regulatory signs, street markings, speed surveys, construction traffic control, etc. The CA MUTCD references the CVC and is considered as a publication of statutory authority, since it is codified in CVC Section 21400 to be adopted as the uniform standard and specification for *all* official traffic control devices in the state of California.

Within the CA MUTCD, the warrants for STOP sign installation are detailed and explained in *Section 2B.06 – STOP Sign Applications* (for two-way STOP controlled intersections) and in *Section 2B.07 – Multi-Way STOP Applications* (typically, for four-way STOP controlled intersections). Please see “*Exhibit 2a.*”

For the intersection of Duncan Avenue and Triggs Street, STOP sign warrant analysis using Section 2B.06 of the CA MUTCD does *not* apply, since the intersection is already a two-way STOP controlled intersection in the north-south direction of Duncan Avenue.

#### *Simplified Warrant Analysis for Four-Way (or Multi-STOP) Intersection:*

Currently, the intersection of Duncan Avenue and Triggs Street is a two-way STOP controlled intersection with STOP signs installed in the north-south direction of Duncan Avenue. Please see “*Exhibits 3a & 3b.*”

This warrant analysis seeks the justification of installing STOP signs in the east-west direction of Triggs Street, thereby making it a four-way STOP controlled intersection. Please note that this is a “simplified” study for consideration purposes. Any decision to actually implement a four-way STOP-controlled intersection would require a formal traffic engineering study.

The warrants for creating a four-way (or multi-way) STOP-controlled intersection are described in Section 2B.07 of the CA MUTCD. Consideration is primarily given to these salient factors: traffic volume, accident data, and approach speeds. Other criteria that can be considered consist of vehicle and pedestrian turning conflicts.

The following is the simplified four-way STOP-controlled warrant analysis at the intersection of Duncan Avenue and Triggs Street, as stipulated in Section 2B.07 of the CA MUTCD:

- A. Where traffic control signals are justified, the multi-way STOP is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.*

Analysis: Not applicable since the intersection does not justify the installation of a traffic control signal. The intersection is in a small residential area, and neither traffic volumes nor accident data warrant such installation.

- B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way STOP installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.*

Analysis: Accident data shown on page 3 of this preliminary study show that there were only four (4) accidents at this intersection from year 2010 to year 2015. This averages to less than one (1) accident per year. By virtue of this data, this warrant is *not* satisfied.

*C. Minimum Volumes:*

- 1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour (vph) for any 8 hours of an average day; and*

Analysis: Traffic volume data on page 2 of this preliminary study show that the vehicular volume for Triggs Street is approximately 4,500 vehicles per day (vpd), which is equivalent to 188 vph. This figure is an average given a 24-hour day. This portion of the warrant is *not* satisfied since 188 vph is much less than the 300 vph required in this warrant.

- 2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but*

Analysis: Pedestrian and bicycle volume is quite low and almost non-existent during most parts of the day at this intersection. Although a more formal traffic study would need to be initiated to determine these volumes, causal observations made by Public Works staff dictate that such volumes are low and do not rise to the level of at least 200 units per hour, as required in this warrant. By virtue of the low pedestrian and bicycle volumes, and also that Minimum Volume Item No. 1 was not satisfied, this portion of the warrant is *not* satisfied.



3. *If the 85<sup>th</sup>-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*

Analysis: The 85<sup>th</sup>-percentile approach speed (or posted speed limit) on Triggs Street, which is the major street, is 25 mph. Since this speed does not exceed 40 mph, this portion of the warrant is *not* satisfied. The statements regarding “70 percent of the values” are irrelevant since the 40 mph requirement was not initially satisfied.

- D. *Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.*

Analysis: For this criterion (D) to be satisfied, all three (3) criteria B, C.1, and C.2 must be satisfied. For criteria B, eighty percent (0.80) of the required five accidents per year is four accidents ( $0.80 \times 5 = 4$ ). However, accident data shown on page 3 of this preliminary study show that there were only four (4) accidents at this intersection from year 2010 to year 2015. This averages to less than one (1) accident per year. By virtue of this data, this warrant is *not* satisfied.

Other criteria such as the need to control left-turn conflicts or vehicle/pedestrian conflicts are not corroborated by the traffic collision data shown on page 3 of this preliminary study. Most collisions during the time span of 2010 to 2015 have been rear-end or sideswipe collisions and are not normally related to left-turn or vehicle/pedestrian conflicts.

*Therefore, based on the above analysis, Public Works staff does not recommend the installation of STOP signs for the east-west direction of Triggs Street since none of the above warrants have been satisfied.*

Per the CA MUTCD, the manual makes note of the following:

- *Section 2A.04 – Excessive Use of Signs* which states: “Regulatory and warning signs should be used conservatively because these signs, if used to excess, tend to lose their effectiveness.”
- *Section 2B.04 – Right of Way at Intersections* which states: “YIELD or STOP signs should not be used for speed control.”
- *Section 2B.05 – STOP Sign (R1-1) and ALL WAY Plaque (R1-3P)* which states: “A STOP (R1-1) sign is not a “cure-all” and is not a substitute for other traffic control devices.”

## MITIGATION MEASURES:

The infrequency of collisions at the intersection of Duncan Avenue and Triggs Street indicates that major mitigation or significant changes are not necessary, and that a proactive approach is appropriate to the situation at hand and provides the best course for mitigation.

### Refresh Existing Street Markings and Add Double Yellow Line ~

At the stop-controlled sides of Duncan Avenue, there are existing stop bar and stop markings that have partially faded over years of use. Refreshing these markings using thermoplastic reflective paint will accentuate or highlight the markings, thereby informing drivers of an impending stop. This will enhance visibility and reinforce drivers the need to stop and take precaution before entering and making any turning maneuvers at the intersection. Furthermore, a double-yellow dividing line could be installed on Duncan Avenue in order to emphasize its two-way traffic nature. The advantage to this allows drivers to “funnel” into their correct lanes, thereby increasing safety and also not blocking the view of oncoming traffic. Please see “*Exhibits 3a & 3b.*”

The City does not currently have an established thermoplastic marking policy, whereby street markings clearly delineate traffic direction and provide advance warning. The vast majority of the thermoplastic street markings in the City of Commerce do conform to regulations, as codified in the CA MUTCD.

However, constant “wear and tear” due to the passage of time has diminished the visual acuity of these markings. Capital improvement street rehabilitation projects present the opportunity to “refresh” these markings, but an active campaign to refresh these existing markings, *absent a scheduled capital improvement street project*, does not at present exist.

Markings that show significant wear and tear are dealt with on a “case-by-case” basis, and if refreshment is deemed warranted by City staff, a County request order is issued for pavement marking refreshment.

### Improve Retro-reflectivity by Using Special Micro-Structure & Sealed Surface ~

Retro-reflectivity guidelines are standardized in section 2A.08 of the CA MUTCD, and the judgment as to how the signs should be “retro-reflectorized” is deferred to public agencies. The materials for retro-reflectivity consist of prismatic sheeting sealed with a clear coating. Per the CA MUTCD and *Federal Highway Administration’s* (FHWA’s) guidelines, assessments made by public agencies in maintaining retro-reflectivity of regulatory and warning signs conform to the following: (A) Visual nighttime inspection, (B) Measured sign retro-reflectivity, (C) Expected sign life, (D) Blanket replacement, (E) Control signs, and (F) Other methods. The advantages of implementing retro-reflective signs include lower costs for installation and maintenance, since these signs do not require any electrical input and provide ample reflection from the glare of street lights and vehicle headlights. The disadvantage of retro-reflective signs is that they do not necessarily prevent accidents.

*Install and Move Up New STOP Bars & Markings ~*

By placing the stop bar approximately five feet northerly, the sight triangle for the drivers becomes elongated, and thereby decreases the possibility of an incident coming from traffic either from the left or the right. This essentially allows drivers to move a bit forward into the intersection in order to get a clearer view of intersection traffic. *Please see “Exhibits 4a & 4b.”* In addition, a double-yellow dividing line could be installed on Duncan Avenue in order to emphasize its two-way traffic nature, as was suggested in the first mitigation measure described above.

*Prohibit Parking at the Tip of the Intersection with Red Curbs ~*

The possibility that a car might be able to park at the tip of the intersection significantly restricts sight visibility, since the car acts as an obstruction. In order to prevent such a situation, red curb markings of approximately twenty-five lineal feet (25 ft.) can be installed or extended at both sides of Duncan Avenue and Triggs Street at the tip of the intersection. This will allow drivers to navigate freely when coming to a stop at the intersection without the drivers’ view of oncoming traffic becoming compromised. However, residential concerns may need to be taken into account, as this action will reduce public parking. *Please see “Exhibit 5.”*

*Request Increased Traffic Enforcement ~*

Officers from the City’s Public Safety division and deputies from the Los Angeles County Sheriff’s Department can be called and directed to patrol and enforce safety at the intersection of Duncan Avenue and Triggs Street. Law enforcement presence can serve as both encouragement and deterrent for good and bad driving behavior. The downside would be the increased added cost and resources of personnel.

**RECOMMENDATION & COST ESTIMATE:**

Given the options presented, and weighing each option’s advantages and disadvantages, the mitigation measures that Public Works staff recommends are the following:

- Refresh Existing Street Markings and Add Double Yellow Line
- Retro-reflectorize Existing STOP Signs
- Install and Move Up New STOP Bars & Markings

The above recommendations provide the best outcome both in terms of cost and long-term maintenance, as already described and detailed in the section above, entitled “Mitigation Measures.”

The cost breakdown for (1) refreshing existing STOP bars & pavement markings and adding a double yellow line, (2) retro-reflectorizing the two STOP signs, and (3) moving or shifting up the new STOP bars & markings at the intersection of Duncan Avenue & Triggs Street consists of the following, which includes parts, materials, labor, and construction administration:



STOP Sign Traffic Study for  
DUNCAN AVENUE & TRIGGS STREET

---

- Refresh Existing Pavement STOP Bars & Markings & Add Double Yellow Line ~  
2 locations X \$5,000.00 per location = **\$10,000**
- Remove Existing and Replace with Retro-reflectorized STOP Signs ~  
2 signs X \$250.00 per sign = **\$500**
- Moving or Shifting Pavement STOP Bars & Markings ~  
Sandblasting existing markings = **\$3,000**
- Construction Administration (i.e., City Staff Time) ~  
1 lump sum = **\$2,000**

**TOTAL COST ESTIMATE = \$10,000 + \$500 + \$3,000 + \$2,000  
= \$15,500**

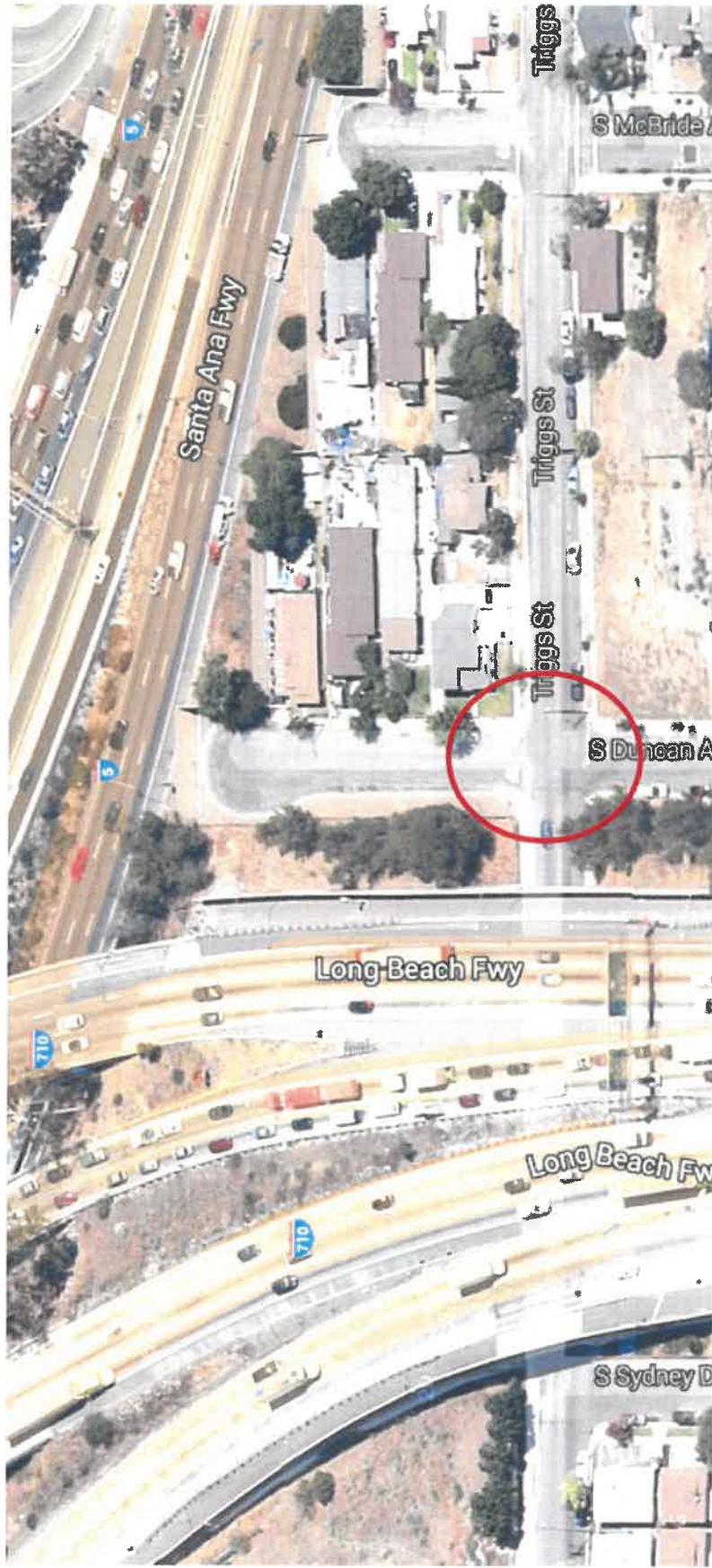
**CONCLUSION:**

This sight visibility traffic study for Duncan Avenue and Triggs Street serves as a preliminary review and investigation regarding traffic incidents within that area. This study is not intended to be exhaustive and comprehensive, but to assist staff and administration officials on what factors may be contributing to the perceived cause of such traffic incidents and what mitigating measures can be implemented in order to reduce such incidents.

**Respectfully submitted,**

Maryam Babaki, P.E.  
Director of Public Works & Development Services

**EXHIBITS FOR TRIGGS STREET & DUNCAN AVENUE INTERSECTION**



**ATTACHMENT 1: Aerial View of Duncan Avenue & Triggs Street (City of Commerce, CA.)**

**EXHIBITS FOR TRIGGS STREET & DUNCAN AVENUE INTERSECTION**



**ATTACHMENT 1: Southside of Duncan Avenue (Existing STOP Signs)**

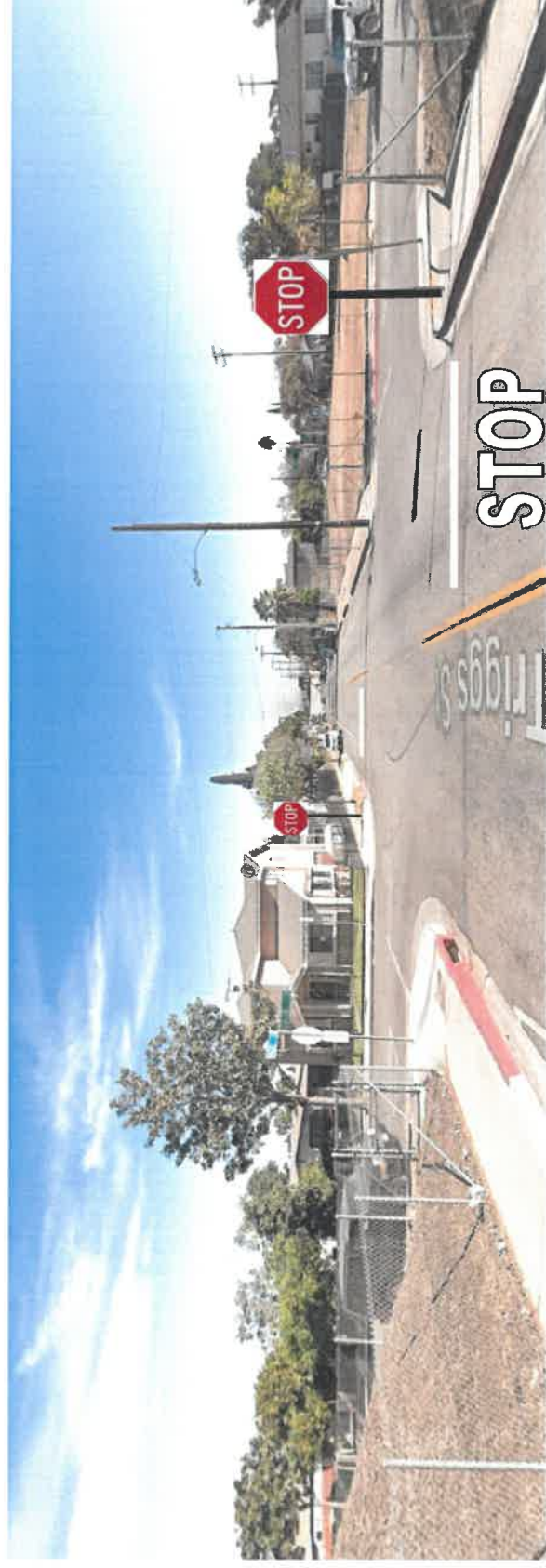


**EXHIBITS FOR TRIGGS STREET & DUNCAN AVENUE INTERSECTION**



**ATTACHMENT 1: Eastbound Triggs Street (No STOP Signs)**

## EXHIBITS FOR TRIGGS STREET & DUNCAN AVENUE INTERSECTION



ATTACHMENT 1: Eastbound Triggs Street (Proposed STOP Signs → Four-Way STOP)



**Standard:**

**05** Each standard sign shall be displayed only for the specific purpose as prescribed in this Manual. Determination of the particular signs to be applied to a specific condition shall be made in accordance with the provisions set forth in Part 2. Before any new highway, private road open to public travel (see definition in Section 1A.13), detour, or temporary route is opened to public travel, all necessary signs shall be in place. Signs required by road conditions or restrictions shall be removed when those conditions cease to exist or the restrictions are withdrawn.

## **Section 2A.04 Excessive Use of Signs**

**Guidance:**

**01** *Regulatory and warning signs should be used conservatively because these signs, if used to excess, tend to lose their effectiveness. If used, route signs and directional guide signs should be used frequently because their use promotes efficient operations by keeping road users informed of their location.*

**Support:**

**02** Sign information overload occurs when the frequency of signing, complexity of messages or diversity of messages is so great that they cannot be readily assimilated by motorists in time to respond properly and safely to roadway situations. Sign information overload can be avoided by:

- A. Increasing the spacing between signs so that they can be understood before encountering new messages.
- B. Minimizing content and using accepted symbols so as to simplify messages.
- C. Spreading the information so that each element of stand-alone information is presented in a separate sign.
- D. Using standard sign formats applied in a consistent fashion to enhance motorist recognition.
- E. Using redundant signing or a combination of signing and pavement messages to offer multiple opportunities for motorists to recognize and respond to the situation.
- F. Reducing or eliminating less-essential signs.

**03** See ITE's Traffic Control Devices Handbook, Chapter 2 for more information on this topic. See Section 1A.11 for information regarding this publication.

## **Section 2A.05 Classification of Signs**

**Standard:**

**01** Signs shall be defined by their function as follows:

- A. Regulatory signs give notice of traffic laws or regulations.
- B. Warning signs give notice of a situation that might not be readily apparent.
- C. Guide signs show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information.

**Support:**

**01a** In California, prior to the adoption of Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD) on May 20, 2004, signs were classified into four categories, the fourth category being Construction signs. In general, Construction signs are Warning, Regulatory or Guide signs. Hence, this categorical classification is deleted for Construction signs in California and as per the MUTCD only the three basic categories are recognized. Construction signs are now included in Part 6.

**02** Object markers are defined in Section 2C.63.

## **Section 2A.06 Design of Signs**

**Support:**

**01** This Manual shows many typical standard signs and object markers approved for use on streets, highways, bikeways, and pedestrian crossings.

**02** In the specifications for individual signs and object markers, the general appearance of the legend, color, and size are shown in the accompanying tables and illustrations, and are not always detailed in the text.

**03** Detailed drawings of standard signs, object markers, alphabets, symbols, and arrows (see Figure 2D-2) are shown in the "Standard Highway Signs and Markings" book. Section 1A.11 contains information regarding how to obtain this publication.

**Standard:**

**03 Except as provided in Paragraphs 4 and 5, the minimum sizes for regulatory signs facing traffic on multi-lane conventional roads shall be as shown in the Multi-lane column of Table 2B-1 and 2B-1(CA).**

**Option:**

**04 Where the posted speed limit is 35 mph or less on a multi-lane highway or street, other than for a STOP sign, the minimum size shown in the Single Lane column in Table 2B-1 and 2B-1(CA) may be used.**

**05 Where a regulatory sign, other than a STOP sign, is placed on the left-hand side of a multi-lane roadway in addition to the installation of the same regulatory sign on the right-hand side or the roadway, the size shown in the Single Lane column in Table 2B-1 and 2B-1(CA) may be used for both the sign on the right-hand side and the sign on the left-hand side of the roadway.**

**Standard:**

**06 A minimum size of 36 x 36 inches shall be used for STOP signs that face multi-lane approaches.**

**07 Where side roads intersect a multi-lane street or highway that has a speed limit of 45 mph or higher, the minimum size of the STOP signs facing the side road approaches, even if the side road only has one approach lane, shall be 36 x 36 inches.**

**08 Where side roads intersect a multi-lane street or highway that has a speed limit of 40 MPH or lower, the minimum size of the STOP signs facing the side road approaches shall be as shown in the Single Lane or Multi-lane columns of Table 2B-1 and 2B-1(CA) based on the number of approach lanes on the side street approach.**

**Guidance:**

*09 The minimum sizes for regulatory signs facing traffic on exit and entrance ramps should be as shown in the column of Table 2B-1 and 2B-1(CA) that corresponds to the mainline roadway classification (Expressway or Freeway). If a minimum size is not provided in the Freeway column, the minimum size in the Expressway column should be used. If a minimum size is not provided in the Freeway or Expressway Column, the size in the Oversized column should be used.*

## Section 2B.04 Right-of-Way at Intersections

**Support:**

**01 State or local laws written in accordance with the "Uniform Vehicle Code" (see Section 1A.11) establish the right-of-way rule at intersections having no regulatory traffic control signs such that the driver of a vehicle approaching an intersection must yield the right-of-way to any vehicle or pedestrian already in the intersection. When two vehicles approach an intersection from different streets or highways at approximately the same time, the right-of-way rule requires the driver of the vehicle on the left to yield the right-of-way to the vehicle on the right. The right-of-way can be modified at through streets or highways by placing YIELD (R1-2) signs (see Sections 2B.08 and 2B.09) or STOP (R1-1) signs (see Sections 2B.05 through 2B.07) on one or more approaches.**

**Guidance:**

*02 Engineering judgment should be used to establish intersection control. The following factors should be considered:*

- A. Vehicular, bicycle, and pedestrian traffic volumes on all approaches;*
- B. Number and angle of approaches;*
- C. Approach speeds;*
- D. Sight distance available on each approach; and*
- E. Reported crash experience.*

**03 YIELD or STOP signs should be used at an intersection if one or more of the following conditions exist:**

- A. An intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;*
- B. A street entering a designated through highway or street; and/or*
- C. An unsignalized intersection in a signalized area.*

**04 In addition, the use of YIELD or STOP signs should be considered at the intersection of two minor streets or local roads where the intersection has more than three approaches and where one or more of the following conditions exist:**

- A. *The combined vehicular, bicycle, and pedestrian volume entering the intersection from all approaches averages more than 2,000 units per day;*
  - B. *The ability to see conflicting traffic on an approach is not sufficient to allow a road user to stop or yield in compliance with the normal right-of-way rule if such stopping or yielding is necessary; and/or*
  - C. *Crash records indicate that five or more crashes that involve the failure to yield the right-of-way at the intersection under the normal right-of-way rule have been reported within a 3-year period, or that three or more such crashes have been reported within a 2-year period.*
- 05 YIELD or STOP signs should not be used for speed control.**

**Support:**

**06** Section 2B.07 contains provisions regarding the application of multi-way STOP control at an intersection.

**Guidance:**

**07** *Once the decision has been made to control an intersection, the decision regarding the appropriate roadway to control should be based on engineering judgment. In most cases, the roadway carrying the lowest volume of traffic should be controlled.*

**08** *A YIELD or STOP sign should not be installed on the higher volume roadway unless justified by an engineering study.*

**Support:**

**09** The following are considerations that might influence the decision regarding the appropriate roadway upon which to install a YIELD or STOP sign where two roadways with relatively equal volumes and/or characteristics intersect:

- A. Controlling the direction that conflicts the most with established pedestrian crossing activity or school walking routes;
- B. Controlling the direction that has obscured vision, dips, or bumps that already require drivers to use lower operating speeds; and
- C. Controlling the direction that has the best sight distance from a controlled position to observe conflicting traffic.

**Standard:**

**10** **Because the potential for conflicting commands could create driver confusion, YIELD or STOP signs shall not be used in conjunction with any traffic control signal operation., except in the following cases:**

- A. If the signal indication for an approach is a flashing red at all times;**
- B. If a minor street or driveway is located within or adjacent to the area controlled by the traffic control signal, but does not require separate traffic signal control because an extremely low potential for conflict exists; or**
- C. If a channelized turn lane is separated from the adjacent travel lanes by an island and the channelized turn lane is not controlled by a traffic control signal.**

**10a** **STOP signs shall not be erected at any entrance to an intersection controlled by traffic signals. Refer to CVC 21355(a).**

**Option:**

**10b** **YIELD or STOP signs may be used at a channelized turn lane if it is separated from the adjacent travel lanes moving in same direction by an island and the channelized turn lane is not controlled by a traffic control signal.**

**Standard:**

**11** **Except as provided in Section 2B.09, STOP signs and YIELD signs shall not be installed on different approaches to the same unsignalized intersection if those approaches conflict with or oppose each other.**

**12** **Portable or part-time STOP or YIELD signs shall not be used except for emergency and temporary traffic control zone purposes.**

**13** **A portable or part-time (folding) STOP sign that is manually placed into view and manually removed from view shall not be used during a power outage to control a signalized approach unless the maintaining agency establishes that the signal indication that will first be displayed to that approach upon restoration of power is a flashing red signal indication and that the portable STOP sign will be manually removed from view prior to stop-and-go operation of the traffic control signal.**



**Option:**

<sup>14</sup> A portable or part-time (folding) STOP sign that is electrically or mechanically operated such that it only displays the STOP message during a power outage and ceases to display the STOP message upon restoration of power may be used during a power outage to control a signalized approach.

**Support:**

<sup>15</sup> Section 9B.03 contains provisions regarding the assignment of priority at a shared-use path/ roadway intersection.

## **Section 2B.05 STOP Sign (R1-1) and ALL WAY Plaque (R1-3P)**

**Standard:**

<sup>01</sup> When it is determined that a full stop is always required on an approach to an intersection, a STOP (R1-1) sign (see Figure 2B-1) shall be used.

<sup>02</sup> The STOP sign shall be an octagon with a white legend and border on a red background.

<sup>03</sup> Secondary legends shall not be used on STOP sign faces.

<sup>04</sup> At intersections where all approaches are controlled by STOP signs (see Section 2B.07), an ALL WAY supplemental plaque (R1-3P) shall be mounted below each STOP sign. The ALL WAY plaque (see Figure 2B-1) shall have a white legend and border on a red background.

<sup>05</sup> The ALL WAY plaque shall only be used if all intersection approaches are controlled by STOP signs.

<sup>06</sup> Supplemental plaques with legends such as 2-WAY, 3-WAY, 4-WAY, or other numbers of ways shall not be used with STOP signs.

**Support:**

<sup>07</sup> The use of the CROSS TRAFFIC DOES NOT STOP (W4-4P) plaque (and other plaques with variations of this word message) is described in Section 2C.59.

**Guidance:**

<sup>08</sup> *Plaques with the appropriate alternative messages of TRAFFIC FROM LEFT (RIGHT) DOES NOT STOP (W4-4aP) or ONCOMING TRAFFIC DOES NOT STOP (W4-4bP) should be used at intersections where STOP signs control all but one approach to the intersection, unless the only non-stopped approach is from a one-way street.*

**Option:**

<sup>09</sup> An EXCEPT RIGHT TURN (R1-10P) plaque (see Figure 2B-1) may be mounted below the STOP sign if an engineering study determines that a special combination of geometry and traffic volumes is present that makes it possible for right-turning traffic on the approach to be permitted to enter the intersection without stopping.

**Support:**

<sup>10</sup> The design and application of Stop Beacons are described in Section 4L.05.

<sup>11</sup> A STOP (R1-1) sign is not a "cure-all" and is not a substitute for other traffic control devices. Often, the need for a STOP (R1-1) sign can be eliminated if the sight distance is increased by removing obstructions.

## **Through Highways**

**Option:**

<sup>12</sup> STOP (R1-1) signs may be installed either at or near the entrance to a State highway, except at signalized intersections, or at any location so as to control traffic within an intersection. Refer to CVC 21352 and 21355. See Section 1A.11 for information regarding this publication.

**Support:**

<sup>13</sup> When STOP (R1-1) signs or traffic control signals have been erected at all entrances, a highway constitutes a through highway. Refer to CVC 600.

<sup>14</sup> Authority to place STOP (R1-1) signs facing State highway traffic is delegated to the Caltrans District Directors.

**Option:**

<sup>15</sup> Local authorities may designate any highway under their jurisdiction as a through highway and install STOP (R1-1) signs in a like manner. Refer to CVC 21354.

**Standard:**

<sup>16</sup> No local authority shall erect or maintain any STOP (R1-1) sign or other traffic control device requiring a stop, on any State highway, except by permission of Caltrans. Refer to CVC 21353.

**Support:**

<sup>17</sup> Caltrans will grant such permission only when an investigation indicates that the STOP (R1-1) sign will benefit traffic.

## **Section 2B.06 STOP Sign Applications**

**Guidance:**

<sup>01</sup> At intersections where a full stop is not necessary at all times, consideration should first be given to using less restrictive measures such as YIELD signs (see Sections 2B.08 and 2B.09).

<sup>02</sup> The use of STOP signs on the minor-street approaches should be considered if engineering judgment indicates that a stop is always required because of one or more of the following conditions:

- A. The vehicular traffic volumes on the through street or highway exceed 6,000 vehicles per day;
- B. A restricted view exists that requires road users to stop in order to adequately observe conflicting traffic on the through street or highway; and/or
- C. Crash records indicate that three or more crashes that are susceptible to correction by the installation of a STOP sign have been reported within a 12-month period, or that five or more such crashes have been reported within a 2-year period. Such crashes include right-angle collisions involving road users on the minor-street approach failing to yield the right-of-way to traffic on the through street or highway.

**Support:**

<sup>03</sup> The use of STOP signs at grade crossings is described in Sections 8B.04 and 8B.05.

## **Section 2B.07 Multi-Way Stop Applications**

**Support:**

<sup>01</sup> Multi-way stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multi-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multi-way stop control is used where the volume of traffic on the intersecting roads is approximately equal.

<sup>02</sup> The restrictions on the use of STOP signs described in Section 2B.04 also apply to multi-way stop applications.

**Guidance:**

<sup>03</sup> The decision to install multi-way stop control should be based on an engineering study.

<sup>04</sup> The following criteria should be considered in the engineering study for a multi-way STOP sign installation:

- A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
- B. Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.
- C. Minimum volumes:
  - 1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and
  - 2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
  - 3. If the 85<sup>th</sup>-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.
- D. Where no single criterion is satisfied, but where Criteria B, C.1, and C.2 are all satisfied to 80 percent of the minimum values. Criterion C.3 is excluded from this condition.

**Option:**

<sup>05</sup> Other criteria that may be considered in an engineering study include:

- A. The need to control left-turn conflicts;
- B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes;
- C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiate the intersection unless conflicting cross traffic is also required to stop; and



- D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

## Section 2B.08 YIELD Sign (R1-2)

### Standard:

01 The YIELD (R1-2) sign (see Figure 2B-1) shall be a downward-pointing equilateral triangle with a wide red border and the legend YIELD in red on a white background.

### Support:

02 The YIELD sign assigns right-of-way to traffic on certain approaches to an intersection. Vehicles controlled by a YIELD sign need to slow down to a speed that is reasonable for the existing conditions or stop when necessary to avoid interfering with conflicting traffic.

## Section 2B.09 YIELD Sign Applications

### Option:

01 YIELD signs may be installed:

- A. On the approaches to a through street or highway where conditions are such that a full stop is not always required.
- B. At the second crossroad of a divided highway, where the median width at the intersection is 30 feet or greater. In this case, a STOP or YIELD sign may be installed at the entrance to the first roadway of a divided highway, and a YIELD sign may be installed at the entrance to the second roadway.
- C. For a channelized turn lane that is separated from the adjacent travel lanes by an island, even if the adjacent lanes at the intersection are controlled by a highway traffic control signal or by a STOP sign.
- D. At an intersection where a special problem exists and where engineering judgment indicates the problem to be susceptible to correction by the use of the YIELD sign.
- E. Facing the entering roadway for a merge-type movement if engineering judgment indicates that control is needed because acceleration geometry and/or sight distance is not adequate for merging traffic operation.

### Standard:

02 A YIELD (R1-2) sign shall be used to assign right-of-way at the entrance to a roundabout. YIELD signs at roundabouts shall be used to control the approach roadways and shall not be used to control the circulatory roadway.

03 Other than for all of the approaches to a roundabout, YIELD signs shall not be placed on all of the approaches to an intersection.

## Section 2B.10 STOP Sign or YIELD Sign Placement

### Standard:

01 The STOP or YIELD sign shall be installed on the near side of the intersection on the right-hand side of the approach to which it applies. When the STOP or YIELD sign is installed at this required location and the sign visibility is restricted, a Stop Ahead sign (see Section 2C.36) shall be installed in advance of the STOP sign or a Yield Ahead sign (see Section 2C.36) shall be installed in advance of the YIELD sign.

02 The STOP or YIELD sign shall be located as close as practical to the intersection it regulates, while optimizing its visibility to the road user it is intended to regulate.

02a YIELD signs shall not be erected upon the approaches to more than one of the intersecting streets. Refer to CVC 21356.

03 STOP signs and YIELD signs shall not be mounted on the same post.

04 No items other than inventory stickers, sign installation dates, and bar codes shall be affixed to the fronts of STOP or YIELD signs, and the placement of these items shall be in the border of the sign.

05 No items other than official traffic control signs, inventory stickers, sign installation dates, anti-vandalism stickers, and bar codes shall be mounted on the backs of STOP or YIELD signs.

06 No items other than retroreflective strips (see Section 2A.21) or official traffic control signs shall be mounted on the fronts or backs of STOP or YIELD signs supports.

# ATTACHMENT 3

08/01/2017 thru 07/31/2018

Include State Highways cases

Total Count: 1162

Jurisdiction(s): ALL

Report Run On: 08/03/2018

Primary Rd		TRIGGS ST		Distance (ft)	70	Direction	E	Secondary Rd	DUNCAN AV	NCIC	1900 State Hwy?	N	Route	Badge	534575	Collision Date	20170819	Postmile	Side of Hwy				
City	Commerce	County	Los Angeles	Population	3	Rpt Dist	0241	Type	0	CalTrans	0	Severely	PDO	NO UNUSL CND	Rdwy Cond2	0	Time	1340 Day SAT	Process Date	20180207			
Primary Collision Factor	DRVR ALCPDRG	Weather1	CLEAR	Motor Vehicle Involved With	PKD MV	Lighting	DAYLIGHT	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Process Date	20180207	Postmile	Side of Hwy			
Hit and Run																							
Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info			
Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	PRKD	998	-			PARKED	E	D	2200	TOYOT	2017	-	-	A	22107	-	-	-	-	-	-	-	-
2	DRVR	84	M	H	HBD-UJ	PROC ST	E	A	0700	JEEP	2003	-	-	-	-	-	-	-	-	-	-	-	-
Primary Rd		TRIGGS ST		Distance (ft)	27	Direction	E	Secondary Rd	MCDONNELL AV	NCIC	1900 State Hwy?	N	Route	Badge	610405	Collision Date	20171122	Postmile	Side of Hwy				
City	Commerce	County	Los Angeles	Population	3	Rpt Dist	0243	Type	0	CalTrans	0	Severely	PDO	NO UNUSL CND	Rdwy Cond2	0	Time	0800 Day WED	Process Date	20180214			
Primary Collision Factor	R-O-W AUTO	Weather1	CLEAR	Motor Vehicle Involved With	OTHER MV	Lighting	DAYLIGHT	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Process Date	20180214	Postmile	Side of Hwy			
Hit and Run																							
Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info			
Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	35	F	H	HNB	ENT TRAF	E	A	0100	INFIN	2003	-	-	3	N	-	-	-	-	-	-	-	-
2	DRVR	21	M	H	HNB	PROC ST	E	A	0700	SUZUK	2017	-	-	3	N	-	-	-	-	-	-	-	-
Primary Rd		TRIGGS ST		Distance (ft)	475	Direction	E	Secondary Rd	MCDONNELL AV	NCIC	1900 State Hwy?	N	Route	Badge	610421	Collision Date	20171203	Postmile	Side of Hwy				
City	Commerce	County	Los Angeles	Population	3	Rpt Dist	0241	Type	0	CalTrans	0	Severely	PDO	NO UNUSL CND	Rdwy Cond2	0	Time	1930 Day FRI	Process Date	20180216			
Primary Collision Factor	IMPROP TURN	Weather1	CLEAR	Motor Vehicle Involved With	PKD MV	Lighting	DARK - ST	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Process Date	20180216	Postmile	Side of Hwy			
Hit and Run																							
Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info			
Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	21	F	B	FATG	PROC ST	E	A	0100	TOYOT	2017	-	-	3	N	-	-	-	-	-	-	-	-
2	PRKD	998	-			PROC ST	E	A	0100	TOYOT	2017	-	-	-	-	-	-	-	-	-	-	-	-
Primary Rd		TRIGGS ST		Distance (ft)	0	Direction	E	Secondary Rd	SYDNEY DR	NCIC	1900 State Hwy?	N	Route	Badge	C11172	Collision Date	20170816	Postmile	Side of Hwy				
City	Commerce	County	Los Angeles	Population	3	Rpt Dist	0241	Type	0	CalTrans	0	Severely	PDO	NO UNUSL CND	Rdwy Cond2	0	Time	1400 Day WED	Process Date	20170914			
Primary Collision Factor	UNKNOWN	Weather1	CLEAR	Motor Vehicle Involved With	PKD MV	Lighting	DAYLIGHT	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Process Date	20170914	Postmile	Side of Hwy			
Hit and Run																							
Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info			
Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1	998	-				OTHER	W	A	0900	-	-	-	-	0	-	-	-	-	-	-	-	-	-
2	PRKD	998	-			PARKED	W	A	0700	FORD	2003	-	-	0	-	-	-	-	-	-	-	-	-
Primary Rd		TUBEWAY AV		Distance (ft)	112	Direction	E	Secondary Rd	SMITHWAY ST	NCIC	1900 State Hwy?	N	Route	Badge	610405	Collision Date	20180104	Postmile	Side of Hwy				
City	Commerce	County	Los Angeles	Population	3	Rpt Dist	0246	Type	0	CalTrans	0	Severely	PDO	NO UNUSL CND	Rdwy Cond2	0	Time	1100 Day THU	Process Date	20180517			
Primary Collision Factor	IMPROP PASS	Weather1	CLEAR	Motor Vehicle Involved With	OTHER MV	Lighting	DAYLIGHT	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Process Date	20180517	Postmile	Side of Hwy			
Hit and Run																							
Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info		Party Info			
Party Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	34	F	H	HNB	RGT TURN	N	A	0100	SUBAR	2017	-	-	3	N	-	-	-	-	-	-	-	-
2	DRVR	33	M	W	HNB	RGT TURN	N	A	0100	AUDI	2012	-	-	3	N	-	-	-	-	-	-	-	-

# ATTACHMENT 4

## City of Commerce Engineering and Traffic Survey Summary

Street: **TRIGGS ST EB**  
Limits: **MARIANNA AVE**  
**MCDONNELL AVE**

Field Observer: **EFI**  
Checked By: **EGF**  
Date: **8/8/2015**

Factors	Direction: <b>East</b>
<b>A. Prevailing Speed Data</b>	
Location of Survey	I-710 Underpass(E)
85th Percentile	32.4
10 mph Pace	25 - 34
Percent in Pace	92.0%
Posted Speed Limit	25
<b>B. Collision History</b>	
Date Range Covered	1/1/2012 To 12/31/2014 ( 3 Years )
Total Collisions	7
Collision Rate (Acc/MVM)	3.152
Expected Collision Rate	1.37
<b>C. Traffic Factors</b>	
Average Daily Traffic	5783
Length of Segment	1850
Lane Configuration	1 Ln Ea Dir Undivided
Street Classification	Major Collector
<b>D. Conditions Not Readily Apparent</b>	
Conditions	Numerous driveways, on street parking both sides, accident rate
Roadway Geometrics	None Apparent
Comments	Recommended speed limit per 85th% is 30 mph. Posted limit may be rounded down to the nearest 5 mph based on adjacent land use and roadway conditions. The roadway should remain at 25 mph per CVC 21400
<b>E. Adjacent Land Use</b>	
	RESIDENTIAL
Posted Speed Limit	25
Speed Limit Change?	No
Revised Speed Limit	
Approved and Authorized for release by City of Commerce - Traffic Engineering Department:	
	Date Loc. #



# ATTACHMENT 4

Prepared by NDS/ATD  
Prepared by National Data & Surveying Services

## VOLUME

Triggs St Bet. Marianna Ave & McDonnell Ave(W/O I-5 On-Off Ramp)

Day: Tuesday  
Date: 4/19/2016

City: Commerce  
Project #: CA16\_5225\_041

DAILY TOTALS						NB	SB	EB	WB	Total	
						0	0	3,801	1,982	5,783	
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00	0	0	8	4	12	12:00	0	0	24	39	63
00:15	0	0	2	8	10	12:15	0	0	22	32	54
00:30	0	0	6	3	9	12:30	0	0	32	23	55
00:45	0	0	3	19	22	12:45	0	0	23	101	124
01:00	0	0	3	6	9	13:00	0	0	24	24	48
01:15	0	0	3	7	10	13:15	0	0	34	26	60
01:30	0	0	4	4	8	13:30	0	0	48	33	81
01:45	0	0	1	11	12	13:45	0	0	41	147	188
02:00	0	0	5	3	8	14:00	0	0	32	41	73
02:15	0	0	2	4	6	14:15	0	0	40	38	78
02:30	0	0	5	3	8	14:30	0	0	49	37	86
02:45	0	0	2	14	16	14:45	0	0	57	178	235
03:00	0	0	6	12	18	15:00	0	0	86	30	116
03:15	0	0	3	5	8	15:15	0	0	129	18	147
03:30	0	0	4	5	9	15:30	0	0	129	37	166
03:45	0	0	2	15	17	15:45	0	0	134	478	612
04:00	0	0	5	3	8	16:00	0	0	130	30	160
04:15	0	0	6	3	9	16:15	0	0	148	24	172
04:30	0	0	10	4	14	16:30	0	0	126	36	162
04:45	0	0	12	33	45	16:45	0	0	150	554	704
05:00	0	0	10	5	15	17:00	0	0	184	17	201
05:15	0	0	18	11	29	17:15	0	0	142	24	166
05:30	0	0	26	30	56	17:30	0	0	155	25	180
05:45	0	0	31	85	116	17:45	0	0	159	640	799
06:00	0	0	20	18	38	18:00	0	0	147	29	176
06:15	0	0	32	21	53	18:15	0	0	123	21	144
06:30	0	0	29	16	45	18:30	0	0	98	21	119
06:45	0	0	28	109	137	18:45	0	0	83	451	534
07:00	0	0	36	23	59	19:00	0	0	50	18	68
07:15	0	0	42	30	72	19:15	0	0	38	40	78
07:30	0	0	25	29	54	19:30	0	0	29	40	69
07:45	0	0	26	129	155	19:45	0	0	26	143	169
08:00	0	0	36	30	66	20:00	0	0	28	41	69
08:15	0	0	32	24	56	20:15	0	0	19	27	46
08:30	0	0	24	25	49	20:30	0	0	24	45	69
08:45	0	0	29	121	150	20:45	0	0	18	89	107
09:00	0	0	24	13	37	21:00	0	0	22	34	56
09:15	0	0	23	24	47	21:15	0	0	27	23	50
09:30	0	0	28	27	55	21:30	0	0	27	20	47
09:45	0	0	29	104	133	21:45	0	0	18	94	112
10:00	0	0	25	19	44	22:00	0	0	20	24	44
10:15	0	0	24	24	48	22:15	0	0	12	15	27
10:30	0	0	20	24	44	22:30	0	0	12	10	22
10:45	0	0	30	99	129	22:45	0	0	14	58	72
11:00	0	0	23	24	47	23:00	0	0	9	13	22
11:15	0	0	27	26	53	23:15	0	0	8	7	15
11:30	0	0	25	31	56	23:30	0	0	7	10	17
11:45	0	0	26	101	127	23:45	0	0	4	28	32
TOTALS			840	716	1556	TOTALS			2961	1266	4227
SPLIT %			54.0%	46.0%	26.9%	SPLIT %			70.0%	30.0%	78.1%

DAILY TOTALS						NB	SB	EB	WB	Total	
						0	0	3,801	1,982	5,783	
AM Peak Hour		06:30	11:30	07:15	PM Peak Hour		17:00	19:15	17:00		
AM Pk Volume		185	128	238	PM Pk Volume		584	163	727		
Pk Hr Factor		0.804	0.615	0.826	Pk Hr Factor		0.918	0.861	0.904		
7 - 9 Volume		250	204	454	4 - 6 Volume		1194	202	1396		
7 - 9 Peak Hour		07:00	07:15	07:15	4 - 6 Peak Hour		17:00	16:00	17:00		
7 - 9 Pk Volume		129	109	238	4 - 6 Pk Volume		840	113	727		
Pk Hr Factor		0.768	0.908	0.826	Pk Hr Factor		0.870	0.799	0.904		

**Standard:**

07 The U.S. Secretary of Transportation, under authority granted by the Highway Safety Act of 1966, decreed that traffic control devices on all public streets and highways open to public travel (and privately owned and maintained roads or commercial establishments, if the particular city or county enacts an ordinance or resolution to this effect), in accordance with 23 U.S.C. 109(d) and 402(a) in each State shall be in substantial conformance with the Standards issued or endorsed by the FHWA.

**Support:**

08 The "Uniform Vehicle Code (UVC)" is one of the publications referenced in the MUTCD. The UVC contains a model set of motor vehicle codes and traffic laws for use throughout the United States.

**Guidance:**

09 The States should adopt Section 15-116 of the UVC, which states that, "No person shall install or maintain in any area of private property used by the public any sign, signal, marking, or other device intended to regulate, warn, or guide traffic unless it conforms with the State manual and specifications adopted under Section 15-104."

**Support:**

10 The Standard, Guidance, Option, and Support material described in this edition of the MUTCD provide the transportation professional with the information needed to make appropriate decisions regarding the use of traffic control devices on streets, highways, bikeways, and private roads open to public travel (see definition in Section 1A.13).

11 Throughout this Manual the headings Standard, Guidance, Option, and Support are used to classify the nature of the text that follows. Figures and tables, including the notes contained therein, supplement the text and might constitute a Standard, Guidance, Option, or Support. The user needs to refer to the appropriate text to classify the nature of the figure, table, or note contained therein.

11a The figures shown in the California MUTCD are typical or example applications of the traffic control devices to illustrate their use and manner. Criteria for position, location, and use of traffic control devices in the figures are furnished solely for the purpose of guidance, understanding and information, and are not a legal standard. Engineering judgment must be used to apply these guidelines to the typical or example applications, or adjust them to fit individual field site conditions. The California MUTCD is not intended to be a substitute for engineering knowledge, experience or judgment.

**Standard:**

12 When used in this Manual, the text headings of Standard, Guidance, Option, and Support shall be as defined in Paragraph 1 of Section 1A.13. For all purposes, regardless of the text heading, any sentence containing the verb shall or MUTCD text edited to the verb shall, shall be considered a Standard. Similarly, any sentence containing the verb should or MUTCD text edited to the verb should, shall be considered Guidance and any sentence containing the verb may or MUTCD text edited to the verb may, shall be considered an Option.

**Support:**

13 Throughout this Manual all dimensions and distances are provided in English units. Appendix A2 contains tables for converting each of the English unit numerical values that are used in this Manual to the equivalent Metric (International System of Units) values.

**Guidance:**

14 If Metric units are to be used in laying out distances or determining sizes of devices, such units should be specified on plan drawings and made known to those responsible for designing, installing, or maintaining traffic control devices.

14a In 1993, Caltrans had adopted the International System of Units as the preferred system of weights and measures to comply with federal law. The law was subsequently changed making the use of the Metric System optional. Caltrans made the decision in 2004 to readopt the U.S. Customary (English) system of units and measures as the preferred system. Guidance on the use of the Metric and U.S. Customary Systems of Measurement is available from Caltrans' Division of Design.

15 Except when a specific numeral is required or recommended by the text of a Section of this Manual, numerals displayed on the images of devices in the figures that specify quantities such as times, distances, speed limits, and weights should be regarded as examples only. When installing any of these devices, the numerals should be appropriately altered to fit the specific situation.