

## MEMORANDUM

June 17, 2022

To: Andrew S. Winje, P.E., City Engineer, City of Redondo Beach

From: Jorge Sanchez, Associate Transportation Engineer I, AGA Engineers, Inc.

**Subject: Request for Red Curb on 1900 S. Prospect Avenue**

St. Lawrence Catholic Church has expressed concern that it can be difficult to see oncoming vehicles on Prospect Avenue when leaving the church's north driveway due to vehicles parked along the east side on Prospect Avenue, south of the parking lot's exit, and has requested red curb to be installed on the east side of Prospect Avenue, south of the driveway (see **Figure 1**). At the study location, Prospect Avenue is a collector street with two travel lanes in each direction. The church's north driveway is located just north of the intersection of Prospect Avenue and Avenue G (all-way stop controlled). Based on the church's concern, a sight distance analysis was conducted at Prospect Avenue and the north driveway.



**Figure 1: Study Area**

There are two assessments of sight distance at roadway intersections, corner sight distance and stopping sight distance. The corner sight distance evaluates the required sight distance from the minor approach (driveway and/or side street) and the stopping sight distance evaluates the sight distance from the major approach. Per the Highway Design Manual, Section 405.1 - Corner Sight Distance 2d. Urban Driveways (see attached), corner sight distance requirements are not to be applied to urban driveways. Therefore, stopping sight distance analysis was utilized for this sight distance assessment.

The stopping sight distance was evaluated for northbound and southbound vehicles on Prospect Avenue and westbound vehicles exiting the parking lot. Prospect Avenue has a speed limit of 30 mph. Per the *Caltrans Highway Design Manual Table 201.1 – Sight Distance Standards* (see attached), a stopping sight distance of 200 feet was utilized based on the approach speed of 30 mph. However, for the northbound approach, motorists must stop at the intersection of Prospect Avenue and Avenue G. Based on field review, northbound vehicles cannot achieve a speed of 30 mph immediately after stopping at Avenue G. Therefore, an approach speed of 25 mph was utilized for the northbound approach. A stopping sight distance of 150 feet was utilized based on the northbound approach speed of 25 mph. Based on field evaluations, vehicles waiting to turn from the north driveway move out beyond the extension of the curb to look for oncoming traffic on Prospect Avenue. Therefore, the stopping sight distance analysis utilized the front of the westbound vehicle to be four feet of the curb line extension.

#### Northbound/Southbound Line of Sight- Westbound Vehicle Exiting North Driveway

Based on the stopping sight distance analysis (see **Figure 2**), the line of sight for northbound vehicles approaching the driveway (westbound vehicle) could be impeded by vehicles parked along the east side of Prospect Avenue, south of the north driveway. Therefore, it is recommended to install 20 feet of additional red curb to the existing 14 feet of red curb on the east side of Prospect Avenue, south of the north driveway. The line of sight for southbound vehicles approaching the north driveway (westbound vehicle) is not impeded by vehicles parked and/or objects along the east side of Prospect Avenue, north of the driveway.

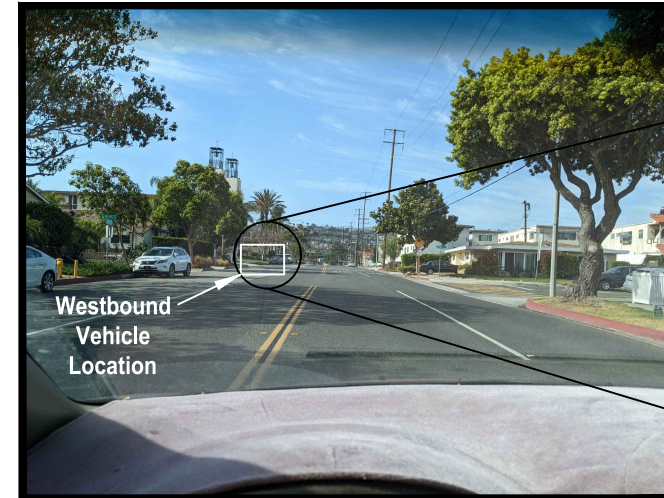
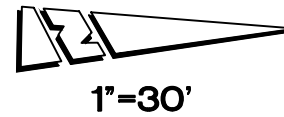
Collision data from the Statewide Integrated Traffic Records System (SWITRS) was also evaluated from January 1, 2019 through May 15, 2022. There was one collision recorded during this three-year period near the study location at Prospect Avenue and Avenue F. The collision was not related to the westbound/eastbound vehicles exiting the church's parking lot and unsafe speed was the primary factor of this collision. Attached is the SWITRS record of the collision.

Attachments – Highway Design Manual Section 405.1, Highway Design Manual Table 201.1 – Sight Distance Standards, SWITRS collision data





Typical Northbound Approach



Typical Southbound Approach



\* Nose of vehicle is 4' from curb line extension

**Highway Design Manual  
Section 405.1 Sight Distance**

**Attachment**





July 1, 2020

- (5) *Lock To Lock Time* - The time in seconds that an average driver would take under normal driving conditions to turn the steering wheel of a vehicle from the lock position on one side to the lock position on the other side. The default in AutoTurn software is 6 seconds.
- (6) *Steering Lock Angle* - The maximum angle that the steering wheels can be turned. It is further defined as the average of the maximum angles made by the left and right steering wheels with the longitudinal axis of the vehicle.
- (7) *Articulating Angle* - The maximum angle between the tractor and semitrailer.

## Topic 405 – Intersection Design Standards

### 405.1 Sight Distance

(1) *Stopping Sight Distance*. See Index 201.1 for minimum stopping sight distance requirements.

(2) *Corner Sight Distance*.

- (a) General. At unsignalized intersections a substantially clear line of sight should be maintained between the driver of a vehicle, bicyclist or pedestrian stopped on the minor road and the driver of an approaching vehicle on the major road that has no stop. Line of sight for all users should be included in right of way, in order to preserve sight lines.

See DIB 79 for 2R, 3R, certain storm damage, protective betterment, operational, and safety projects on two-lane and three-lane conventional highways.

Adequate time should be provided for the stopped vehicle on the minor road to either cross all lanes of through traffic, cross the near lanes and turn left, or turn right, without requiring through traffic to radically alter their speed. The visibility required for these maneuvers form a clear sight triangle with the corner sight distance  $b$  and the crossing distance  $a_1$  or  $a_2$  (see Figure 405.1 as an example of corner sight distance at a two-lane, two-way highway). Dimensions  $a_1$  and  $a_2$  are measured from the decision point to the center of the lane. The actual number of lanes will vary on the major and minor roads. There should be no sight obstruction within the clear sight triangle.

The methodology used for the driver on the minor road that is stopped to complete the necessary maneuver while the approaching vehicle travels at the design speed of the major road is based on gap-acceptance behavior. A 7-1/2 second criterion is applied to a passenger car (including pickup trucks) for a left turn from a stop on the minor road. However, this time gap does not account for a single-unit truck (no semitrailer), a combination truck (see Index 404.4 for truck tractor-semitrailer guidance), a right-turn from a stop, or for a crossing maneuver. See Table 405.1A for the time gap that addresses these situations for the assumed design vehicle making these maneuvers from the minor road.

In determining corner sight distance, a set back distance for the vehicle waiting on the minor road must be assumed as measured from the edge of traveled way of the major road. Set back for the driver of the vehicle on the minor road should be a minimum of 10 feet plus the shoulder width of the major road but not less than 15 feet. The location of the driver's eye for the set back is the decision point per Figure 405.1. Corner sight distance and the driver's eye set back are also illustrated in Figures 405.7 and 504.3I. Line of sight for corner sight distance for passenger cars is to be determined from a 3 and 1/2-foot height at the location of the driver of the vehicle in the center of the minor road lane to a 3 and 1/2-foot object height in the center of the approaching outside lane of the major road. This provides for reciprocal sight by both vehicles. The passenger

car driver's eye height should be applied to all minor roads. In addition, a truck driver's eye height of 7.6 feet should be applied to the minor road where applicable. Additionally, if the major road has a median barrier, a 2-foot object height should be used to determine the median barrier set back. A median that is wide enough to accommodate a stopped vehicle should also provide a clear sight triangle.

The minimum corner sight distance (feet) should be determined by the equation:  $1.47V_mT_g$ , where  $V_m$  is the design speed (mph) of the major road and  $T_g$  is the time gap (seconds) for the minor road vehicle to enter the major road. The values given in Table 405.1A should be used to determine  $T_g$  based on the design vehicle, the type of maneuver, and whether the stopped vehicle's rear wheels are on an upgrade exceeding 3 percent. The distance from the edge of traveled way to the rear wheels at the minor road stop location should be assumed as: 20 feet for a passenger car, 30 feet for a single-unit truck, and 72 feet for a combination truck.

- (b) Public Road Intersections (Refer to Topic 205 and Index 405.7); corner sight distance applies, see Table 405.1A.

At signalized intersections the corner sight distances should also be applied whenever possible. Even though traffic flows are designed to move at separate times, unanticipated conflicts can occur due to violation of signal, right turns on red, malfunction of the signal, or use of flashing red/yellow mode.

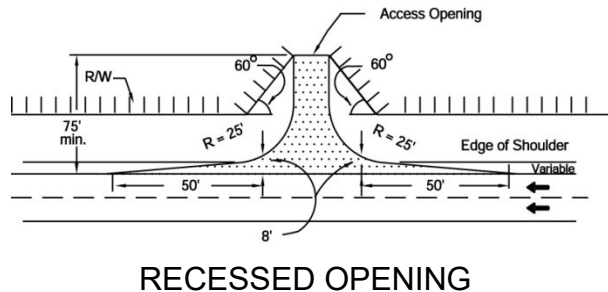
The minimum value for corner sight distance at signalized intersections should be equal to the stopping sight distance as given in Table 201.1, measured as previously described. This includes an urban driveway that forms a leg of the signalized intersection.

- (c) Private Road Intersections (Refer to Index 205.2) and Rural Driveways (Refer to Index 205.4); corner sight distance applies, see Table 405.1A. If signalized, the minimum corner sight distance should be equal to the stopping sight distance as given in Table 201.1, measured as previously described.
- (d) Urban Driveways (Refer to Index 205.3); corner sight distance requirements as described above are not applied to urban driveways unless signalized. See Index 405.1(2)(b) underlined standard. If parking is allowed on the major road, parking should be prohibited on both sides of the driveway per the California MUTCD, 3B.19.
- (3) Decision Sight Distance. At intersections where the State route turns or crosses another State route, the decision sight distance values given in Table 201.7 should be used. In computing and measuring decision sight distance, the 3.5-foot eye height and the 0.5-foot object height should be used, the object being located on the side of the intersection nearest the approaching driver.

The application of the various sight distance requirements for the different types of intersections is summarized in Table 405.1B

### Figure 205.1

## Access Openings on Expressways



NOTES:

- By widening the expressway shoulder, deceleration lanes may be provided where justified.
- This detail, without the recess, may be used on conventional highways.

## 205.3 Urban Driveways

These instructions apply to the design of driveways to serve property abutting on State highways in cities or where urban type development is encountered.

Details for driveway construction are shown on the Standard Plans. Corner sight distance requirements are not applied to urban driveways. See Index 405.1(2) for further information.

- (1) *Correlation with Local Standards.* Where there is a local requirement regulating driveway construction, the higher standard will normally govern.
- (2) *Driveway Width.* The width of driveways for both residential and commercial usage is measured at the throat, exclusive of any flares. ("W" as shown in Standard Plan A87A).
- (3) *Residential Driveways.* The width of single residential driveways should be 12 feet minimum and 20 feet maximum. The width of a double residential driveway such as used for multiple dwellings should be 20 feet minimum and 30 feet maximum. The width selected should be based on an analysis of the anticipated volume, type and speed of traffic, location of buildings and garages, width of street, etc.
- (4) *Commercial Driveways.* Commercial driveways should be limited to the following maximum widths:
  - (a) When the driveway is used for one-way traffic, the maximum width should be 25 feet. If the driveway serves a large parcel, where large volumes of vehicles or large vehicles are expected, the entrance maximum width should be 40 feet and the exit maximum width should be 35 feet.
  - (b) When the driveway is used for two-way traffic, the maximum width should be 35 feet. If the driveway serves a large parcel, where large volumes of vehicles or large vehicles are expected, then the maximum width should be 45 feet.
  - (c) When only one driveway serves a given property, in no case should the width of the driveway including the side slope distances exceed the property frontage.
  - (d) When more than one driveway is to serve a given property, the total width of all driveways should not exceed 70 percent of the frontage where such a frontage is 100 feet or less. Where the frontage is more than 100 feet, the total driveway width

**Highway Design Manual  
Table 201.1 Sight Distance Standards**

**Attachment**





July 1, 2020

**Table 201.1****Sight Distance Standards**

Design Speed <sup>(1)</sup> (mph)	Stopping <sup>(2)</sup> (ft)	Passing (ft)
10	50	---
15	100	---
20	125	800
25	150	950
30	200	1,100
35	250	1,300
40	300	1,500
45	360	1,650
50	430	1,800
55	500	1,950
60	580	2,100
65	660	2,300
70	750	2,500
75	840	2,600
80	930	2,700

Notes:

<sup>(1)</sup>See Topic 101 for selection of design speed.<sup>(2)</sup>For sustained downgrades, refer to underlined standard in Index 201.3

The sight distance available for passing at any place is the longest distance at which a driver whose eyes are 3 ½ feet above the pavement surface can see the top of an object 4 ¼ feet high on the road. See Table 201.1 for the calculated values that are associated with various design speeds.

In general, 2-lane highways should be designed to provide for passing where possible, especially those routes with high volumes of trucks or recreational vehicles. Passing should be done on tangent horizontal alignments with constant grades or a slight sag vertical curve. Not only are drivers reluctant to pass on a long crest vertical curve, but it is impracticable to design crest vertical curves to provide for passing sight distance because of high cost where crest cuts are involved. Passing sight distance for crest vertical curves is 7 to 17 times longer than the stopping sight distance.

Ordinarily, passing sight distance is provided at locations where combinations of alignment and profile do not require the use of crest vertical curves.

# **Statewide Integrated Traffic Records System (SWITRS) Report**

**Attachment**



Does not include State Highway cases

Report Run On: 06/01/2022

Primary Rd PHELAN LN		Distance (ft)	156.	Direction	N	Secondary Rd GATES AV		NCIC	1956	State Hwy?	N	Route		Postmile Prefix		Postmile		Side of Hwy							
City	Redondo Beach	County	Los Angeles	Population	5	Rpt Dist	55	Beat	004	Type	0	CalTrans	Badge	1292	Collision Date	20210306	Time	2500	Day SAT						
Primary Collision Factor		IMPROP TURN		Violation	22107	Collision Type		SIDESWIPE		Severity	PDO	#Killed	0	#Injured	0	Tow Away?		Process Date 20210416							
Weather1	CLEAR	Weather2		Rdwy Surface DRY		Rdwy Cond1		NO UNUSL CND		Rdwy Cond2		Spec Cond		0											
Hit and Run		MSDMNR		Motor Vehicle Involved With		PKD MV		Lighting	DAYLIGHT	Ped Action		Cntrl Dev		NT PRS/FCTR		Loc Type		Ramp/Int							
Party Info														Victim Info											
Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	998	-		IMP UNK	IMP UNK	UNS TURN	-	-	9900	-	-	-	N	-	-	-								
2	PRKD	998	-				PARKED	-	D	2200	-	2021	-	N	-	-	-								

Primary Rd PHELAN LN		Distance (ft)	1.00	Direction	N	Secondary Rd GRANT AV		NCIC	1956	State Hwy?	N	Route		Postmile Prefix		Postmile		Side of Hwy							
City	Redondo Beach	County	Los Angeles	Population	5	Rpt Dist	43	Beat	003	Type	0	CalTrans	Badge	1335	Collision Date	20210909	Time	1600	Day THU						
Primary Collision Factor		UNSAFE SPEED		Violation	22350	Collision Type		REAR END		Severity	PDO	#Killed	0	#Injured	0	Tow Away?		Process Date 20211019							
Weather1	CLEAR	Weather2		Rdwy Surface DRY		Rdwy Cond1		NO UNUSL CND		Rdwy Cond2		Spec Cond		0											
Hit and Run		MSDMNR		Motor Vehicle Involved With		OTHER MV		Lighting	DAYLIGHT	Ped Action		Cntrl Dev		FNCTNG		Loc Type		Ramp/Int							
Party Info														Victim Info											
Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	65	F	W	IMP UNK	IMP UNK	PROC ST	S	A	0100	-	1999	-	-	N	-	-	-							
2	DRVR	44	F	A	HNBD		STOPPED	S	A	0800	-	2015	-	3	N	-	M	G							

Primary Rd PROSPECT AV		Distance (ft)	0.00	Direction		Secondary Rd AVENUE F		NCIC	1956	State Hwy?	N	Route		Postmile Prefix		Postmile		Side of Hwy							
City	Redondo Beach	County	Los Angeles	Population	5	Rpt Dist	04	Beat	001	Type	0	CalTrans	Badge	1183	Collision Date	20211017	Time	2000	Day SUN						
Primary Collision Factor		UNSAFE SPEED		Violation	22350	Collision Type		REAR END		Severity	PDO	#Killed	0	#Injured	0	Tow Away?		Process Date 20211115							
Weather1	CLEAR	Weather2		Rdwy Surface DRY		Rdwy Cond1		NO UNUSL CND		Rdwy Cond2		Spec Cond		0											
Hit and Run		MSDMNR		Motor Vehicle Involved With		OTHER MV		Lighting	DARK - ST	Ped Action		Cntrl Dev		NT PRS/FCTR		Loc Type		Ramp/Int							
Party Info														Victim Info											
Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	998	F	H	IMP UNK	IMP UNK	PROC ST	S	A	0700	-	-	3	N	-	-	-								
2	DRVR	43	M	W	HNBD		RGT TURN	S	A	0100	-	1962	-	3	N	-	P	C							

Primary Rd PROSPECT AV		Distance (ft)	182.	Direction	S	Secondary Rd CAMINO REAL		NCIC	1956	State Hwy?	N	Route		Postmile Prefix		Postmile		Side of Hwy							
City	Redondo Beach	County	Los Angeles	Population	5	Rpt Dist	5	Beat	001	Type	0	CalTrans	Badge	1244	Collision Date	20210209	Time	1745	Day TUE						
Primary Collision Factor		UNSAFE SPEED		Violation	22350	Collision Type		HIT OBJECT		Severity	PDO	#Killed	0	#Injured	0	Tow Away?		Process Date 20210413							
Weather1	CLEAR	Weather2		Rdwy Surface DRY		Rdwy Cond1		NO UNUSL CND		Rdwy Cond2		Spec Cond		0											
Hit and Run		MSDMNR		Motor Vehicle Involved With		FIXED OBJ		Lighting	DARK - ST	Ped Action		Cntrl Dev		NT PRS/FCTR		Loc Type		Ramp/Int							
Party Info														Victim Info											
Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	22	M	B	HNBD		LFT TURN	S	A	0100	FORD	1998	-	3	A	22107	N	M	G						

Primary Rd PROSPECT AV		Distance (ft)	0.00	Direction		Secondary Rd DEL AMO ST		NCIC	1956	State Hwy?	N	Route		Postmile Prefix		Postmile		Side of Hwy							
City	Redondo Beach	County	Los Angeles	Population	5	Rpt Dist	26	Beat	002	Type	0	CalTrans	Badge	1183	Collision Date	20211206	Time	0751	Day MON						
Primary Collision Factor		STOP SGN SIG		Violation	21453A	Collision Type		BROADSIDE		Severity	INJURY	#Killed	0	#Injured	2	Tow Away?		Process Date 20220105							
Weather1	FOG	Weather2		Rdwy Surface DRY		Rdwy Cond1		NO UNUSL CND		Rdwy Cond2		Spec Cond		0											
Hit and Run		MSDMNR		Motor Vehicle Involved With		OTHER MV		Lighting	DAYLIGHT	Ped Action		Cntrl Dev		FNCTNG		Loc Type		Ramp/Int							
Party Info														Victim Info											
Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	39	F	W	HNBD		PROC ST	S	A	0700	FORD	1999	-	3	N	-	M	G	DRVR	COMP PN 39	F	1	0	M	G
2	DRVR	50	F	B	HNBD		PROC ST	E	A	0100	-	2013	-	3	N	-	L	G	DRVR	COMP PN 50	F	1	0	L	G