



May 23, 2022

Mr. Vatsal Patel, PE  
Senior Engineer  
City of San Carlos  
600 Elm Street  
San Carlos, CA 94070

## **Crosswalk Warrants for Alameda de Las Pulgas/Hilltop Drive and 1650 Industrial Road**

Dear Mr. Patel;

As requested, W-Trans has prepared a warrant analysis to determine the potential need for new pedestrian crosswalks at two locations in the City of San Carlos: Alameda de Las Pulgas/Hilltop Drive and midblock near 1650 Industrial Road (24-hour Fitness). The purpose of this letter is to document the existing conditions, data obtained, analysis performed, and present the results of the evaluation.

### **Existing Conditions**

A site evaluation was conducted on Friday, February 25, 2022, to confirm the physical characteristics of the roadway and observe the behavior of all users, including pedestrians and motorists.

Alameda de Las Pulgas/Hilltop Drive is an offset four-way intersection with De Anza Avenue adding a *de facto* fifth leg just north of Hilltop Drive. Alameda de Las Pulgas is a two-lane minor arterial street traversing several residential neighborhoods in San Carlos. Alameda de Las Pulgas is 45 feet wide with 10.5-foot-wide travel lanes, 5-foot-wide bicycle lanes, and 7-foot-wide parking lanes on each side. The posted speed limit is 30 mph. Hilltop Drive and De Anza Avenue are both two-lane local streets with on-street parking available on both sides. At the intersection with Alameda de Las Pulgas, the Hilltop Drive and De Anza Avenue approaches are stop controlled. No crossings are currently delineated for pedestrians at the intersection and only two curb ramps currently exist, one at each corner of the northern Hilltop Drive leg. The unmarked crossing connecting these two ramps is approximately 75 feet long.

Industrial Road is a four-lane minor arterial street providing access to the abutting commercial businesses located along either side as well as connecting with Whipple Avenue, Brittan Avenue, Holly Street, and Harbor Boulevard. Industrial Road is 50 feet wide and has a posted speed limit of 35 mph. Each travel lane is 10-feet wide with 5-foot-wide Class II bicycle lanes in each direction. North of 1650 Industrial Road, intermittent parking bays are located along both sides of the street which widen Industrial Road by eight feet outside of the bicycle lanes.

### **Measured Speeds**

At the time of the site visit, a spot speed survey sampling of 179 vehicles on Alameda de Las Pulgas (74 in the southbound direction and 105 in the northbound direction), resulted in an 85<sup>th</sup>-percentile speed of 35 mph for both directions. These observed speeds are about 5 mph higher than the posted speed limit of 30 mph. On Industrial Road, a speed survey sampling 174 vehicles (71 in the southbound direction and 103 in the northbound direction) resulted in an 85<sup>th</sup>-percentile speed of 39 mph for southbound and 41 mph for northbound travel. These observed speeds are about 5 mph higher than the posted speed limit of 35 mph. A summary of individual speed measurements is enclosed for both locations.

## Vehicle and Pedestrian Counts

Vehicle counts on Alameda de Las Pulgas and Industrial Road were conducted on Wednesday, February 2, 2022, for a 24-hour period to establish typical travel patterns and levels of traffic demand. According to these counts, approximately 9,900 vehicles use Alameda de Las Pulgas on a typical weekday and 11,400 vehicles use Industrial Road. Summaries of these counts are enclosed.

Vehicle, bicycle, and pedestrian turning movement counts were also conducted at Alameda de Las Pulgas/Hilltop Drive on Wednesday, February 2, 2022, from 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. For both the a.m. and p.m. count periods, fourteen bicycle trips were observed through the intersection in addition to thirty-eight pedestrian trips, four of which were pedestrian trips across Alameda de Las Pulgas during the a.m. peak hour. A summary of the turning movement counts is enclosed.

A pedestrian crossing study was conducted on Wednesday, February 2, 2022, between 4:00 and 6:00 p.m. in the vicinity of 1650 Industrial Road to determine where pedestrians are choosing to cross and how many pedestrians are currently utilizing the unmarked crossing along the segment of Industrial Road between Washington Street and Bing Street. Thirty-six pedestrians and three cyclists were observed crossing this segment of Industrial Road during the p.m. peak period, with nineteen pedestrians and one cyclist crossing in the peak hour between 4:00 and 5:00 p.m. The most popular crossing location, with 26 pedestrian crossings, was observed to be between Washington Street and the 24-hr Fitness driveway, north of 1650 Industrial Road. A summary of pedestrian and cyclist crossings is provided in Table 1.

**Table 1 – Observed Pedestrian/Cyclist Crossings at Industrial Road (4:00 to 6:00 p.m.)**

Segment Limits	Number of Pedestrians			Number of Cyclists		
	EB	WB	Total	EB	WB	Total
Washington St to 24-hr Fitness South Dwy	10	16	26	0	0	0
24-hr Fitness South Dwy to Young's Auto Supply Center Dwy	0	3	3	0	3	3
Young's Auto Supply Center Dwy to Bing St	2	5	7	0	0	0
<b>Total</b>	<b>12</b>	<b>24</b>	<b>36</b>	<b>0</b>	<b>3</b>	<b>3</b>

Note: EB = Eastbound, WB = Westbound

## Collision Analysis

The collision histories for the study areas were reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is from May 1, 2016, to April 30, 2021. Caltrans computes collision rates at intersections based on the number of crashes per the number of vehicles entering the intersection (collisions per million vehicles entering, c/mve). Similarly, for segments the collision rate is measured as collisions per million vehicle miles (c/mvm), which considers the number of collisions, average daily traffic, and length of the segment. The collision rate for the five-year study periods was lower than the Statewide average as published in the *2018 Collision Data on California State Highways*, Caltrans, on Alameda de Las Pulgas/Hilltop Drive since there were no reported collisions during this period. This equates to a collision rate of 0.00 c/mve. Fifteen crashes were documented on the segment of Industrial Road between G Street and American Street, two involving pedestrian right-of-way violations. This segment of Industrial Road, which is approximately 0.39 miles long, had a crash rate of 1.85 collisions per million

vehicle miles (c/mvm), which is greater than the statewide average crash rate for similar facilities. A summary is provided in Table 2. The Collision Report Summaries for both locations are enclosed.

**Table 2 – Collision Summary**

Location	Number of Collisions	Collision Rate	Statewide Average Collision Rate for Similar Facilities
Alameda de Las Pulgas/Hilltop Dr	0	0.00 c/mve	0.14 c/mve
Industrial Rd between G St and American St	15	1.85 c/mvm	0.94 c/mvm

Notes: c/mve = collisions per million vehicles entering; c/mvm = collisions per million vehicle miles

## Sight Distance Evaluation

The stopping sight distance needed for a following driver to stop if there is a vehicle ahead is evaluated based on stopping sight distance criterion, the approach speed and slope of the street under evaluation.

For the measured critical speed of 35 mph with a positive grade on Alameda de Las Pulgas, the recommended stopping sight distance is 250 feet as stipulated in Table 201.1 of the *Highway Design Manual* published by Caltrans. The northbound Alameda de Las Pulgas approach to the Hilltop Drive intersection contains a crest vertical curve that ends at the limits of the intersection. The southbound approach follows level terrain. Sight distances along Alameda de Las Pulgas through the intersection were measured in excess of 300 feet. These sight distances are considered adequate as they are greater than the minimum required distance of 250 feet.

Sight distance along Industrial Road was evaluated to determine suitability for future crosswalk improvements and to judge sight requirements for turning movements into driveways from Industrial Road. The recommended sight distance on Industrial Road is 300 feet based on the observed critical speed of 40 mph. Since no horizontal or vertical curves exist along the Industrial Road alignment that would limit sight distance in either direction, sight lines exceed 300 feet in both directions and therefore the minimum sight distance requirement is met.

## Crosswalk Warrant Analysis

As a preliminary step to evaluate the potential use of enhancements at crossings for pedestrians, warrant analyses were conducted for the study locations of Alameda de Las Pulgas/Hilltop Drive and Industrial Road relative to need for a High-intensity Activated crossWalk (HAWK), Rectangular Rapid Flash Beacons (RRFB), or other intersection crossing enhancements.

The analysis was based on the HAWK warrants from the *California Manual on Uniform Traffic Control Devices* (CA MUTCD) as well as the "Guidelines for Pedestrian Crossing Treatments" from the National Cooperative Highway Research Program (NCHRP) Report 562. These methodologies use the volume of pedestrian crossings, the volume of vehicle traffic, vehicle travel speeds and pedestrian crossing distance to determine whether enhanced pedestrian crossing facilities are appropriate. According to this calculation, neither of the study locations would currently meet the warrants for a HAWK signal. Alameda de Las Pulgas at Hilltop Drive does not meet any crosswalk warrants while the area near 1650 Industrial Road does satisfy the criteria for active/enhanced crossing treatments, such as rectangular rapid flashing beacons (RRFB), flashing warning lights, and/or traffic calming measures such as refuge islands. Additional warrants are generally not met since pedestrian crossing volumes are relatively low. However, given the lack of existing pedestrian infrastructure in the immediate area as well as input from the public describing a desire for additional pedestrian facilities, it is likely that the existing vehicle traffic conditions are a deterrent to pedestrians attempting to cross the street.

Therefore, a sensitivity analysis was conducted to determine the number of pedestrians that would need to be present during the peak hour for each location to meet warrants for enhancements. From this analysis it was concluded that sixteen additional pedestrians would need to cross Alameda de las Pulgas during the peak hour to meet the warrant for a crosswalk. The crossing at Industrial Road would meet the warrants for a HAWK signal with an increase of twenty-four pedestrians during the peak hour. Given the characteristics of the surrounding land uses and destinations (e.g., White Oaks Elementary School, Trinity Presbyterian Church, bus stops, commercial businesses), combined with the observed pedestrian activity, it is reasonable to assume that the number of pedestrian crossings at these locations would increase with improved pedestrian infrastructure creating a preferred pedestrian route. Therefore, a striped crosswalk is recommended at Alameda de Las Pulgas and a crosswalk with active/enhanced crossing treatments are recommended at Industrial Road.

## **Pedestrian Crossing Treatment**

The recommended striped crosswalk across Alameda de Las Pulgas would need to be placed approximately 20 feet north of the northwest curb return due to utility conflicts. The installation should include advance warning signs (such as the R1-5, W11-2 and W16-9P signs) and pavement markings (crosswalk lines and appropriate yield lines) consistent with the most recent standards from the MUTCD, Chapter 3B. It is also recommended that the 70-foot crossing distance across the eastern leg of Hilltop Drive be reduced by installing a pedestrian refuge island consistent with the recommendations from the NCHRP P562 analysis. The island can be constructed using either standard raised concrete curbs or if desired, the Dura-Curb © Raised Separator System or similar product. It is also possible to stripe the center refuge island with hatched or decorative striping and provide flexposts to delineate the area. Modifications to the existing pavement striping to accommodate the new crosswalk and pedestrian refuge would be necessary. The NCHRP pedestrian crossing worksheets are enclosed.

For crossings across Industrial Road, it is recommended that a crosswalk be established in front of the 24-hour Fitness and placed south of the main driveway. The crosswalk can be positioned between existing tree wells to maintain existing trees. In addition to the crosswalk, advance warning signs (such as the R1-5, W11-2 and W16-9P signs) and pavement markings (crosswalk lines and appropriate yield lines) consistent with the most recent standards from the MUTCD, Chapter 3B should be installed. To further enhance pedestrian safety, solar-powered RRFB devices consistent with FHWA Interim Approval 21 should be placed adjacent to the crosswalk.

Example layout sketches for both locations are enclosed.

## **Conclusions and Recommendations**

- Approximately 9,900 vehicles use Alameda de Las Pulgas near its intersection with Hilltop Drive and 11,400 use Industrial Road in the study area during a typical weekday.
- Observed speeds at both locations are approximately 5 mph higher than the posted speed limit.
- While the collision rate at Alameda de Las Pulgas/Hilltop Drive was lower than the Statewide average for similar facilities, the rate for Industrial Road exceeded the average rate.
- Based on the observed vehicle speeds, the sight distances are adequate along Alameda de Las Pulgas and Industrial Road.
- To accommodate safe pedestrian crossings across Alameda de Las Pulgas it is recommended that a crosswalk with advance signing be established north of the northwest leg of the intersection.
- Installation of a pedestrian refuge island on the eastern leg of Hilltop Drive at Alameda de Las Pulgas is recommended.

- An installation including a crosswalk with appropriate markings and RRFB is recommended on Industrial Road south of the main driveway to the 24-hour Fitness center.

Thank you for giving W-Trans the opportunity to provide these services. Please call if you have any questions.

Sincerely,



Nick Brunetto, EIT  
Assistant Engineer



Kenny Jeong, PE  
Senior Engineer



Mark Spencer, PE  
Senior Principal



MES/kbj/nb/SCA900-17.L1

Enclosures: Vehicle Speed Observations, Peak-Hour Vehicle Turning Movement Counts, 24-hour Vehicle Counts, P.M. Peak Pedestrian Crossing Counts, Collision Report Summaries, TCRP NCHRP Worksheets, and Conceptual Layout Sketches

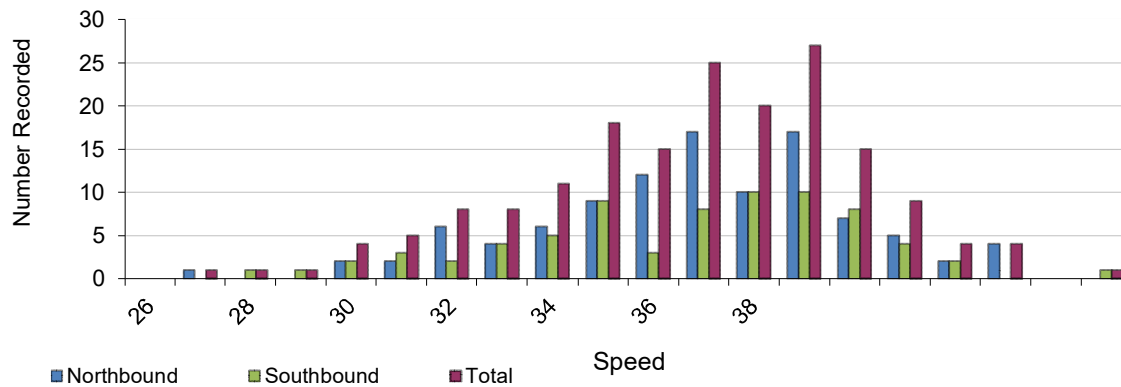
# San Carlos, CA Speed Survey

**Street:** Alameda de Las Pulgas **From:** Saint Francis Way **To:** Hilltop Dr

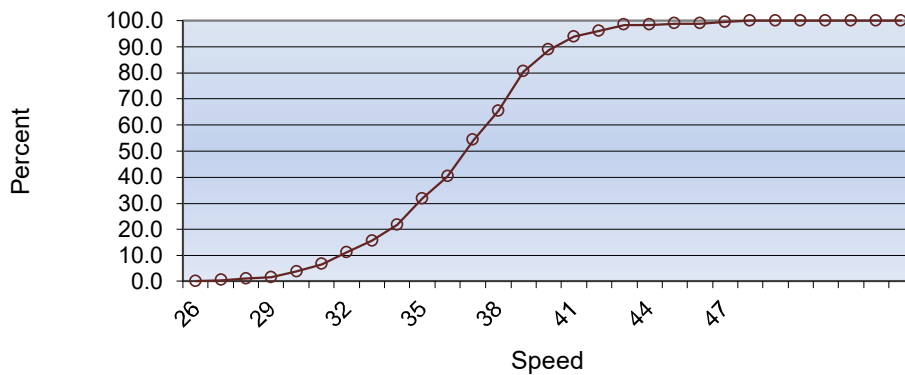
## Summary of Output

<b>Overall</b>	Vehicles Sampled:	179
	85th Percentile Speed:	35 mph
	Mean (50th Percentile) Speed:	32 mph
	Pace:	26 to 36 mph
<b>Northbound</b>	Vehicles Sampled:	105
	85th Percentile Speed:	35 mph
	Mean (50th Percentile) Speed:	32 mph
	Pace:	27 to 37 mph
<b>Southbound</b>	Vehicles Sampled:	74
	85th Percentile Speed:	35 mph
	Mean (50th Percentile) Speed:	32 mph
	Pace:	27 to 37 mph

## Speed Profile



## Cumulative Speed Profile



**Date Data Collected:** February 25, 2022 **Start Time:** 3:35 PM **Weather:** Sunny  
**Day of the Week:** Friday **End Time:** 3:55 PM **Recorder:** NB

# San Carlos, CA Speed Survey

**Street:** Industrial Road

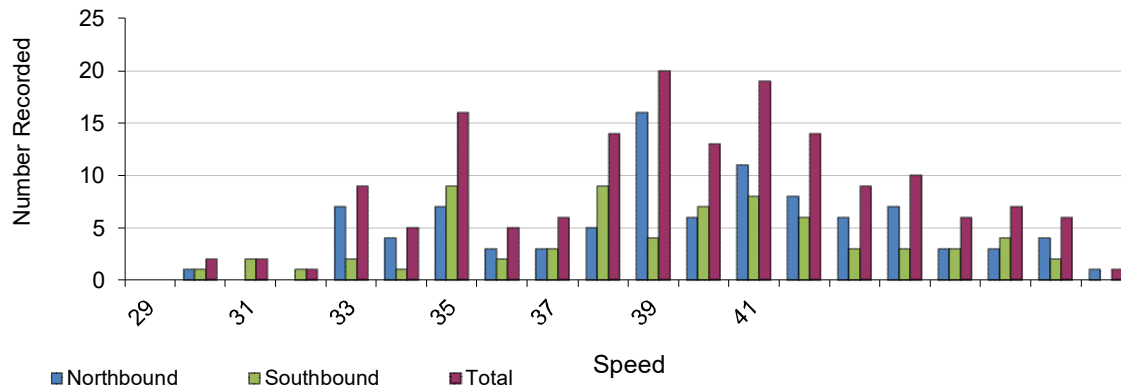
**From:** Washington Street

**To:** Bing Street

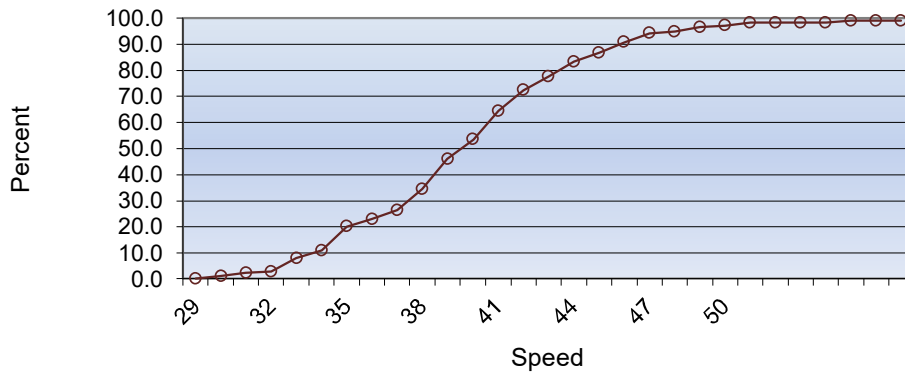
## Summary of Output

<b>Overall</b>	Vehicles Sampled:	174
	85th Percentile Speed:	40 mph
	Mean (50th Percentile) Speed:	35 mph
	Pace:	29 to 39 mph
<b>Northbound</b>	Vehicles Sampled:	103
	85th Percentile Speed:	41 mph
	Mean (50th Percentile) Speed:	35 mph
	Pace:	29 to 39 mph
<b>Southbound</b>	Vehicles Sampled:	71
	85th Percentile Speed:	39 mph
	Mean (50th Percentile) Speed:	35 mph
	Pace:	29 to 39 mph

## Speed Profile



## Cumulative Speed Profile



**Date Data Collected:**  
**Day of the Week:**

February 25, 2022  
Friday

**Start Time:** 4:37 PM  
**End Time:** 4:57 PM

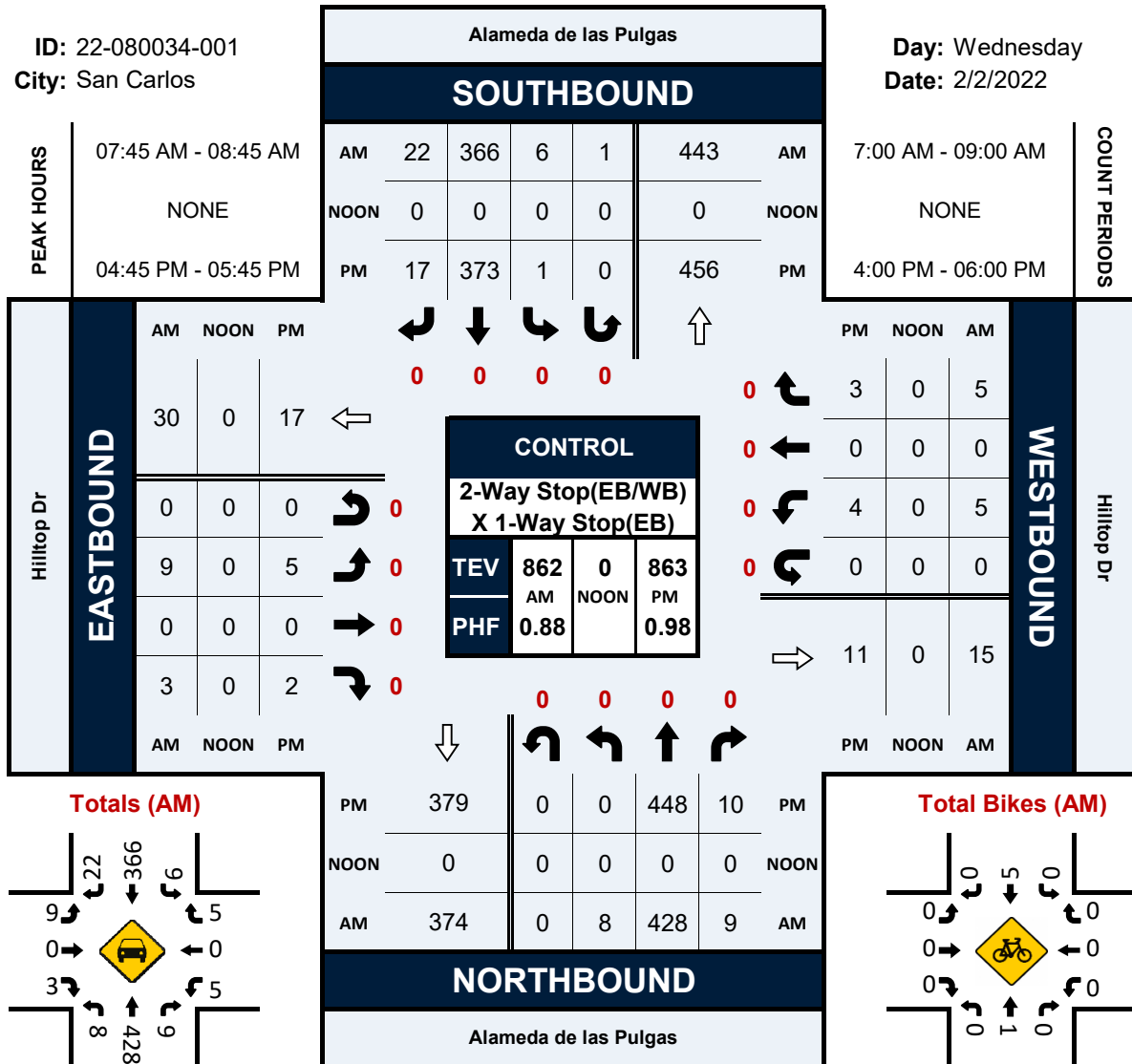
**Weather:** Sunny  
**Recorder:** NB

## Alameda de las Pulgas &amp; Hilltop Dr

## Peak Hour Turning Movement Count

ID: 22-080034-001  
City: San Carlos

Day: Wednesday  
Date: 2/2/2022





**VOLUME**

Alameda de las Pulgas Bet. Hilltop Dr &amp; St Francis Way

Day: Wednesday  
Date: 2/2/2022City: San Carlos  
Project #: CA22\_080035\_001

DAILY TOTALS					NB	SB	EB					WB	Total
					5,398	4,447						0	0
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL		
0:00	3	0			3	12:00	115	76			191		
0:15	0	2			2	12:15	92	68			160		
0:30	1	1			2	12:30	98	88			186		
0:45	2	6	4	7	6	12:45	89	394	94	326	183		
1:00	1	1			2	13:00	105	73			178		
1:15	0	0			0	13:15	96	91			187		
1:30	1	0			1	13:30	85	80			165		
1:45	1	3	0	1	1	13:45	96	382	75	319	171		
2:00	1	0			1	14:00	68	94			162		
2:15	2	1			3	14:15	97	74			171		
2:30	1	1			2	14:30	95	88			183		
2:45	1	5	0	2	1	14:45	130	390	100	356	230		
3:00	0	1			1	15:00	131	87			218		
3:15	1	0			1	15:15	106	102			208		
3:30	1	0			1	15:30	131	90			221		
3:45	3	5	0	1	3	15:45	139	507	104	383	243		
4:00	0	0			0	16:00	138	107			245		
4:15	2	0			2	16:15	119	89			208		
4:30	2	0			2	16:30	110	90			200		
4:45	2	6	7	7	9	16:45	122	489	98	384	220		
5:00	3	2			5	17:00	110	105			215		
5:15	3	7			10	17:15	109	105			214		
5:30	10	9			19	17:30	132	84			216		
5:45	5	21	11	29	16	17:45	136	487	88	382	224		
6:00	6	12			18	18:00	114	97			211		
6:15	11	21			32	18:15	87	63			150		
6:30	18	14			32	18:30	71	56			127		
6:45	35	70	34	81	69	18:45	98	370	52	268	150		
7:00	22	41			63	19:00	63	35			98		
7:15	65	52			117	19:15	62	32			94		
7:30	82	85			167	19:30	52	55			107		
7:45	97	266	94	272	191	19:45	51	228	34	156	85		
8:00	114	119			233	20:00	40	35			75		
8:15	122	86			208	20:15	39	29			68		
8:30	115	94			209	20:30	31	30			61		
8:45	96	447	72	371	168	20:45	29	139	20	114	49		
9:00	87	69			156	21:00	28	31			59		
9:15	72	66			138	21:15	24	15			39		
9:30	92	82			174	21:30	18	15			33		
9:45	76	327	73	290	149	21:45	19	89	10	71	29		
10:00	71	71			142	22:00	19	11			30		
10:15	80	66			146	22:15	12	8			20		
10:30	88	73			161	22:30	10	7			17		
10:45	102	341	69	279	171	22:45	5	46	4	30	9		
11:00	76	68			144	23:00	7	4			11		
11:15	98	85			183	23:15	3	4			7		
11:30	85	68			153	23:30	7	4			11		
11:45	102	361	83	304	185	23:45	2	19	2	14	4		
TOTALS	1858	1644			3502	TOTALS	3540	2803			6343		
SPLIT %	53.1%	46.9%			35.6%	SPLIT %	55.8%	44.2%			64.4%		

DAILY TOTALS				NB		SB		EB				WB		Total	
				5,398		4,447						0		0	
AM Peak Hour	7:45	7:45			7:45	PM Peak Hour	15:30	15:15			15:15				
AM Pk Volume	448	393			841	PM Pk Volume	527	403			917				
Pk Hr Factor	0.918	0.826			0.902	Pk Hr Factor	0.948	0.942			0.936				
7 - 9 Volume	713	643	0	0	1356	4 - 6 Volume	976	766	0	0	1742				
7 - 9 Peak Hour	7:45	7:45			7:45	4 - 6 Peak Hour	16:00	16:30			16:00				
7 - 9 Pk Volume	448	393	0	0	841	4 - 6 Pk Volume	489	398	0	0	873				
Pk Hr Factor	0.918	0.826	0.000	0.000	0.902	Pk Hr Factor	0.886	0.948	0.000	0.000	0.891				

**VOLUME**

Industrial Rd Bet. Washington St &amp; Bing St

Day: Wednesday  
Date: 2/2/2022City: San Carlos  
Project #: CA22\_080035\_002

DAILY TOTALS					NB	SB					EB	WB	Total
					7,252	4,129					0	0	11,381
AM Period	NB	SB	EB	WB	TOTAL		PM Period	NB	SB	EB	WB	TOTAL	
0:00	6	5			11		12:00	138	79			217	
0:15	1	0			1		12:15	141	79			220	
0:30	7	6			13		12:30	138	78			216	
0:45	4	18	2	13	6	31	12:45	136	553	85	321	221	874
1:00	3	8			11		13:00	156	69			225	
1:15	0	2			2		13:15	144	78			222	
1:30	1	3			4		13:30	130	67			197	
1:45	0	4	4	17	4	21	13:45	140	570	64	278	204	848
2:00	3	3			6		14:00	144	78			222	
2:15	2	2			4		14:15	146	72			218	
2:30	1	2			3		14:30	127	73			200	
2:45	3	9	3	10	6	19	14:45	106	523	95	318	201	841
3:00	5	5			10		15:00	131	82			213	
3:15	4	2			6		15:15	137	83			220	
3:30	3	10			13		15:30	143	106			249	
3:45	7	19	6	23	13	42	15:45	127	538	76	347	203	885
4:00	5	6			11		16:00	144	109			253	
4:15	2	14			16		16:15	124	106			230	
4:30	13	12			25		16:30	144	107			251	
4:45	20	40	10	42	30	82	16:45	156	568	79	401	235	969
5:00	23	20			43		17:00	127	70			197	
5:15	21	11			32		17:15	149	86			235	
5:30	38	12			50		17:30	150	71			221	
5:45	47	129	21	64	68	193	17:45	124	550	78	305	202	855
6:00	42	17			59		18:00	120	66			186	
6:15	62	26			88		18:15	96	55			151	
6:30	53	17			70		18:30	73	50			123	
6:45	101	258	47	107	148	365	18:45	105	394	61	232	166	626
7:00	90	40			130		19:00	80	40			120	
7:15	101	34			135		19:15	51	30			81	
7:30	104	49			153		19:30	68	28			96	
7:45	120	415	71	194	191	609	19:45	65	264	35	133	100	397
8:00	138	48			186		20:00	45	26			71	
8:15	112	51			163		20:15	45	19			64	
8:30	138	72			210		20:30	37	37			74	
8:45	128	516	60	231	188	747	20:45	38	165	27	109	65	274
9:00	121	70			191		21:00	37	24			61	
9:15	103	55			158		21:15	30	16			46	
9:30	107	65			172		21:30	23	11			34	
9:45	127	458	78	268	205	726	21:45	18	108	11	62	29	170
10:00	116	74			190		22:00	16	9			25	
10:15	114	66			180		22:15	13	12			25	
10:30	123	81			204		22:30	4	3			7	
10:45	144	497	60	281	204	778	22:45	5	38	7	31	12	69
11:00	175	69			244		23:00	14	4			18	
11:15	132	84			216		23:15	7	2			9	
11:30	136	93			229		23:30	3	5			8	
11:45	146	589	82	328	228	917	23:45	5	29	3	14	8	43
TOTALS	2952	1578			4530		TOTALS	4300	2551			6851	
SPLIT %	65.2%	34.8%			39.8%		SPLIT %	62.8%	37.2%			60.2%	

DAILY TOTALS					NB	SB					EB	WB	Total
					7,252	4,129					0	0	11,381
AM Peak Hour	11:00	11:15			11:00		PM Peak Hour	16:45	16:00			16:00	
AM Pk Volume	589	338			917		PM Pk Volume	582	401			969	
Pk Hr Factor	0.841	0.909			0.940		Pk Hr Factor	0.933	0.920			0.958	
7 - 9 Volume	931	425	0	0	1356		4 - 6 Volume	1118	706	0	0	1824	
7 - 9 Peak Hour	8:00	7:45			7:45		4 - 6 Peak Hour	16:45	16:00			16:00	
7 - 9 Pk Volume	516	242	0	0	750		4 - 6 Pk Volume	582	401	0	0	969	
Pk Hr Factor	0.935	0.840	0.000	0.000	0.893		Pk Hr Factor	0.933	0.920	0.000	0.000	0.958	

## Crosswalk, Jaywalking Study

**Location:** Industrial Rd Bet. Washington St & Bing St  
**City:** San Carlos

**Date** 2/2/2022  
**Day** Wednesday

TIME	Peds					
	Zone 1		Zone 2		Zone 3	
	EB	WB	EB	WB	EB	WB
4:00 PM	0	3	0	1	2	2
4:15 PM	2	1	0	1	0	0
4:30 PM	1	1	0	0	0	1
4:45 PM	2	1	0	0	0	1
5:00 PM	1	2	0	0	0	0
5:15 PM	2	1	0	0	0	1
5:30 PM	0	2	0	1	0	0
5:45 PM	2	5	0	0	0	0
<b>Totals</b>	<b>10</b>	<b>16</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>5</b>

TIME	Bikes					
	Zone 1		Zone 2		Zone 3	
	EB	WB	EB	WB	EB	WB
4:00 PM	0	0	0	0	0	0
4:15 PM	0	0	0	1	0	0
4:30 PM	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0
5:30 PM	0	0	0	2	0	0
5:45 PM	0	0	0	0	0	0
<b>Totals</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>



**Alameda de Las Pulgas at Hilltop Dr  
San Carlos, San Mateo County**

**Collision Report Summary**

2/8/2022

Date Range Reported: 5/1/16 - 4/30/21

Total Number of Collisions: 0

Total Number of Persons Injured:

Total Number of Persons Killed:

Page 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.
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**Industrial Rd from G St to American St  
San Carlos, San Mateo County**

**Collision Report Summary**

2/8/2022

Date Range Reported: 5/1/16 - 4/30/21

Total Number of Collisions: 15

Total Number of Persons Injured: 14

Total Number of Persons Killed: 0

Page 1

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.
8063623	5/16/16	13:48	Industrial Rd & Bing St	222'	South	Broadside	Other Motor Vehicle	North	Making U Turn	Not Stat	Proceeding Straight	Improper Turning	0	0
8168947	8/31/16	00:57	Industrial Rd & Center St	0'	In Int.	Head-On	Other Object	South	Ran Off Road	Not Stat	Not Stated	Improper Turning	2	0
8182527	9/22/16	14:30	Center St & Industrial Rd	0'	In Int.	Sideswipe	Other Motor Vehicle	Not State	Making Left Turn	East	Not Stated	Unsafe Speed	0	0
8182855	9/29/16	05:55	Industrial Rd & Washington St	149'	South	Head-On	Other Motor Vehicle	North	Making Left Turn	North	Proceeding Straight	Auto R/W Violation	1	0
8172625	9/30/16	09:16	Industrial Rd & Washington St	0'	In Int.	Rear-End	Other Motor Vehicle	North	Crossed Into Opposing	North	Not Stated	Unsafe Speed	1	0
8163581	10/22/16	07:44	Industrial Rd & America St	30'	South	Hit Object	Fixed Object	East	Proceeding Straight			Driving Under Influence	1	0
8172161	11/4/16	09:50	Industrial Rd & Washington Av	175'	South	Vehicle - Pedestrian	Pedestrian	North	Proceeding Straight	East	Not Stated	Pedestrian Violation	1	0
8311216	2/17/17	19:18	Industrial Rd & Washington St	47'	South	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Making Left Turn	Driving Under Influence	1	0
8329169	3/10/17	16:42	Industrial Rd & Washington St	3'	North	Sideswipe	Other Motor Vehicle	South	Making Right Turn	South	Proceeding Straight	Unsafe Lane Change	1	0
8462447	8/10/17	14:54	Industrial Rd & American St	298'	South	Broadside	Bicycle	North	Not Stated	North	Proceeding Straight	Improper Turning	1	0
8854264	3/4/19	10:40	Industrial Rd & Washington St	132'	South	Sideswipe	Parked Motor Vehicle	South	Proceeding Straight	South	Parked	Improper Turning	1	0
8826176	3/14/19	06:37	American St & Industrial Rd	7'	East	Vehicle - Pedestrian	Pedestrian	East	Proceeding Straight	Not Stat	Not Stated	Ped R/W Violation	1	0

Report#	Date	Time	Location	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Dir. of Travel 1	Movement Prec. Coll. 1	Dir. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil.
8946865	9/18/19	19:39	Industrial Rd & Washington St	151'	South	Head-On	Other Motor Vehicle	North	Making Left Turn	South	Proceeding Straight	Improper Turning	1	0
9082958	3/12/20	07:10	Industrial Rd & Washington St	12'	East	Broadside	Other Motor Vehicle	North	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	1	0
9093669	4/7/20	10:06	Industrial Rd & Bing St	111'	South	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Slowing/Stopping	Unsafe Speed	1	0

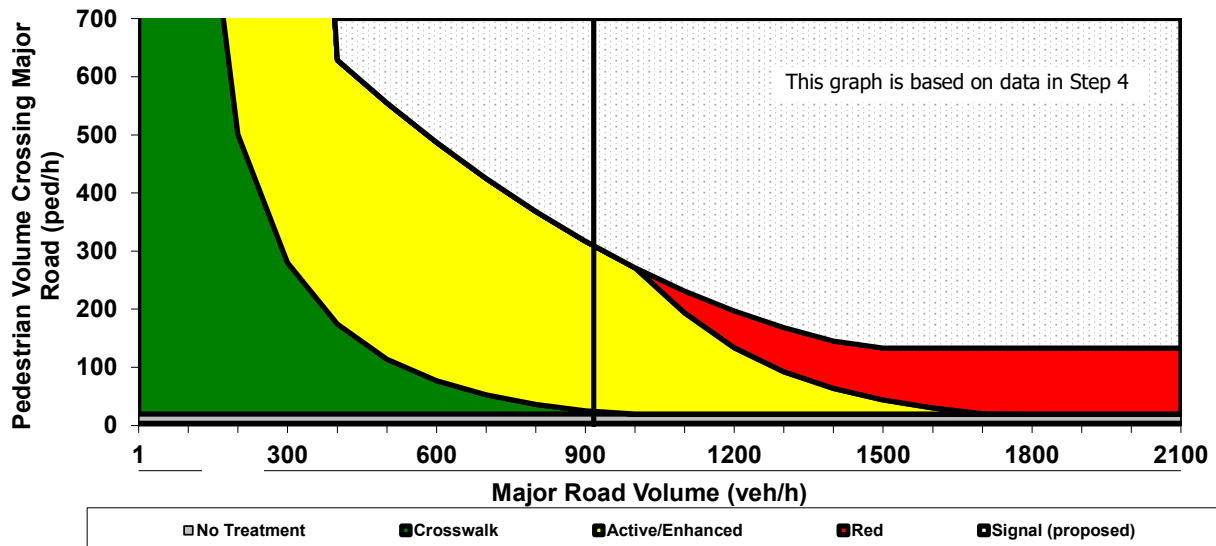
## GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

### Key

	Blue fields contain descriptive information.
	Green fields are required and must be completed.
	Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
	Gray fields are automatically calculated and should not be edited.

Analyst and Site Information			
Analyst	Nick Brunetto	Major Street	Alameda de Las Pulgas
Analysis Date	February 14, 2022	Minor Street or Location	Hilltop Drive
Data Collection Date	February 2, 2022	Peak Hour	3:15 PM
<b>Step 1: Select worksheet:</b>			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		1a	35
Is the population of the surrounding area <10,000? (enter <b>YES</b> or <b>NO</b> )		1b	NO
<b>Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?</b>			
Peak-hour pedestrian volume (ped/h), $V_p$		2a	4
<b>Result: Consider raised median islands, curb extensions, traffic calming, etc. as feasible.</b>			
<b>Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?</b>			
Major road volume, total of both approaches during peak hour (veh/h), $V_{maj-s}$		3a	917
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		3b	309
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		3c	309
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter <b>YES</b> or <b>NO</b> )		3d	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50%.		% rate of reduction for 3c (up to 50%)	3e 0%
		Reduced value or 3c	3f 309
<b>Result:</b>			
<b>Step 4: Estimate pedestrian delay.</b>			
Pedestrian crossing distance, curb to curb (ft), L		4a	45
Pedestrian walking speed (ft/s), $S_p$ (suggested speed = 3.5 ft/s)		4b	3.5
Pedestrian start-up time and end clearance time (s), $t_s$ (suggested start-up time = 3 sec)		4c	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), $t_c$		4d	15.8
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), $V_{maj-d}$		4e	917
Major road flow rate (veh/s), v		4f	0.25
Average pedestrian delay (s/person), $d_p$		4g	188
Total pedestrian delay (h), $D_p$ The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		4h	0.2
		4i	
<b>Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.</b>			
Expected motorist compliance at pedestrian crossings in region: enter <b>HIGH</b> for High Compliance or <b>LOW</b> for Low Compliance		5a	HIGH
<b>Treatment Category:</b>		<b>Consider raised median islands, curb extensions, traffic calming, etc. as feasible.</b>	



This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

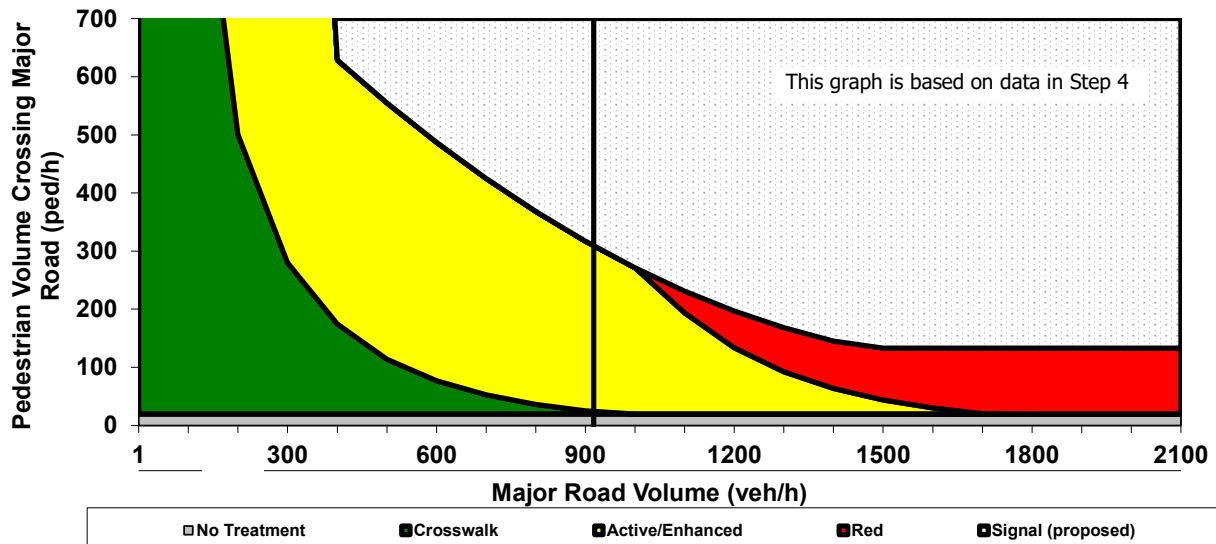
## GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

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Analyst and Site Information			
Analyst	Nick Brunetto	Major Street	Alameda de Las Pulgas
Analysis Date	February 14, 2022	Minor Street or Location	Hilltop Drive
Data Collection Date	February 2, 2022	Peak Hour	3:15 PM
<b>Step 1: Select worksheet:</b>			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		1a	35
Is the population of the surrounding area <10,000? (enter <b>YES</b> or <b>NO</b> )		1b	NO
<b>Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?</b>			
Peak-hour pedestrian volume (ped/h), $V_p$		2a	20
<b>Result: Go to step 3.</b>			
<b>Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?</b>			
Major road volume, total of both approaches during peak hour (veh/h), $V_{maj-s}$		3a	917
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		3b	309
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		3c	309
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter <b>YES</b> or <b>NO</b> )		3d	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50%.		% rate of reduction for 3c (up to 50%)	3e 0%
		Reduced value or 3c	3f 309
<b>Result: The signal warrant is not met. Go to step 4.</b>			
<b>Step 4: Estimate pedestrian delay.</b>			
Pedestrian crossing distance, curb to curb (ft), L		4a	45
Pedestrian walking speed (ft/s), $S_p$ (suggested speed = 3.5 ft/s)		4b	3.5
Pedestrian start-up time and end clearance time (s), $t_s$ (suggested start-up time = 3 sec)		4c	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), $t_c$		4d	15.8
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), $V_{maj-d}$		4e	917
Major road flow rate (veh/s), v		4f	0.25
Average pedestrian delay (s/person), $d_p$		4g	188
Total pedestrian delay (h), $D_p$ The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		4h	1.0
		4i	
<b>Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.</b>			
Expected motorist compliance at pedestrian crossings in region: enter <b>HIGH</b> for High Compliance or <b>LOW</b> for Low Compliance			5a HIGH
<b>Treatment Category:</b>		<b>CROSSWALK</b>	



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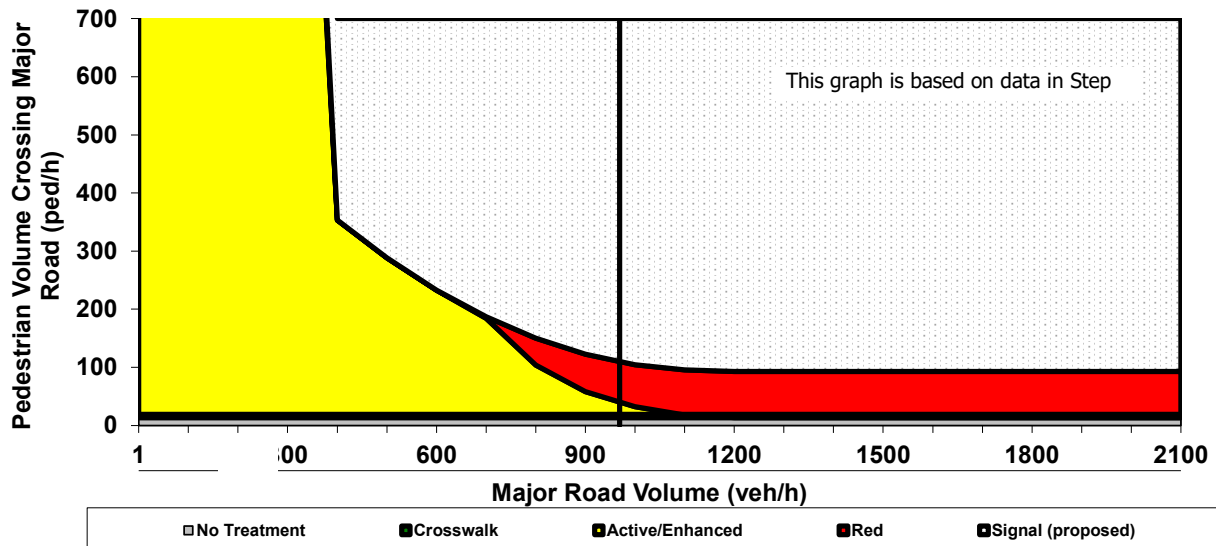
## GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

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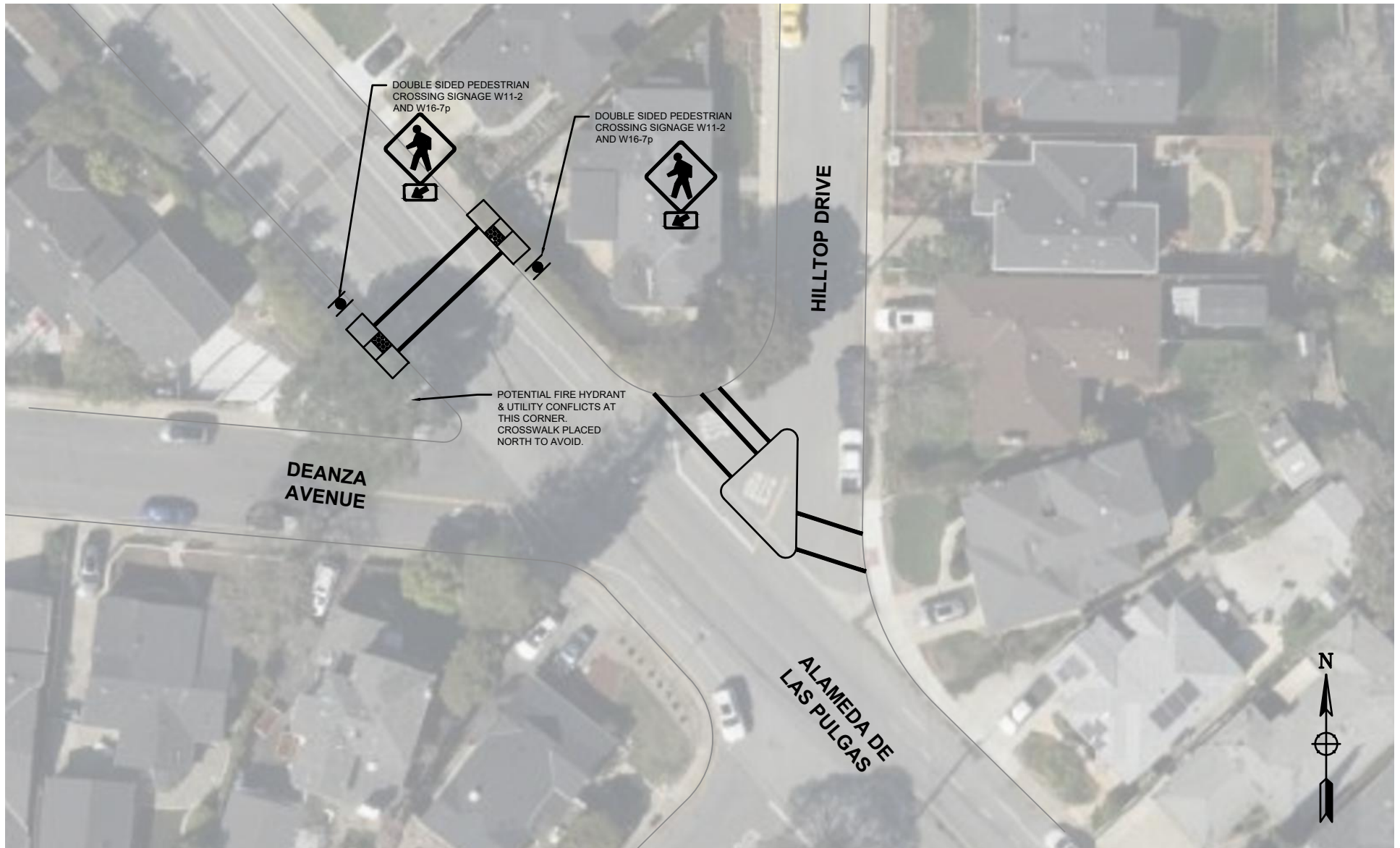
### Key

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Analyst and Site Information			
Analyst	Nick Brunetto	Major Street	Industrial Road
Analysis Date	February 14, 2022	Minor Street or Location	1650 Industrial Road
Data Collection Date	February 2, 2022	Peak Hour	4:00 PM
<b>Step 1: Select worksheet:</b>			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		1a	36
Is the population of the surrounding area <10,000? (enter <b>YES</b> or <b>NO</b> )		1b	NO
<b>Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?</b>			
Peak-hour pedestrian volume (ped/h), $V_p$		2a	19
<b>Result: Go to step 3.</b>			
<b>Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?</b>			
Major road volume, total of both approaches during peak hour (veh/h), $V_{maj-s}$		3a	969
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		3b	109
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		3c	109
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter <b>YES</b> or <b>NO</b> )		3d	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50%.		% rate of reduction for 3c (up to 50%)	3e 0%
		Reduced value or 3c	3f 109
<b>Result: The signal warrant is not met. Go to step 4.</b>			
<b>Step 4: Estimate pedestrian delay.</b>			
Pedestrian crossing distance, curb to curb (ft), L		4a	50
Pedestrian walking speed (ft/s), $S_p$ (suggested speed = 3.5 ft/s)		4b	3.5
Pedestrian start-up time and end clearance time (s), $t_s$ (suggested start-up time = 3 sec)		4c	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), $t_c$		4d	17.2
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), $V_{maj-d}$		4e	969
Major road flow rate (veh/s), $v$		4f	0.38
Average pedestrian delay (s/person), $d_p$		4g	1795
Total pedestrian delay (h), $D_p$ The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		4h	9.5
		4i	
<b>Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.</b>			
Expected motorist compliance at pedestrian crossings in region: enter <b>HIGH</b> for High Compliance or <b>LOW</b> for Low Compliance		5a	HIGH
<b>Treatment Category:</b>		<b>ACTIVE OR ENHANCED</b>	



This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.



## ALAMEDA DE LAS PULGAS CONCEPT

