



City of Santa Barbara  
Public Works Department – Engineering Division

**Memorandum**

**DATE:** January 26, 2012  
**TO:** Christine Andersen, Public Works Director  
**VIA:** Pat Kelly, Assistant Public Works Director/City Engineer  
**FROM:** Derrick Bailey, Supervising Transportation Engineer  
**SUBJECT:** Technical Analysis of Pedestrian Crossing Treatment Alternatives for Milpas and Ortega Streets, and Milpas and Yanonali Streets

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**Objective**

The objective of this memorandum is to present an analysis of options for pedestrian crossing treatments at Milpas and Ortega Streets, and at Milpas and Yanonali Streets.

The options presented in this memorandum are viable engineering solutions. Enforcement and education are also important components of a comprehensive solution.

Policies contained within the Santa Barbara Pedestrian Master Plan that pertain to this project, include the following:

Policy 1.2: The City shall improve pedestrian safety and comfort at intersections.

Policy 1.5: The City shall assist neighborhoods that desire to improve pedestrian access to, from, and within their neighborhoods.

**Background**

Fatal Pedestrian Involved Crash

At approximately 21:15 on October 7, 2011, Sergio Romero was killed while crossing Milpas Street at Ortega Street. Sergio was westbound in the south crosswalk. He had been waiting at the transit stop for northbound Milpas, on the northeast corner of the intersection, and after seeing his friend onto the bus, attempted to cross back over Milpas Street. A southbound vehicle in the number 1 lane stopped for Sergio. A second southbound vehicle, in the number 2 southbound lane travelling at approximately 50mph (30mph speed limit), passed vehicle number 1, did not yield to Sergio, and hit him in the crosswalk.

Community Meetings

City staff members attended the Neighborhood Advisory Committee (NAC) meeting on November 2, 2011, and a community meeting jointly organized by the Coalition for Sustainable Transportation (COAST), Pueblo, and the Milpas Community Association (MCA) on November 16, 2011. At both

meetings, the City received many comments about the difficulty crossing Milpas Street at Ortega and Yanonali Streets. The community is asking for improved crossing conditions at both intersections. The most common request was for a traffic signal.

### Action Taken To Date

As an initial response to improve conditions, the City is working with the Santa Barbara Metropolitan Transit District (MTD) to evaluate removing or relocating the northbound transit stop at the intersection of Milpas and Ortega Streets, and the southbound transit stop at the intersection of Milpas and Yanonali Streets, to signalized locations. This will reduce the number of pedestrians attempting to cross Milpas. Other treatments are presented in this memo.

### **Discussion**

#### Analysis of Various Types of Pedestrian Treatments for Milpas Street

The purpose of a traffic control device is to provide traffic (vehicles, bikes, pedestrians) with information so they can make good decisions while traveling. The five basic requirements for any traffic control device:

- Fulfill a need,
- Command attention,
- Convey a clear, simple meaning,
- Command respect from roadway users, and,
- Give adequate response time.

An improperly placed traffic control device runs the risk of being ignored by drivers, which can result in lower than typical compliance rates and an increased risk of crashes.

#### Ideas Considered, But Not Recommended

##### *Marked Crosswalks and Warning Signs (Existing Conditions)*

The existing ladder style crosswalks and florescent green warning signs are not adequate traffic control devices at Milpas and Ortega Streets, and at Milpas and Yanonali Streets, due to the number of lanes to cross, traffic speeds, and traffic volumes. These devices are not creating the desired driver yielding behavior. Additional signs or markings would not make a noticeable difference in crossing conditions.

##### *Traffic Signals*

The purpose of a traffic signal is to assign right of way between different movements. A traffic signal should only be installed if efficiency and overall traffic safety would be improved. Traffic signal installations should be considered very carefully because there can be some negative effects on traffic, including:

- Increased driver delay, especially locations with low side street traffic volumes, such as Ortega Street and Yanonali Street.
- Potential for increased collision frequency, especially rear end and red light running (broadside) related collisions.

Because side street traffic volumes are low at both intersections, a traffic signal would increase driver delay for both the main street and side street traffic. Due to spacing or adjacent signalized intersections, the ability to provide two-way progression on Milpas Street would be significantly impacted.

Installation of traffic signals does not always result in reduced crash frequency. In fact, the frequency of crashes can increase at intersections that have low existing crash frequencies. Typically, when a traffic signal is installed, the number of rear end type collisions increases. Also, even though driver compliance with traffic signals is quite high, a small number of drivers can periodically disregard traffic signals (red light running) and that can result in a broadside collision.

A comparison was performed between the unsignalized intersections of Milpas and Ortega Streets, and Milpas and Yanonali Streets, and signalized intersections along Milpas Street between Quinientos and Canon Perdido Streets. Data for a three year period between October 2008 and October 2011 was used to determine the total number of rear end, and broadside crashes. The data is presented in the table below.

**Total Number of Crashes (All Modes), By Type and Intersection  
October 2008 through October 2011**

Type of Crash	Milpas/Ortega	Milpas/Yanonali	Average of Other Milpas Intersections*
Rear End	2	2	2
Broadside	1	1	2.6

\* Average number of crashes at signalized intersections along Milpas Street between Quinientos and Canon Perdido

Signalized intersections along Milpas Street between Quinientos and Canon Perdido, on average, have 2.5 times the number of broadside crashes that occur at Milpas and Ortega Streets, and at Milpas and Yanonali Streets. Broadside crashes usually result in more severe damage than other types of crashes. Typically, we would expect the number of rear end collisions to be higher at signalized intersections, but in this example, the frequencies are about equal.

Because of increased driver delay and the potential for increased frequency of crashes, traffic operations would not be improved at these intersections, and therefore, non signalized alternatives should be pursued.

In addition to the risk of increased crash frequency, the City would also face increased liability exposure if an unwarranted traffic signal were installed. As the owner of intersections, the City is frequently subject to claims resulting from traffic collisions. As a defense, the City can claim design immunity if the intersection was designed and is operated using recognized State of California and

national standards. In this case, recognized State of California and national standards say that a traffic signal is not warranted.

#### *Pedestrian Over/Underpass*

An overpass or underpass for pedestrians would be cost prohibitive, with expected costs being in the millions of dollars. Constructability of the crossing would be difficult due to the length of the required approach ramps, and the constrained right of way available. An overpass would also not fit in with the character of the neighborhood.

#### Viable Alternatives for Milpas – North End

##### *Alternative #1 - Remove Existing Crosswalks at Ortega*

Statistically speaking, removing the marked crosswalks would likely result in fewer pedestrians involved crashes compared with existing conditions. Pedestrians would likely cross with more caution or use adjacent signalized intersections. Removing marked crosswalks would not increase the number of crossing opportunities for pedestrians.

##### *Alternative #2 - Median Refuge Island and Pedestrian Activated Flashing Lights*

Providing median refuge islands would allow pedestrians to cross half the road at a time. From a pedestrian perspective, finding an acceptable gap in one direction of traffic at a time is easier than finding a gap for both directions.

Creating space for a median refuge on Milpas Street will be challenging. Currently, the configuration of Milpas Street is as follows:

- Total width (face of curb to face of curb) = 64 feet
  - Two – seven foot wide parking lanes (one northbound, one southbound)
  - Four – ten foot wide through traffic lanes (two northbound, two southbound)
  - One – ten foot wide center turn lane

These lane widths are the minimum acceptable, and there is no opportunity to further narrow lanes to create more space. Therefore, creating room for a median refuge island will require removing one of the lanes listed above. Options are as follows:

- Prohibit parking near the intersections
- Remove a traffic lane
- Remove left turn access

One median refuge island concept for Milpas and Ortega is shown in Figure 1. This configuration would require the elimination of five on street parking spaces, and the consolidation of the northbound transit stop into the existing stop at De La Guerra Street.

In addition to a median refuge, pedestrian activated flashing lights would improve driver yielding. Several types of flashing lights were considered:

- Flashing beacons, or standard amber flashing lights. Driver compliance with these lights typically ranges from 30% to 70%. Due to the potential for low driver yielding rates, we do not consider these devices feasible.
- Pavement flashing lights. During daylight hours, driver compliance is expected to be about 53%, and nighttime compliance is expected to be about 65%. Maintenance and reliability could be an issue with these lights. Due to the low driver yield rates and maintenance issues that other agencies have experienced, we do not consider these devices feasible.
- Rectangular rapid flashing beacons (RRFB's). These devices were recently approved for use in California. Also known as stutter flashers, when activated by a pedestrian, amber lights flash in an irregular pattern, attracting the attention of drivers. Experimental installations in Florida, Washington D.C., and Chicago, have resulted in driver compliance rates exceeding 80%. These devices are a possible solution. However, due to the width of Milpas Street, a third flashing device should be used, meaning these devices would be installed as a supplement to a median refuge.

An RRFB is illustrated on the next page:

### Rectangular Flashing Beacon (RRFB)



*Photo Courtesy of St. Petersburg, Florida*

*Alternative #3: Neighborhood Transition Striping*

Milpas Street, north of Canon Perdido Street, consists of one traffic lane per direction, plus parking lanes. Milpas Street, between Canon Perdido Street and Highway 101, consists of two traffic lanes per direction, a center turn lane, plus parking lanes.

At about 15,700 vehicles per day, traffic volumes between Cota Street and Canon Perdido Street are low enough that one traffic lane could be removed per direction. A striping concept is shown in Figure 1, and daily traffic volumes for the Milpas Street corridor are shown in Figure 2. Traffic volumes increase from 8,600 per day in the neighborhood to over 20,000 near the freeway. This would effectively create a three block long striping transition zone from a neighborhood with lower traffic volumes, to the freeway area that has higher traffic volumes. Similar lane configurations on other city streets include the recently re-striped Cliff Drive, and Upper De La Vina Street (between Alamar and Upper State).

While performing traffic counts, it was discovered that about 2/3 of traffic on Milpas Street use the number 1 (inside) lane, and only 1/3 of traffic uses the number 2 (outside) lane. This is likely due to drivers feeling uncomfortable driving close to parked vehicles and stopped buses. This means that roadway capacity would not be cut in half by removing one lane.

Benefits of this roadway configuration:

- Fewer lanes for pedestrians to cross
- Wider traffic lanes, and fewer side swipe crashes
- Space for cyclists
- Easier parking maneuvers

It should be noted that this scenario does differ from Cliff Drive and from Upper De La Vina. The section of Cliff Drive that has been restriped is completely free flow. The section of Milpas Street between Cota and Canon Perdido is affected by the traffic signal at De La Guerra Street. A typical free flowing travel lane can accommodate about 1,800 to 2,000 vehicles per hour. When a traffic signal is present, some of the available capacity is allocated to the side street while the main street is stopped at the red light. At Milpas and De La Guerra Streets, about 1/3 of green time is allocated to De La Guerra, and 2/3 is allocated to Milpas. This means that the available capacity on Milpas would be 1/3 less than Cliff Drive at De La Guerra Street. Upper De La Vina Street carries about 12,000 vehicles per day, versus over 15,000 on Milpas Street.

The results from a capacity analysis are presented in the following table:

**Existing Vs. Transition Striping at Milpas Street and De La Guerra Street**

Time of Day	Movement	Existing Conditions			Transition Striping		
		Volume to Capacity Ratio	Average Delay in Seconds	Max. Queue Length (Vehicles)	Volume to Capacity Ratio	Level of Service (Delay in Seconds)	Max. Queue Length (Vehicles)
AM Peak	Northbound Through	.35	7.4	6	.53	10.1	13
	Southbound Through	.32	5.0	2	.49	7.4	5
PM Peak	Northbound Through	.31	10.9	7	.48	12.1	11
	Southbound Through	.48	6.6	4	.56	9.3	6

In addition, lanes could be configured such that the sidewalk areas could each be widened by about 4 feet in the future.

The striping transition alone may not result in desired pedestrian crossing conditions. The striping transition can be supplemented with a median refuge, curb extensions, and pedestrian activated flashing lights.

Alternatives for Milpas and Yanonali Streets

Traffic volumes at Yanonali Street are higher than at Ortega Street, meaning the striping transition is not a viable alternative. The following represents viable alternatives for Milpas and Yanonali Streets:

*Alternative #1 - Remove Existing Crosswalks at Ortega Street*

Statistically speaking, removing the marked crosswalks would likely result in fewer pedestrians involved crashes compared with existing conditions. Pedestrians would likely cross with more caution or use adjacent signalized intersections. Removing marked crosswalks would not increase the number of crossing opportunities for pedestrians.

*Alternative #2 - Median Refuge Island and Pedestrian Activated Flashing Lights*

A median refuge island would allow pedestrians to cross half the roadway at a time. Due to the presence of driveways, streetlights, and a fire hydrant, moving the ramps is not an option, and will result in a median refuge configured differently than that proposed at Ortega Street. The configuration is shown in Figure 4. The configuration shown will result in the loss of six on street parking spaces, and if located on the north leg, would affect left turn egress movements from the Winchell's driveway, located at 202 North Milpas Street.



In addition to the median refuge, pedestrian activated flashing lights would improve driver yielding. Due to the width of Milpas Street, a device should be installed in the median to improve conspicuity.

### **Summary**

Due to the low side street traffic volumes and relatively low crash frequency at Milpas and Ortega Streets, and Milpas and Yanonali Streets, a traffic signal would not improve overall traffic operations at either intersection. Several non-signalized options have been identified:

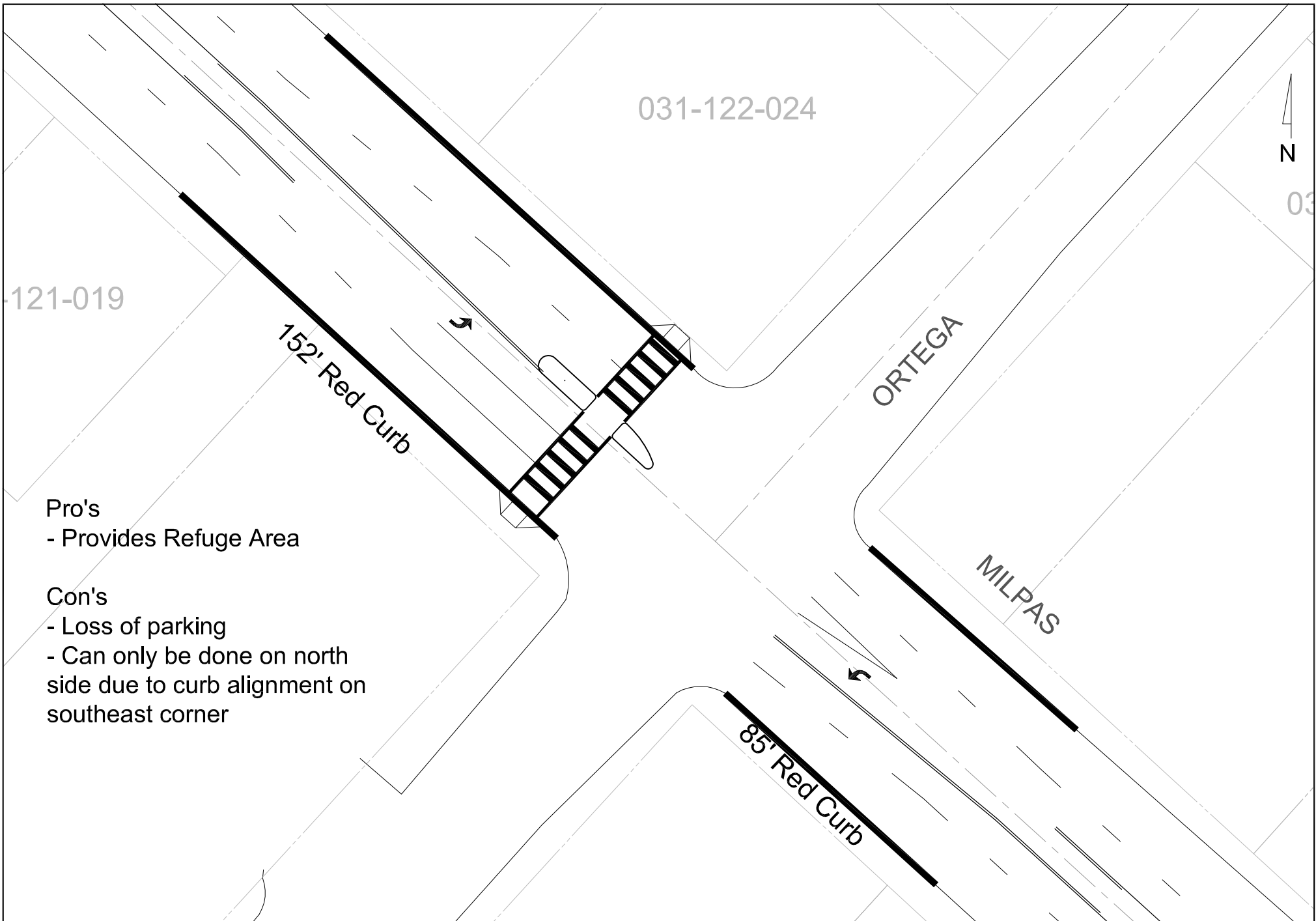
#### Milpas Street – North End:

- Remove the marked crosswalks
- Median refuge islands
  - Supplemented with pedestrian activated flashing lights
- Neighborhood Transition Striping
  - Could be supplemented with median refuge islands, curb extensions, or pedestrian activated flashing lights

#### Milpas and Yanonali:

- Remove crosswalks
- Median refuge islands
  - Supplemented with pedestrian activated flashing lights

A technical analysis of these options will be presented to the Transportation and Circulation Committee (TCC) at their January 26, 2012 meeting. Staff will be seeking feedback from the TCC and from the community. Staff will be presenting these same options to the Neighborhood Advisory Committee in February. Staff will return to the TCC for final direction at a subsequent meeting.



Pro's  
 - Provides Refuge Area

Con's  
 - Loss of parking  
 - Can only be done on north side due to curb alignment on southeast corner

