City of Saratoga Crosswalk Policy

BACKGROUND

The transportation system in Saratoga was originally developed before the City was incorporated and was based on planning principles for rural communities. These principles included construction of numerous local streets without finished curbs, gutters, or sidewalks. The relatively low traffic volumes on most streets and the combination of pedestrian and vehicle traffic in the roadway does not typically result in problems.

The City strives to provide crosswalks on all of its minor and major arterial roadways throughout the City, though gaps in pedestrian paths and sidewalks do exist. Even without the provision of sidewalks on many of the City's streets, pedestrians have a need to cross roadways to reach their destination. However, the decision to install a crosswalk should be done with careful consideration of location, demand, pedestrian access route, traffic volumes, roadway width and lanes, speed, sight distance, and other factors as appropriate. This memorandum outlines basic guidelines with respect to crosswalks at signalized, uncontrolled, and mid-block locations.

EXECUTIVE SUMMARY

- **Crosswalks serve the following two primary functions:**

  - Highlight the presence of pedestrians to drivers
  - Guide pedestrians to the appropriate location for crossing a roadway
  - At controlled locations (signalized intersections or stop-controlled approaches) best practices recommend that crosswalks are marked across all approaches (i.e., legs of the intersection) using standard crosswalk markings or high-visibility markings, except at; Crossing locations with heavy right- or left-turn volumes Intersections with inadequate sight distance or other safety issues.
  - At uncontrolled locations, including mid-block locations, crossings should be marked where all of the following occur:
    - Sufficient demand exists
    - Location has sufficient sight distance
    - Safety considerations do not preclude a crosswalk
    - Demand considerations at uncontrolled crossings include:
    - High number of pedestrians currently using the crosswalk (typical thresholds used include 40 pedestrians in a hour)
    - Crossing is on a direct route to or from a pedestrian generator, such as a school, library, senior center, shopping center, park, or employment center

- **Special treatments at uncontrolled locations should be considered if:**

  - Crosswalk is deemed appropriate at an uncontrolled crossing location on either a multi-lane street (three or more lanes), or
  - Two-lane streets with average daily traffic (ADT) greater than 12,000,
  - Posted speed limit exceeds 30 miles per hour.

- A crosswalk should not be installed if sight distance in feet is less than ten times the speed limit.
    - For example, if an intersection has an approach speed of 25 miles per hour, the unrestricted view of pedestrians by motorists should be at least 250 feet.

I. FUNCTION OF CROSSWALKS

Well-marked pedestrian crossings prepare drivers for the likelihood of encountering a pedestrian, and create an atmosphere of walkability and accessibility for pedestrians. In California, it is legal for pedestrians to cross any street, except at unmarked locations between immediately adjacent signalized crossings or where crossing is expressly prohibited. Marked crossings reinforce the location and legitimacy of a crossing.

A. Crosswalk Function:

- Creating reasonable expectations where pedestrians may cross a roadway
- Predictability of pedestrian actions and movement
- Channelization of pedestrians to designated crossing locations

1. Advantages of marked crosswalks:

a. Help pedestrians find their way across complex intersections
b. Designate the shortest path
c. Direct pedestrians to locations of best sight distance

2. Disadvantages of marked crosswalks:

a. May create a “false sense of security” for pedestrians
b. At uncontrolled locations on multi-lane streets with higher traffic volumes, may result in a greater number of pedestrian collisions if additional enhancements are not provided
c. Maintenance incurs costs

In pedestrian-friendly cities, crossing locations are treated as essential links in the pedestrian network.

3. At mid-block locations, pedestrians cannot cross legally without a marked crosswalk.

4. When there are pedestrian generators in these locations, it may be appropriate to create safe, convenient crossing opportunities.

5. Without mid-block crossing locations, pedestrians face the following three choices: detour to a controlled crossing location; detour to an intersection where it is legal to cross, even if not controlled; or jaywalk (cross illegally).

6. Steps in identifying candidate locations for crosswalks

a. Identify the places people would like to walk (pedestrian desire lines) which are affected by local land uses (homes, schools,parks, commercial establishments, etc.) and the location of transit stops. This information forms a basis for identifying pedestrian crossing improvement areas and prioritizing such improvements, thereby creating a convenient, connective and continuous walking environment.

b. Identify where it is safest for people to cross. Of all road users, pedestrians have the highest risk because they are the least protected. National statistics indicate that pedestrians represent 14 percent of all traffic incident fatalities while walking accounts for only three percent of total trips (based on the 2000 Census walking represents less than one percent of all commute trips). Pedestrian collisions occur most often when a pedestrian is attempting to cross the street at an intersection or mid-block location.

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II. CROSSWALK SAFETY RESEARCH

- A study by the City of San Diego in 1970 found that a higher rate of collisions involving pedestrians occurred at uncontrolled locations with marked crosswalks. However, the City of San Diego study, which was widely used by many other cities as a rationale for removing marked crosswalks at uncontrolled locations, fails to differentiate between different types of streets and crossing locations.

- A separate study conducted on California State highways reached similar conclusions in 1996, but this study was also limited in its applicability to City streets that typically have fewer lanes and carry less traffic volume than State highways.

- A landmark study conducted by in 2001 for the Federal Highway Administration (FHWA) analyzed five years of pedestrian collisions at 1,000 marked crosswalks and 1,000 matched unmarked comparison sites in 30 U.S. cities.

- The study found that no meaningful crash risk differences occur on two-lane roads or on low-volume multilane roads. However, on multi-lane roads with traffic volumes greater than about 12,000 vehicles per day, having a marked crosswalk alone (without other substantial roadway treatments) was associated with a higher pedestrian crash rate than having an unmarked crosswalk. The researchers concluded that on many roads, particularly high-speed and multi-lane roads, more substantial improvements are often needed for safer pedestrian crossings, such as providing raised median islands, installing traffic signals (with pedestrian signals) when warranted, implementing speed-reduction and lane-reducing measures, and/or other measures.

- The results from these studies should not be interpreted as justification to simply take out marked crosswalks or to fail to install marked crosswalks at appropriate pedestrian crossings.

A. Pedestrian Crash Types

- A 1990's Information Guide, FHWA; This paper analyzed 5,076 pedestrian crashes that occurred during the early 1990's. Crashes were evenly selected from small, medium, and large communities within six states: California, Florida, Maryland, Minnesota, North Carolina, and Utah.

- By taking such an approach, the safety and mobility needs of pedestrians are not adequately met. Instead, these studies underscore the need for roadway owners/operators to develop a balanced and strategic crosswalk policy.

- A recent research effort jointly sponsored by the Transit Cooperative Research Program (TCRP) and the National Cooperative Highway Research Program (NCHRP) and conducted by the Texas Transportation Institute (TTI) focused on determining the effectiveness of many of the pedestrian safety engineering countermeasures for unsignalized crossings that were recommended in the 2001 FHWA study.

- As a result of this study, specific guidelines for selecting effective pedestrian crossing treatments for unsignalized intersections and midblock locations are now available based on key input variables (such as pedestrian volume, street crossing width, and traffic volume).

- The study also suggested modifications to the pedestrian traffic signal warrant in the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD).

III. CONTROLLED LOCATIONS

A. Best Practices

1. The following is the recommended, or best practice, for pedestrian treatments in crosswalks at signalized intersections or stop-controlled approaches (i.e., vehicles stop at approach in question).
    a. Mark Crosswalks on all approaches (i.e., legs of the intersection) using standard crosswalk markings or high-visibility markings.
    b. Where the accident data or observations of conflicts identify a crosswalk of particular concern, consider special treatments
    c. Pedestrian signals should be timed for a pedestrian travel speed of 4 feet per second
    d. Slower walking speeds (3.5 feet per second) should be considered if there are special land uses such as senior centers or schools within 100 feet of the intersection,

2. The following two situations are exceptions to the policy of marking crosswalks on all approaches:
    a. Crossing locations with heavy right- or left-turn volumes that occur during the same signal phase as the conflicting pedestrian movement where protected signal phasing for the heavy movement or other solutions are infeasible
    b. Intersections with inadequate sight distance of pedestrians. Elimination of crosswalks in these instances should only occur after other solutions have been deemed infeasible

3. The current standard of 4 feet per second is based on California Department of Transportation (Caltrans) Traffic Manual, 1996. The rate of 3.5 feet per second is recommended for pedestrian crossings by the U.S. Department of Transportation, Designing Sidewalks and Trails for Access, Part II: Best Practices Design Guide, 2001.

4. Alternative pedestrian crossings should be identified and it may be necessary to install barrier treatments to reinforce that pedestrian should not cross at the location without a marked crosswalk.

5. Unrestricted sight distance of pedestrians by motorists should be at least ten times the speed limit (for example, 250 feet for a street with a speed limit of 25 miles per hour).

B. Special Treatments

1. A number of innovative treatments for pedestrians can be used at signalized intersections, mostly related to pedestrian signals.
2. At locations with high pedestrian volumes and pedestrian-vehicle conflicts, special treatments could include bulbouts or curb extensions, reduced corner radii special pavement stencils, countdown signals, or other treatments as appropriate.

IV. UNCONTROLLED LOCATIONS

- This section describes best practices for considering the installation of crosswalks at uncontrolled intersections and mid-block locations, safety considerations, and special treatments in locations where special consideration is recommended.

A. When to Install Crosswalks at Uncontrolled or Mid-Block Intersections

1. The following are best practices for pedestrian treatments at uncontrolled approaches to intersections that are not controlled by traffic signals or stop signs or at mid-block locations.

    a. Crossings should be marked where all of the following occur:
        i. Sufficient demand exists to justify the installation of a crosswalk (see Demand Considerations below)
        ii. The location has sufficient sight distance (sight distance in feet should be greater than 10 times the speed limit), and/or sight distance will be improved prior to crosswalk marking
        iii. Safety considerations do not preclude a crosswalk

2. Demand Consideration: Uncontrolled crossings should be identified as a candidate for marking if there is a demonstrated need for a crosswalk. Need can be demonstrated by:
    a. A high number of pedestrians currently using the crosswalk (typical thresholds used include 40 pedestrians in a hour) or
    b. The crossing is on a direct route to or from a pedestrian generator, such as a school, library, senior center, shopping center, park, or employment center

B. Special Treatments for Uncontrolled Locations

- Fehr & Peer has developed a Crosswalk Treatment Identification Tool that identifies special crosswalk treatments based on roadway characteristics.
- The Crosswalk Treatment Identification Tool should be used to determine if special treatments are needed to ensure safe crossing at uncontrolled locations. The crossing should be a high-visibility style when either of the following criteria are met:

    1. Crosswalk is deemed appropriate at an uncontrolled crossing location on either a multi-lane street (three or more lanes)on two-lane streets with average daily traffic (ADT) greater than 12,000
    2. The most common crosswalk of this type will be at intersections where a minor side street has sign and a major street is uncontrolled.
    3. Where the posted speed limit exceeds 30 miles per hour.
    4. High visibility crosswalks include the textured pavement crosswalk, the "ladder," and the "broken ladder." The use of textured crosswalks should be selective due to higher maintenance costs.
    5. They may also be supplemented with signs and in pavement flashers.

C. Safety Considerations at Uncontrolled Locations

1. A crosswalk should not be installed if sight distance in feet is less than ten times the speed limit.
    a. For example, if an intersection has an approach speed of 25 miles per hour, the unrestricted view of pedestrians by motorists should be at least 250 feet.
2. Where safety concerns become evident after installation of special treatments, pedestrian signal warrants, established in the Manual on Uniform Traffic Control Devices, should be tested to determine whether the crossing warrants a signal.
3. In the event that a signal is determined to be inappropriate, the crosswalk should not be marked.