



City of Alameda

Pedestrian Design Guidelines



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***Prepared by
City of Alameda Public Works Department***

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Introduction

Purpose

The purpose of the Pedestrian Design Guidelines is to provide guidelines to City of Alameda (City) staff, residents, decision makers, and developers on how to build pedestrian facilities. The overarching vision statement for the Pedestrian Plan and for this corresponding document is as follows:

Plan, construct, and adequately maintain a functional, comfortable and convenient pedestrian network throughout the City of Alameda that addresses pedestrians' mobility needs in a manner that enhances community identity and livability.

Pedestrian-friendly places already exist in the City such as Park Street, Webster Street, Bay Farm Island lagoons, and shoreline pedestrian paths. This document will help preserve these places, and will show how to improve them and other locations throughout the City. Some potential opportunities for pedestrian improvements include the following locations:

- Alameda Point
- Cross Alameda Trail
- Northern Waterfront
- Infill and redevelopment areas throughout the City

It should be noted that these are only guidelines and are meant to allow flexibility, which will be needed for retrofit and infill development projects. Furthermore, the Guidelines provide a broad overview, while individual projects will require consideration of site-specific concerns and constraints. Therefore, these guidelines should be used along with engineering judgment to reduce ad-hoc decisions. When a specific guideline cannot be met, designers and engineers are expected to use their professional judgment to recommend the best improvement possible under each specific circumstance.

These guidelines do not supercede street improvement standards or City ordinances in the Alameda Municipal Code. Appendix A describes the applicable federal and local guiding policies that should be used in conjunction with this guide.

Resources

Key resources used to establish these guidelines are shown below. The City does not find all the design guideline elements that are mentioned in these documents relevant to the City of Alameda's Pedestrian Design Guidelines. Only the extracted portions of these reference documents, as shown in the below sections, are applicable to the City of Alameda's Pedestrian Design Guidelines.

AC Transit, *Designing with Transit – Making Transit Integral to East Bay Communities*, December 2004.

Agerschou, Hans, *Planning and Design of Ports and Marine*, published by Thomas Telford, 2004.

American Association of State Highway and Transportation Officials, *A Policy on Geometric Design of Highways and Streets*, Washington, D.C., Fifth Edition, 2004.

American Association of State Highway and Transportation Officials, *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004.

BC Ferries, *Crofton Terminal Conceptual Designs*, http://www.bcferries.com/bcf-apps/about/public_consult/bcf_pubs/docs/publications/Crofton-Matrix-001.pdf, 2005.

California Department of Transportation, *Highway Design Manual*, Chapter 1000, 2006.

Federal Highway Administration (FHWA), *California Manual on Uniform Traffic Control Devices*, 2006.

– Part 4: Highway Traffic Signals

– Part 7: Traffic Controls for School Areas

Federal Highway Administration, *Guidance Memorandum on Consideration and Implementation of Proven Safety Countermeasures*, July 2008 (<http://safety.fhwa.dot.gov/policy/memo071008/>)

City of Alameda, *Draft Northern Waterfront Design Guidelines*, May 2005.

City of Alameda, *Webster Street Design Manual*, March 2005.

Finley, Melisa D., Jeffrey D. Miles, and Paul J. Carlson, *An Assessment of Various Rumble Strip Designs and Pavement Marking Applications for Crosswalks and Work Zones*, Texas Transportation Institute, October 2005.

Institute of Transportation Engineers, *Context Sensitive Solutions (CSS)*, 2010. (<http://www.ite.org/css/>)

Jones, Will, *New Transport Architecture: Travel Hubs in the 21st Century*, Sterling Publishing Company, Inc., 2006.

Kirschbaum, J.B., P.W. Axelson, P.E. Longmuir, K.M. Mispagel, J.A. Stein, and D.A. Yamada, *Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide*. Report FHWA-EP-01-027. Federal Highway Administration, U.S. Department of Transportation, Washington D.C., September 2001.

National Cooperative Highway Research Program, *Accessible Pedestrian Signals: A Guide to Best Practices*, June 2007. (<http://www.apsguide.org>)

National Cooperative Highway Research Program, *NCHRP Report 572: Roundabouts in the United States*, Transportation Research Board, Transportation Research Board of the National Academies, 2007.

San Francisco Bay Conservation and Development Commission, *Shoreline Plants: A Landscape Guide for the San Francisco Bay*, March 2007.

San Francisco Bay Conservation and Development Commission, *Shoreline Signage: Public Access Signage Guidelines*, August 2005.

San Francisco Bay Conservation and Development Commission, *Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay*, April 2005.

United States Access Board, *Pedestrian Access to Modern Roundabouts: Design and Operational Issues for Pedestrians who are Blind*, www.access-board.gov/research/roundabouts/bulletin.htm

United States Access Board, *Revised Draft Guidelines for Accessible Public Rights-of-Way*, November 23, 2005.

United States Architectural and Transportation Barriers Compliance Board, *Accessibility Guidelines for Outdoor Developed Areas Final Report*, September 30, 1999.

United States Department of Transportation, *Rails-with-Trails: Lessons Learned, Literature Review, Current Practices, Conclusions*, August 2002.

United States Department of Transportation, *Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines*, Report FHWA-RD-01-175, February 2002.

Zegeer, C.V., C. Seiderman, P. Lagerwey, M. Cynecki, M. Ronkin, and R. Schneider, *Pedestrian Facilities User Guide – Providing Safety and Mobility*. Report FHWA-RD-01-102, Federal Highway Administration, U.S. Department of Transportation, Washington D.C., March 2002.

Streets

Streets are critical elements for pedestrians providing pedestrian access to destinations. Pedestrians travel along streets, and they cross streets. This section discusses key issues related to streets and how pedestrians access them including buffer areas, bus shelters, bus stops, lighting, sidewalk access at driveways, sight distance and walkways.

Buffer Areas

The buffer area is the space between the sidewalk and the motor vehicle travel lane. This area is also known as the landscape or planting strip. Buffers provide a separation between vehicular traffic and pedestrians, and provide space for streetlights, trees, signs, and other street furniture. Buffers also provide space for trash pick up and for locating pedestrian ramps. At bus stops, the buffer is required to be accessible with a paved bus pad for loading and unloading.

The recommended buffer width is four to six feet which provides adequate space to accommodate street trees. Street trees and other plantings create desirable microclimates, and contribute to the psychological and visual comfort of sidewalk users. For more information on street trees, refer to the City's Master Tree Plan.¹

Bus Shelters or Transit Centers

The below bus shelter/transit center guidelines are based on the best practice standards of the City and of AC Transit, which is the public transportation authority for western Alameda and Contra Costa Counties.^{2 3}



Location

- Install bus shelters at locations with sidewalks and crosswalks. – AC Transit
- Provide ten feet of sidewalk width at the shelter location: four feet for the path of travel and six feet for the bus shelter. – AC Transit
- Place bus shelters at the back of the sidewalk and not where they block the line of sight for a driveway or an intersection. – AC Transit
- Locate the shelters as close as possible to the boarding/alighting area and the bus flag. – AC Transit
 - Place shelter on the far side of the bus flag or eight feet back from the curb.
 - If neither of these options is available, the shelter should be placed 25 feet nearside of the bus flag to allow for a front- and rear-door clear area.

¹ Federal Highway Administration, *Pedestrian Facilities Users Guide: Providing Safety and Mobility*, March 2002, p. 148.

² City of Alameda City Council Meeting, April 3, 2007.

³ AC Transit, *Designing with Transit – Making Transit Integral to East Bay Communities*, December 2004, Chapters 4 and 5.

- Provide an Americans with Disabilities Act (ADA) compliant bus boarding/alighting area. – AC Transit
- Give priority to shelters with the highest durability and the least amount of maintenance. – City
- Use glass walls in high pedestrian areas, at locations where vandalism is not anticipated and where wind protection is a major concern. – City
- Use full-width walls to maximize protection of riders from inclement weather. – City
- Where perforated metal walls are used, the walls should be a narrow in width to maximize the visibility of riders for approaching bus drivers. – City
- Consider the provision of electricity for potential installation of real time arrival signs along the primary transit streets. – City
- Provide bus shelters with the following amenities:
 - Trash and recycling receptacles, unless there are receptacles in the immediate vicinity of the shelter; – City
 - Benches, which should be surface mounted and preferably include three seats; – AC Transit and City
 - Leaning rails; – AC Transit
 - Full-sized service maps with appropriate route and schedule information. – AC Transit and City
- Use the same shade of green as on shelters in the City (including those along Park and Webster Streets), to provide visual consistency within Alameda and with other cities served by AC Transit. – City
- For shelters with narrow-width walls, roofs should be made of metal. – City
- For shelters with full-width walls, metal roofs should be used unless it is determined that metal roofs would not provide sufficient lighting for shelter users. – City
- Make wall frames of steel where possible. – City
- Treat the walls with rust-protective coating. – City
- Use decorative elements, such as the gingerbread on the shelters with no walls, only if it is determined to be reasonably resistant to vandalism. – City
- Design transit centers for effective, efficient operation. – AC Transit
 - Appropriate where multiple bus lines stop or where bus layovers occur.
 - Needs appropriate number of bus bays.

Bus Stops

Best practices recommended by AC Transit include the items listed below.⁴

Sidewalks

- Provide sidewalks and bus pads at all bus stops.
- Sidewalks that are adjacent to transit stops should be visually interesting with irrigated street trees and pedestrian-scaled land uses.
- Provide an accessible bus boarding/alighting area.
- Provide sidewalks that are wide enough and clear enough for bus stops.



Location

- Locate bus stops adjacent to activity centers that generate high pedestrian demand to increase bus passenger comfort and security.
- Minimize circuitous pedestrian access between activity centers and bus stops.
- Outside of downtown areas, site the distance between bus stops approximately every 1,000 feet to balance speed and convenience concerns.
- Locate bus stops at intersections and not at mid block except for when bus stop at intersection is not feasible.
- Whenever possible, locate bus stops at controlled intersections.
- Encourage locating bus stops on the far side of an intersection to reduce intersection interference, especially at uncontrolled intersections for visibility reasons.

Design

- Locate bus stops at the curbside on those streets that have a parking lane. This will require removal of on-street parking to provide access for buses.
- For high volume transit routes with at least two travel lanes per direction and a parking lane, consider installing a bus bulb in parking lane to provide a waiting area for passengers. Provide an adequate length for a bus bulb of between 50 and 70 feet depending on the bus used.
- Make bus stops long enough for the buses that will use them:
 - Provide a bus stop length of between 60 and 80 feet for far side stops to allow for bus clearance from the crosswalk (at least 5 feet), stopping space (40 to 60 feet) and take-off space (at least 15 feet).
 - Near side stops require more stopping space with a recommended length of between 70 and 90 feet: crosswalk clearance of 10 feet, stopping space of 40 to 60 feet and approach space of 20 feet.
- Paint the curb at bus stops red.
- Provide a crosswalk close to the bus stop.

⁴ Ibid, Chapters 4 and 5.

- Prohibit additional driveways at bus stops. New driveways should be located:
 - Behind the bus stop: 5 feet behind the red curbed area of a stop or 45 feet behind the bus stop flag, whichever is greater.
 - In front of the bus stop: should begin at least 10 feet in front of the flag at a bus stop.
- Provide a front door landing area that is 6 feet wide and 8 feet deep from the bus flag to be free of obstacles – AC Transit
- Provide a back door landing area between 12.5 feet and 24 feet wide and 8 feet deep from the bus flag to be free of obstacles – AC Transit

Lighting

Lighting is important at intersections, mid-block crossings and bus stops, and within site developments such as shopping centers or office complexes. Additional pedestrian-scale lighting is appropriate along sidewalks with higher volumes of nighttime pedestrian activity.

Alameda Municipal Power (AMP), a department of the City, is the municipal utility in charge of the 6,360 streetlights. AMP has a program to replace deteriorated streetlights. This program installs new streetlight poles that match the old, historical ones. The program replaces the older steel street lights with fiberglass poles. For new developments, developers are required to install the streetlights according to AMP standards.

Preferred pedestrian-scale lighting consists of:

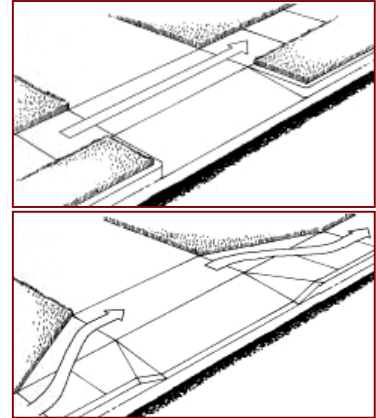
- Light poles in the landscape buffer or at the back of the sidewalk, and not within the clear width of the sidewalk.
- Shorter light poles (i.e. 15-foot tall posts instead of standard street lampposts).
- Lower levels of illuminations (except at crossings).
- Crosswalks with illumination as per the AMP standards.
- Provide adequate spacing between poles for even illumination of the sidewalk in accordance with AMP standards.
- Coordinate tree planting with street light fixtures.
- A “white light,” which can be generated using sodium or mercury vapor, metal halide or incandescent lamps.⁵



⁵ American Association of State Highway and Transportation Officials, *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004, p. 53.

Sidewalk Access at Driveways

Driveways should be designed to provide a level, minimum four-foot wide path of travel behind the driveway apron. All parcels have a right to one driveway. It is recommended to consolidate driveway access in commercial areas with higher pedestrian activity, where possible, to reduce the number of conflict points between pedestrians and motorists.



Sight Distance

Sight distance should:

- Give motorists a clear view of pedestrians and potential conflicts on or adjacent to the street.
- Give pedestrians the ability to view and react to potential conflicts.
- Account for lower eye heights of children and individuals in wheelchairs.

Source: Federal Highway Administration,
www.fhwa.dot.gov/environment/sidewalk2/

Streets should:⁶

- Have a 90-degree intersection angle to improve sight lines and to reduce the conflict zone and the intersection crossing distance.
- Have a no-parking zone of 10 to 20 feet from school designated yellow crosswalks or before signal, stop, or yield signs for improved pedestrian visibility. Additional no parking zones may be needed to address the signal detection zone at a signalized intersection.
- All trees should be at least 15 to 20 feet from intersections and 10 feet from driveways.
- Have street tree canopies limbed up to a height of 14 feet at intersections and driveways so that drivers in high profile vehicles can see pedestrians standing on a street corner without obstructions from low-hanging tree branches.
- Use trees that can be adequately pruned to maintain sight distances such as taller tree species.
- Consider the use of curb bulb-outs at a crosswalk to extend the sight distance at intersections if field conditions and traffic analysis supports it.

⁶ Ibid, pp. 52-53.

Walkways

This walkways section discusses the various components of a walkway and recommended design guidelines. The main attributes of recommended walkways are:

- Safety: Walkways should allow pedestrians to feel a sense of safety and predictability.
- Continuity: The walking route should be obvious and should not require pedestrians to travel out of their way unnecessarily.

Pedestrian Facility Type

The main types of pedestrian facilities are:⁷

- Sidewalks (see inset)
- Multi-use paths and trails

Developers should provide sidewalks within the project impact area of new developments and on both sides of the street. Meandering sidewalks and paths are discouraged. Developers should provide a direct route for pedestrians and an easily definable route for individuals with visual impairments.

Sidewalks

Sidewalks are facilities that are:

- Located between the adjacent property line and the curb, street line, or planter strip.
- Built with concrete or other City approved material to City and ADA standards.
- Have curbs and gutters as integral parts of the sidewalk for purposes of motor vehicle separation and street drainage.



Maintenance

According to the Alameda Municipal Code (AMC) under the “Streets and Sidewalks” chapter (22-16.2 - Duty to Maintain), sidewalk maintenance is the responsibility of adjacent property owners except when damage is caused by street trees or other public right-of-way issues. According to the AMC under the “Parks, Recreation Areas and Public Property” chapter (23-3.3 - Trees, Plants, Shrubs that Extend into or Over Sidewalks and Streets), sidewalk maintenance includes trimming landscaping to prevent encroachments onto the sidewalk right-of-way.

Widths

Sidewalk widths should reflect the amount of use, and should be at least five feet so that two pedestrians can walk together comfortably while a third person passes. The proposed sidewalk widths above the City’s standard width of five feet are only for new development areas and

⁷ Ibid, p. 55.

should not be considered for in-fill development due to lack of available space. The recommended widths for sidewalk for new developments are as follows:^{8 9 10}

- Sidewalks on local or collector streets: Five feet – FHWA and AMC.
- Sidewalks on arterials or major streets: Eight to ten feet – City staff recommendation.
- Sidewalks in business districts: 10 to 12 feet – City staff recommendation.
- Sidewalks adjacent to parks, schools, or other major pedestrian generators: 10 to 12 feet – City staff recommendation.
- Sidewalks with outdoor seating: 15 to 20 feet – Designing with Transit.

Multi-use Paths and Trails

Paths may be located in a natural setting such as a shoreline trail (see inset), or may be more similar to sidewalks in low-density areas and act as street side paths. These facilities are separated by the motor vehicle travel lane by a ditch, swale, fence, trees, landscaping, or curb. They also may contain an adjacent



jogging path built with appropriate material. Paths should be designed for both bicyclist and pedestrian usage. A yellow centerline stripe may be used to separate opposite directions of travel, particularly at curves or other locations where sight lines may be limited.

Widths

The minimum path widths are as follows:^{11 12}

- Multi-use paths
 - Recommended minimum: 10 feet – Caltrans (reduces pavement maintenance due to service vehicle wear and tear);
 - Minimum for low-use path or constrained area: 8 feet – Caltrans; and
 - Recommended for high-use paths: 12 to 14 feet – Caltrans.
- Natural trails: 3 feet, which can be reduced to 32 inches where no mitigations are possible – U.S. Access Board.

Graded Area

The following recommendations are only for those paths that do not serve as a sidewalk and potentially separated by a ditch, swale, fence, trees, or landscaping from street. For any path that serves as a sidewalk, Caltrans minimum standards will be used.

⁸ California Department of Transportation, *Highway Design Manual*, Chapter 1000.

⁹ Zegeer, C.V., C. Seiderman, P. Lagerwey, M. Cynecki, M. Ronkin, and R. Schneider, *Pedestrian Facilities User Guide – Providing Safety and Mobility*. Report FHWA-RD-01-102, Federal Highway Administration, U.S. Department of Transportation, Washington D.C., March 2002, p. 148.

¹⁰ AC Transit, *Designing with Transit – Making Transit Integral to East Bay Communities*, December 2004, Ch. 4.

¹¹ California Department of Transportation, *Highway Design Manual*, Chapter 1000.

¹² U.S. Architectural and Transportation Barriers Compliance Board, *Accessibility Guidelines for Outdoor Developed Areas Final Report*, September 30, 1999.

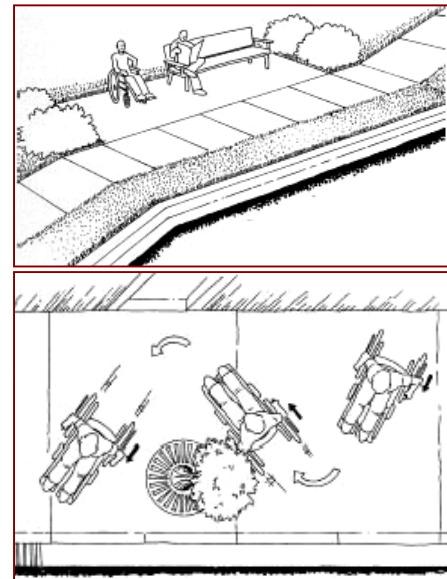
- A 3-foot graded area (free of vegetation) on both sides of the path provides a recovery area and clearance from obstructions.
- If a paved surface is wider than 10 feet, the graded area may be reduced by a comparable amount; however, adequate clearance to obstructions must be maintained.
- For paths with anticipated heavy usage, the graded area on one side should be widened to 4 feet to serve as a jogging path. When provided, jogging paths should be placed on the side with the best view, such as adjacent to the waterfront or other vista.

Accessibility

Walkways should be easily accessible to all users, whatever their level of ability, and should include accessible signs and information. Individuals with mobility impairments have difficulty traveling on walkways with steep grades, severe cross slopes, and protruding objects. If such features are unavoidable due to design constraints then the below design approaches should be considered to reduce the impact.¹³ For accessibility standards that are required, refer to the City's ADA standards.

Grades

- **Handrails:** Recommended where steep grades occur over short distances.
- **Level Landings:**
 - Preferably adjacent to the pedestrian zone so as not to increase the grade between the level landings.
 - Wide enough for an individual in a wheelchair and other pedestrians to maneuver. At least four feet should be provided.
 - Equipped with benches and shade.
- **Signs:** Inform pedestrians of upcoming grades, and ideally of alternative routes with more moderate grades.



Source: Federal Highway Administration, www.fhwa.dot.gov/environment/sidewalk2/

Cross Slopes

- Coordinate building entrance elevation with the sidewalk elevation.
- Consider flush curb returns at all intersections or walkway transitions or provide curb ramps.
- Building entrances should be designed to meet the sidewalk cross slope either by making the transition within the building or having the entrance set back from the property line to allow for the transition.
- Replace steps at a building entrance with a ramp.
- Comply with ADA standards.

¹³ Kirschbaum, J.B., P.W. Axelson, P.E. Longmuir, K.M. Mispagel, J.A. Stein, and D.A. Yamada, Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide. Report FHWA-EP-01-027. Federal Highway Administration, U.S. Department of Transportation, Washington D.C., September 2001, pp. 4-16 to 4-24.

Protruding Objects

- Minimize protruding objects from the entire walkway area except for the buffer area between the curb and walkway.
- Reduce protruding objects within the walkway space between 27 and 80 inches in the vertical plane because individuals with visual impairments have a difficult time detecting them.
- All signs, canopies, tree limbs, etc. should be 8 feet (96 inches) above the sidewalk surface.

Curbs

Curbs serve various functions: drainage control, street edge and pedestrian walkway delineation, aesthetics, and reduced maintenance. Vertical curbs are recommended as opposed to rolled or sloping curbs to prohibit motorists from parking on sidewalks. In the City, vertical curbs are required in public rights-of-way. Vertical curbs range between six and eight inches.

Stairs

Stairs should be avoided yet are sometimes necessary where severe grades exist. Handrails and bicycle stair rails should be considered for all stairs. Bicycle stair rails allow bicyclists to easily push their bikes up or down stairs. The bike stair rail should not conflict with stair railing requirements.

Surface Treatments

The surface of pedestrian facilities should be stable, firm, and slip resistant to meet ADA requirements. For natural trails, the surfaces are not required to be slip resistant because rain, ice, leaves, and other potential debris prevent slip resistance. The preferred surface treatments are:¹⁴



- **Portland Cement Concrete (PCC):** Long lasting, durable and easy to repair; used on sidewalks, and in urban areas. Stamped or stained concrete can take on the appearance of bricks, cobblestone, or wood boardwalk. Stamped concrete surface should not have indentations or grooves to minimize concerns for users of wheelchairs, walkers, strollers, and shopping carts.
- **Asphalt Concrete (AC):** Shorter life expectancy and cheaper than PCC; AC is appropriate for less urban areas and park settings.
- **Crushed Aggregate:** Includes crushed granite limestone or packed soils; appropriate for less urban areas and park settings that are not too steep and that do not have drainage or flooding issues (see inset). Requires more maintenance than PCC and AC to ensure that firm and stable surfaces continue to exist. Is not appropriate at bus stop landing areas.

¹⁴ American Association of State Highway and Transportation Officials, *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004, p. 64.

- **Natural or non-hardened surfaces:** Appropriate for natural settings such as rural or jogging trails.

Construction Work Zones

For any City or City-sanctioned construction project in public right of way, the contractor is required to obtain appropriate permit(s) and to submit a Traffic Control Plan (TCP) to the Public Works Department. The TCP must be:

- Submitted ten working days prior to the commencement of work within the public right-of-way that affects access for pedestrian, bicyclist, transit or vehicular traffic.
- Prepared in accordance with the California Manual of Uniform Traffic Control Devices (MUTCD) standards by a registered civil engineer or traffic engineer, licensed in the State of California. The engineer must stamp the plans as approved.
- Approved by the Public Works Director or designee before construction work may commence.

Intersections

This section discusses design features that enhance the safety, comfort, or visibility of pedestrians at intersections.

Crossing Distances

Pedestrian crossing distances should be as short as possible to reduce pedestrian exposure time, and to decrease motor vehicle delay. In some cases, shorter crossing distances and reduced street lane widths can increase intersection capacity for both vehicles and pedestrians, because shorter crossing distances result in a shorter pedestrian crossing phase. The below section discusses smaller turning radii, curb bulb-outs, and pedestrian refuge islands, which are all strategies that reduce crossing distances for pedestrians.¹⁵

Crosswalks

The California Vehicle Code states that a street crossing or crosswalk is the portion of street at an intersection that represents extensions of the sidewalk lines, or any portion of the street distinctly indicated for pedestrian crossing. Pedestrians are allowed to cross streets at intersections with unmarked crosswalks as long as no crossing prohibitions exist. Marked crosswalks help channelize pedestrians so that motorists know where to look for them.

The Public Works Department provides ***marked crosswalks*** based upon traffic engineering analyses in accordance with the California MUTCD standards and the City crosswalk warrants.



White Crosswalk Installation at Uncontrolled Intersections

Crosswalks may be considered at a crossing if it meets the following conditions:

- The crossing is located at an intersection. If it is not an intersection, then the proposed crossing must **not** be within a horizontal or vertical curve.
- The crossing has ADA accessible ramps at both ends of the crossing or funding is available for such improvements.
- Intersecting streets that are offset or at a skewed angle.

A crossing with the above characteristics is considered a candidate for crosswalk markings if it meets the conditions described in Section 1.

¹⁵ American Association of State Highway and Transportation Officials, *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004, p. 74.

Section 1 - the intersection or proposed crossing location must meet all of the following criteria:

1. Minimum pedestrian volume (for adjacent land use) of 20 pedestrians per peak hour, 15 child or elderly pedestrians per peak hour, or 200 pedestrians per day.
2. Minimum street width of 30 feet.
3. Average Daily Traffic (ADT):
 - Less than or equal to 15,000 if two-lane street.
 - Less than or equal to 12,000 if three-lane street (one of the lanes must be a two-way center lane or a left-turn pocket).
 - Less than or equal to 12,000 if four-lane street with a raised median. A raised median must be at least 4 feet wide and 6 feet long to adequately serve as a refuge area.
 - Less than or equal to 9,000 if four lane street without a raised median.
- Truck volume during peak hours is two percent or less.
- Adequate street lighting as per AMP standards.
- Adequate stopping sight distance is available as per commonly accepted engineering standards.
- The proposed painted crosswalk will not be within 300 feet of another painted crosswalk except for crosswalks that are located at approaches to an intersection.

Striping Treatment

The standard crosswalk *striping treatment* for low-volume pedestrian crossing locations is two parallel lines. High visibility crosswalks that use a ladder-style marking (see inset), diagonal lines, brick pavers, or colored treatment could be considered in the following locations:

- Locations where a school crossing guard is stationed or at intersections that lie within the school zone as defined by the MUTCD (CA).
- Locations within one-quarter mile of transit stations and adjacent to bus stops.
- Formally designated mid-block crosswalks.
- Locations where there is a need to clarify the preferred crossing locations when the proper location for a crossing would otherwise be confusing.
- Locations that experience a high volume of pedestrian crossings.



Crosswalk Design

Marked crosswalk *design* considerations include:

- Contain curb ramps entirely within the marked crosswalk, while maintaining a straight crosswalk.
- Extend crosswalk lines the full length of the crossing.
- Follow MUTCD (CA) standards for stripe color and crosswalk widths.
- For ladder crosswalks, the recommended spacing between the ladder stripes is 24 inches and the recommended width of the striping is 12 inches.

Curb Extensions or Curb Bulb-outs

Curb extensions or bulb-outs may be installed at intersections and mid-block crossings to (see inset):

- Provide for enhanced visibility between pedestrians and drivers.
- Provide greater space for pedestrians waiting to cross the intersection and for curb ramps.
- Reduce the crossing distance for pedestrians.
- Prevent cars from parking in the crosswalk area.
- Slow the turning movements of motorists.

In general, curb extensions should be considered at locations that meet the City's white crosswalk warrants, with local community's support, a traffic analysis supporting it, and where impacts to on-street parking are minimal.

Curb extensions should be built using the following design guidelines:

- Curb extensions should not extend into travel or bicycle lanes.
- Typical curb extensions extend six feet from the curb.
- Low-level landscaping on the curb extension is recommended, if maintained by adjacent property owners.
- Turning needs of larger vehicles should be considered in curb extension design.¹⁶

If the curb extension also will act as a bus bulb, AC Transit prefers a length of between 50 and 70 feet.



¹⁶ American Association of State Highway and Transportation Officials, *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004, pp. 74-75.

Curb Radii

Curb radii should be designed to balance the needs of pedestrians, large vehicles such as buses and trucks, and emergency vehicle access. Smaller curb radii should be considered for streets that seldom have large vehicles with turning maneuvers.

Smaller radii have the following benefits (see inset):

- Reduces motorist speeds.
- Reduces crossing distance for pedestrians.
- Improves sight distances.
- Increases the corner storage space for pedestrians.



Source: www.pedbikeimages.org / Dan Burden

Nevertheless, curbs that protrude into the turning radius of vehicles may result in large vehicles damaging the curb and other street infrastructure, and encroaching on the pedestrian right-of-way at the curb. Furthermore, smaller radii may reduce the operational efficiency of an intersection when the speeds of turning vehicles are slowed.

Corner radii should be built using the following design guidelines:

- For streets with infrequent large turning vehicles, a 15 to 18-foot street corner radius could be considered. – City
- Corner radii should be designed to be as small as possible, while considering the existing and future volumes, types and safety of all intersection users and turning radii in relation to street width.

In-pavement Crosswalk Lights

In-pavement crosswalk lights (see inset), which are referred to as in-roadway warning lights in the MUTCD (CA), alert motorists to the presence of a pedestrian crossing the street. When a pedestrian is detected either by push button or an automated device, lights located in the crosswalk flash at a constant rate in the direction of on-coming motorists. The MUTCD (CA) recommends installing in-pavement crosswalk lights at uncontrolled locations, if the lights meet specified criteria. The criteria are as follows:

- Greater than or equal to 40 pedestrians regularly use the crossing during each of any two hours (not necessarily consecutive) during a 24-hour period.
- Vehicular volume through the crossing exceeds 200 vehicles per hour during peak-hour pedestrian usage.



Source: www.walkinginfo.org

- Critical approach speed (85th percentile) is 45 mph or less.¹⁷

Studies show that in-pavement crosswalk lights are associated with significant improvements in the following:¹⁸

- Driver yielding.
- Increasing driver braking distance.
- Reducing vehicle speed.
- Reducing pedestrian waiting time to enter a crosswalk.

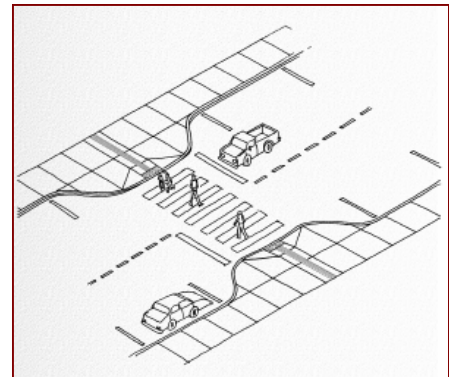
Indiscriminate use of these devices may impact their usefulness. The installation should be supported by an engineering investigation of the site.

Mid-block Crossings

Mid-block crossings could be considered if they meet the City warrant for crosswalks as shown above.

Design issues that should be considered at mid-block crossings include:¹⁹

- Adequate sight distances both from the pedestrian and motorist's perspective.
- Need for a pedestrian-activated signal, based on a MUTCD (CA) warrant analysis, with adequate crossing time.
- Possible need for other special types of signal crossing treatments such as in-pavement crosswalk lights or warning beacons.
- Potential for shortening crossing distance, using curb extensions or median refuges, especially when the crossing exceeds 60 feet or on a multilane street.
- High-visibility crosswalk marking treatment.
- Adequate pedestrian warning signs, pavement markings and lighting.
- Use of other innovative crossing treatments.



Source: Federal Highway Administration, www.fhwa.dot.gov/environment/sidewalk2/

Pedestrian Refuge Islands

Pedestrian crossing islands or median refuges are intended to facilitate pedestrian crossings. Pedestrian crossing islands provide a waiting area for those who cannot finish crossing a street either because they began crossing late or they walk slowly. According to FHWA, pedestrian refuge areas at pedestrian crossings at marked crosswalks have demonstrated a 46 percent

¹⁷ Federal Highway Administration, *California Manual on Uniform Traffic Control Devices*, 2006, Chapter 4L – In-Roadway Lights.

¹⁸ Finley, Melissa D., Jeffrey D. Miles, and Paul J. Carlson, *An Assessment of Various Rumble Strip Designs and Pavement Marking Applications for Crosswalks and Work Zones*, Texas Transportation Institute, October 2005.

¹⁹ American Association of State Highway and Transportation Officials, *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004, pp. 89-93.

reduction in pedestrian collisions. At unmarked crosswalk locations, medians have demonstrated a 39 percent reduction in pedestrian crashes.²⁰

Pedestrian refuge islands should be considered on the following street types:

- Streets with four or more lanes yet can be used at intersections with fewer lanes if justified by an engineering analysis.
- High motorist speeds (greater than 35 mph) or volumes (greater than 12,000 vehicles per day).
- High pedestrian volumes.
- Traffic calming desired.
- Complex or skewed intersections.

Pedestrian refuge islands should be built using the following design guidelines:²¹

- A minimum six feet width to accommodate bicyclists and individuals in wheelchairs.
- Street crossings with higher pedestrian volumes may need eight- to ten-foot width.
- A raised approach nose to reduce the encroachment of turning vehicles into the pedestrian refuge waiting area with appropriate visibility for motorists using reflectorizations, illuminations, markings, or signage.
- Align directly with marked crosswalks and provide an accessible route of travel.

Pedestrian Signs

Pedestrian-related signs provide information to pedestrians or to motorists about upcoming pedestrian areas such as crosswalks or mid-block crossings. The City installs signs after an engineering study. Signs should meet MUTCD (CA) design and placement standards. There are three types of pedestrian-related signs:

- **Regulatory Signs:** Signs that are rectangular in shape such as pedestrian prohibited signs, pedestrian crossing signs, traffic signal signs (see inset), and in-street pedestrian crossing signs (see below for more details).
- **Warning Signs:** Warning signs may be placed at and in advance of pedestrian crossings near schools, bus stops, playgrounds, and other pedestrian attractions.
- **Guide Signs:** Pedestrian-related guide signs should be smaller and lower than signs directed towards motorists.²²



²⁰ Federal Highway Administration, *Guidance Memorandum on Consideration and Implementation of Proven Safety Countermeasures*, July 10, 2008 (<http://safety.fhwa.dot.gov/policy/memo071008/>)

²¹ American Association of State Highway and Transportation Officials, *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004, pp. 75-76.

²² *Ibid*, pp. 111-115.

In-street Pedestrian Crossing Signs

In-street pedestrian crossing signs or paddles (see inset) are installed in the centerlines of intersections adjacent to a marked crosswalk to help enhance crossing visibility. The City has established specific guidelines for in-street pedestrian crossing signs, which are shown below.



Pedestrian paddles may be used in Alameda at a crosswalk that meets the following two conditions:

- Marked crosswalk.
- Applicable warning signs have been installed (W11-2 & W16-7p or S1-1 & W16-7p).

A crosswalk that meets the above characteristics is considered a candidate for a pedestrian paddle if the conditions described in Section 1 and Section 2 are both met.

Section 1 Condition - Crosswalk must meet all of the following criteria:

- Crosswalk is not controlled by a YIELD sign, STOP sign, or traffic signal.
- ADT is greater than or equal to 2,000 vehicles per day.
- Minimum pedestrian volume of 20 per peak hour or 200 per day.
- Minimum lane widths as shown in the table below.

Speed limit	Parking prohibited (both sides)	Parking permitted (both sides)
25 mph - not a bus or truck route	11 ft (22 ft two-way street)	19 ft (38 ft two-way street)
35 mph <u>or</u> 25 mph and bus or truck route	12 ft (24 ft two-way street)	20 ft (40 ft two-way street)

Section 2 Condition - Crosswalk must meet one of the following five criteria:

1. Crosswalk is immediately adjacent to a school (grades K-12), park, government building, or major pedestrian attractor (e.g., grocery store).
2. Street at crosswalk has three or more traffic lanes.
3. Auto-pedestrian injury at crosswalk within the last five years.
4. Clear unrestricted sight distance to the crosswalk is not possible due to uncorrectable conditions.
5. If the street at the crosswalk has two traffic lanes, the ADT is greater than or equal to 9,000.

Pedestrian Signals

Traffic signals and signs should be useful for all pedestrians, and should meet current accessibility guidelines. These signals can be installed if the engineering analysis justifies it including meeting the MUTCD (CA) Pedestrian Signal warrants

Accessible Pedestrian Signals

Accessible pedestrian signals (APS) communicate information about the WALK phase in audible and vibrotactile formats to assist individuals with visual or hearing impairments to cross the street (see inset). APS can provide information to pedestrians about:²³

- Existence of and location of the pushbutton
- Beginning of the WALK interval
- Direction of the crosswalk and location of the destination curb
- Intersection street names in Braille, raised print, or through speech messages
- Intersection signalization with a speech message
- Intersection geometry through tactile maps and diagrams, or through speech messages



To improve accessibility and predictability and to reduce crossing times and delay, the City recommends accessible pedestrian signals at all signalized intersections in the City of Alameda. This policy is based on the Transportation Element of the General Plan’s guiding policy 4.1.1.f.1.

“Upgrade existing pedestrian signals by adding countdown, audible, and tactile/vibrational signals. New signals should include these as standard features.”

The City recommends installing the APS and the pedestrian countdown signals at the same time, if possible, to reduce installation costs. The City also recommends integrating the speakers with the pushbutton on the APS.

Pedestrian Countdown Signals

Pedestrian countdown signals display the amount of time remaining to cross the street to help pedestrians decide whether to cross or to wait until the next interval (see inset). Recent studies by the City of San Francisco suggest that countdown signals significantly reduce vehicle and pedestrian collisions. Recent proposed changes to the national MUTCD would require that all new signals provide countdown signals and all existing signals must be upgraded within ten years.



Source:
www.walkinginfo.org

The City recommends pedestrian countdown signals at all signalized

²³ National Cooperative Highway Research Program, Accessible Pedestrian Signals: A Guide to Best Practices, June 2007, Chapter 1: Introduction (http://www.apsguide.org/chapter1_aps.cfm)

intersections in the City of Alameda. This policy is based on the Transportation Element of the General Plan guiding policy 4.1.1.f, which states:

“Upgrade existing pedestrian signals by adding countdown, audible, and tactile/vibrational signals. New signals should include these as standard features.”

The City recommends installing the accessible pedestrian signals and the pedestrian countdown signals at the same time, if possible, to reduce installation costs.

Pedestrian Signal Phasing

The most common types of pedestrian signal phasings provide a “WALK” (Walking Person) and then a “DO NOT WALK” (Flashing Orange Upright Hand) or a pedestrian countdown signal that are displayed concurrently with the green indication for motorists. Nevertheless, a number of vehicle/pedestrian collisions at signalized intersections involve left- and right-turning vehicles. Some phasing strategies to improve pedestrian safety are as follows

- Prohibiting right turns on red if capacity of the intersection allows.
- Providing the left-turn phase as a completely different time than the “WALK” phase.
- Providing a leading pedestrian interval, which is often referred to as “Advanced Pedestrian Signal Operation” or “Early Start”, with a two- to four-second “WALK” (Walking Person) in advance of the vehicular green indication so that vehicles in conflicting signal phases for pedestrians have an all-red interval for a few seconds. This strategy is most effective when heavy right turn traffic movements exist.

Pedestrian Signal Timing

Walking rates and crosswalk length should be used to calculate the pedestrian interval of a signal in accordance with the CA MUTCD standards. The recommended walking rate to use to calculate the pedestrian interval is 3.5 feet per second, which should accommodate shorter strides and less capable pedestrians. Special considerations should be made for wider intersections and for crossings where high volumes of older pedestrians or pedestrians with disabilities are expected.

The City is maximizing the pedestrian phase to match the green indication for vehicles so that pedestrians are allowed to use the entire green phase. This technique is currently being applied to newer traffic controllers with vehicle detection at intersection approaches, as the fixed time signals are not fitted with appropriate equipment. The City will continue to implement this approach of providing additional crossing time for pedestrians at all new signals and upgraded signals with vehicle detection capabilities.

Roundabouts

A roundabout is a circular intersection around a circular central island (see inset). Roundabouts on transit routes should be designed to accommodate bus operations and bus stops. Pedestrian access at intersections with roundabouts should consider:

- Well-defined walkway edges.
- Perpendicular crossings.
- High-contrast markings.
- Pedestrian lighting.
- Detectable warnings at street edge.
- Separated walkways, with landscaping at street edge to reduce prohibited crossings to center island.
- Bollards or architectural features to indicate crossing locations.



Source: www.pedbikeimages.org / Portland Office of Transportation

Improvements for speed control, yielding and gap creation could include:^{24 25}

- Pedestrian lighting.
- Reduced vehicular exit radius, while maintaining truck and emergency vehicle access.
- Reduced lane widths, while maintaining adequate bicycle and truck access.
- Single lane crossings at entrance and exit of roundabout.
- 'YIELD-TO-PED' markings/driver signs/beacons.

²⁴ U.S. Access Board, *Pedestrian Access to Modern Roundabouts: Design and Operational Issues for Pedestrians who are Blind*, www.access-board.gov/research/roundabouts/bulletin.htm

²⁵ National Cooperative Highway Research Program, *NCHRP Report 572: Roundabouts in the United States*, Transportation Research Board, Transportation Research Board of the National Academies, 2007.

Site Design

A developer should comply with all applicable policies and requirements in the current Pedestrian Master Plan. Key features in new developments that should be considered are as follows:^{26 27 28 29 30}

Design - General

- Minimize setbacks – locate buildings adjacent to sidewalks while maintaining adequate pedestrian visibility at driveways and intersections – Designing with Transit
- Building entrances for pedestrians should be located along the sidewalk while making sure that doors open inward. Any outward opening door must be accommodated in the setback – Designing with Transit, AASHTO, ADA, and City
- Make blocks part of a grid system and should be no longer than 500 feet – Designing with Transit and City of Alameda Transportation Element #4.1.1.k
- Reduce number of driveways and median openings. Each parcel is allowed to have one driveway. – City
- Buffer land uses adjacent to high volume streets without the use of sound walls. Where sound walls or buffers exist, breaks for pedestrian access should be considered wherever pedestrian routes would normally occur. – City’s Transportation Element #4.2.1.a
- Include landscaping in transportation projects to enhance the overall visual appearance of the facility and improve and treat urban runoff (see inset). – City’s Transportation Element #4.2.1.b
- Encourage the inclusion of amenities, such as benches or art, in pedestrian improvement projects. – City’s Transportation Element #4.2.2.f
- Identify and pursue opportunities to enhance shoreline access for pedestrians. – City’s Transportation Element #4.2.3.c
- Include improvements to pedestrian facilities as part of City transportation improvement projects (streets, bridges, etc.). – City’s Transportation Element #4.3.2.a



²⁶ American Association of State Highway and Transportation Officials, *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004, p.28.

²⁷ AC Transit, *Designing with Transit – Making Transit Integral to East Bay Communities*, December 2004, Chapter 4.

²⁸ Agerschou, Hans, *Planning and Design of Ports and Marine*, published by Thomas Telford, 2004, p. 293.

²⁹ Jones, Will, *New Transport Architecture: Travel Hubs in the 21st Century*, Sterling Publishing Company, Inc., 2006, p. 186.

³⁰ BC Ferries, *Crofton Terminal Conceptual Designs*, http://www.bcferries.com/bcf-apps/about/public_consult/bcf_pubs/docs/publications/Crofton-Matrix-001.pdf, 2005

Ferry Terminals

- Provide adequate shelter for passengers waiting to depart at no less than ten square feet per passenger – Planning and Design of Ports and Marines
- Provide facilities for restrooms– Planning and Design of Ports and Marines
- Provide quick entrance and exit of passengers on one level - New Transport Architecture
- Consider security features such as physical barriers and video surveillance - New Transport Architecture
- Separate loading/unloading flows from passenger pick-up and drop-off area - Crofton Terminal Conceptual Designs
- Preserve green and open space - Crofton Terminal Conceptual Designs

Parking Lots

- Where possible, locate parking lots and major driveways to the side or rear of the site – AASHTO and Design with Transit
- Limit the number of driveways in commercial areas by consolidating parking lots and structures – Designing with Transit

School Access

Pedestrian and bicycling facilities at school sites and in the vicinity of the school should meet the guidelines as shown in this document. Crossing guard programs and traffic calming measures also are shown to be beneficial. Refer to Appendix B for school signage, signal and marking standards. Each elementary and middle school should have a walking and bicycling route map as stated in the AMC under the “Traffic, Motor Vehicles and Alternative Transportation Modes” chapter (8-20.4 - Safe Route to Schools).



Traffic Control and Crossings Near Schools

According to the MUTCD (CA), upon request of the local school district, responsible traffic authorities shall investigate all locations along the school route and recommend appropriate traffic control measures. According to the California Vehicle Code (Section 21373), the city may require the requesting school district to pay an amount not to exceed 50 percent of the cost of the survey. To develop a school access plan, an engineering analysis should consider:³¹

- Number and age of children who are biking, walking and driven to school.
- Traffic volumes and speeds (existing and future).
- Existing traffic control devices and street infrastructure.
- Gaps in the traffic stream.
- Intersection and driveway visibility for motorists, pedestrians and bicyclists.
- Traffic collision statistics.
- Land uses surrounding school, including bus stops (existing and planned).

³¹ Ibid, pp. 35-38.

- Circulation to/from school including direction of travel, mode split and drop-off/pick-up times in concert with the surrounding area traffic peaks.
- Passenger loading zone operations.
- School staff insights on school access that may not be obvious during a field assessment.

Walkways

- Consider internal walkway throughout the site – AASHTO
- Provide street trees or landscaping for shade and to separate pedestrians from motor vehicle traffic – AASHTO
- Install accessible signage, information, and facilities – AASHTO
- Provide connections to adjacent neighborhoods and surrounding areas – AASHTO
- Implement direct pedestrian access between parking lots and buildings – Designing with Transit
- Consider dedicated walkways through parking lots – AASHTO
- Install wayfinding signs for pedestrians, especially to access adjacent transit stops and pedestrian facilities – Designing with Transit and AASHTO
- Provide pedestrian-scaled lighting – AASHTO and Designing with Transit

Waterfront Access

The Waterfront Access section focuses on waterfront access objectives, improvements, signage, and plants. This section is primarily extracted from the San Francisco Bay Conservation and Development Commission (BCDC) guidelines:

- A permit from BCDC is required for all development within 100 feet of the shoreline in the San Francisco Bay Area.
- *Shoreline Plants: A Landscape Guide for the San Francisco Bay* (March 2007)
- *Shoreline Signage: Public Access Signage Guidelines* (August 2005)
- *Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay* (April 2005)

Waterfront Access Objectives³²

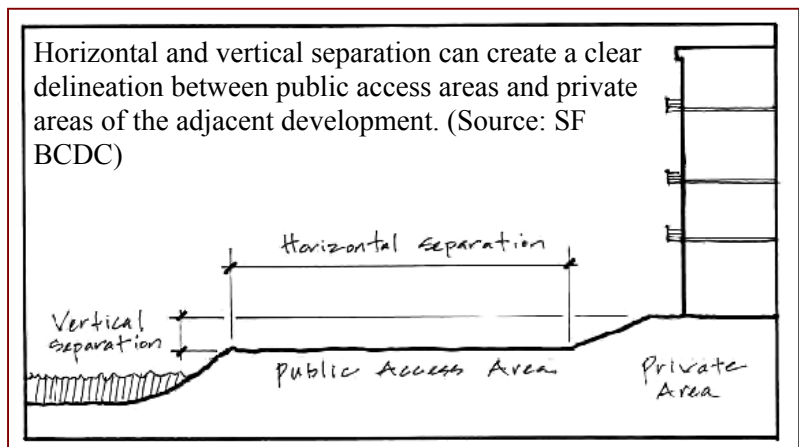
The public access objectives are to:

1. Make public access public.
2. Make public access usable.
3. Provide, maintain, and enhance visual access to the Bay and Alameda/Oakland Estuary shoreline.
4. Maintain and enhance the visual quality of the Bay, Alameda/Oakland Estuary shoreline, and adjacent developments.
5. Provide connections to the continuity along the shoreline.
6. Take advantage of the Bay setting.
7. Ensure that public access is compatible with wildlife.

1. Make Public Access Public

Shoreline areas are most used if they provide physical public access to and along the shoreline and visual public access to the Bay from other public spaces. The goal should be to design public access areas in a way that makes the shoreline enjoyable to the greatest number of people. This objective can be accomplished by:

- Developing shoreline access so that the path is the primary design element.



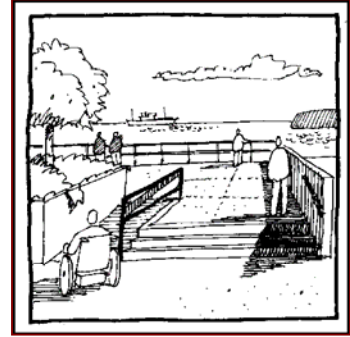
³² San Francisco Bay Conservation and Development Commission, *Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay* (April 2005).

- Designing public access so that the users’ appreciation is not diminished by large nearby building masses, structures or incompatible uses.
- Creating delineation between public areas and private developments.
- Using site furnishings to provide visual cues that the shoreline space is available.

2. Make Public Access Usable

Public access improvements should be designed for a wide range of users, and should respect all visitors’ experiences of the Bay. High active uses should be balanced with opportunities for passive activities. These objectives can be accomplished by:

- Taking advantage of existing site characteristics and opportunities.
- Providing opportunities and facilities to access the water or the Bay.
- Maximizing user comfort by designing for the weather, and day and night use.
- Providing play opportunities for children that have an artistic theme or an educational function.
- Incorporating accessibility improvements into public access areas.
- Designing public access spaces that are adequately secure.
- Providing interpretation of historical, cultural or natural attributes of the site.
- Providing public parking for convenient access to the Bay.
- Providing public amenities for different ages, interests and physical abilities.

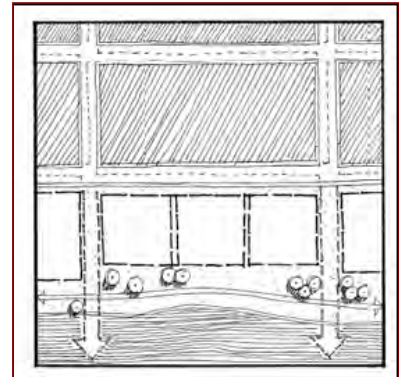


Design for persons with disabilities (Source: SF BCDC)

3. Provide, Maintain and Enhance Visual Access to the Bay and Alameda/Oakland Estuary Shoreline

The most widely enjoyed “use” of the Bay is simply viewing it from the shoreline, water or a distant viewpoint. This “use” can be increased and enhanced by:

- Locating buildings, structures, parking lots, and landscaping so that they enhance the view.
- Organizing shoreline developments to allow Bay views and access between buildings.
- Designing towers, bridges, or other structures as landmarks that suggest the location of the waterfront, even when the Bay itself is not visible.



Take advantage of existing streets and views that lead to the bay. (Source: SF BCDC)

4. Maintain and Enhance the Visual Quality of the Bay, Shoreline and Adjacent Developments

The visual quality of any shoreline development proposal should relate directly to a set of site-specific factors. The visual quality of the bay and its shoreline can be accomplished by:

- Providing visual interest and architectural variety to new buildings along the shoreline.
- Using building footprints to create a diversity of public spaces.
- Articulating shoreline building facades with human-scale elements.
- Using forms, materials, colors, and textures that are compatible with the Bay.
- Locating service areas away from the shoreline or screen them with fencing or landscaping.
- Using the shoreline for Bay-related land uses as much as possible.
- Selecting materials that create an architectural character in keeping with the existing buildings and maritime architecture of Alameda in terms of color, scale, and texture, and convey a sense of durability.³³

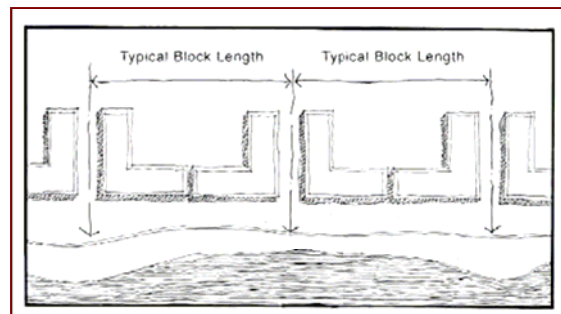


The berms and sawtooth seawall add visual interest and draw the viewer's gaze to the Bay. (Source: SF BCDC)

5. Provide Connections to and Continuity Along the Shoreline

Access areas are used most if they provide direct connections to public rights-of-way, are served by public transit, and are connected to adjacent public access or recreation areas. Connections and continuity along the shoreline can be accomplished by:

- Incorporating the designated Bay Trail route into shoreline projects.
- Providing clear and continuous transitions to adjacent developments.
- Connecting shoreline public access with other existing and planned public spaces.
- Using the local public streets to extend the public realm to the Bay.
- Providing connections perpendicular to the shoreline at regular intervals and based upon an engineering analysis to maximize opportunities for accessing and viewing the Bay.
- Providing pedestrian- and bicycle- friendly intersections and streets near the shoreline.



Distance between view corridors or public access opportunities should be about the length of a typical city block (Source: SF BCDC)

³³ City of Alameda, *Draft Northern Waterfront Design Guidelines*, May 2005.

6. Take Advantage of the Bay Setting

Development along the shores of the Bay should take maximum advantage of the attractive setting that the Bay provides. This objective can be accomplished by:

- Orienting the development to Bay views and providing physical connections to the Bay at every opportunity.
- Orienting public access areas to view opposite shores, landmarks, and adjacent maritime activities such as boat launching, gas docks, or ferry landings.
- Using the shoreline for Bay-related uses.

7. Ensure that Public Access is Compatible with Wildlife

The shoreline edge is a vital zone for wildlife. Public access allows visitors to discover, experience, and appreciate the Bay's natural resources. Nevertheless, public access may have adverse effects on wildlife. The damage can be mitigated by:

- Preparing a site analysis to generate information on wildlife species and habitats.
- Employing strategies to reduce or prevent adverse human and wildlife interactions.
- Planning public access in a way that balances the needs of wildlife and people.
- Providing visitors with diverse and satisfying public access options in designated areas.
- Avoiding habitat fragmentation, vegetation trampling, and erosion.
- Evaluating wildlife predator access and control in site design.
- Retaining existing marsh and tidal flats and restoring or enhancing wildlife habitat wherever possible.



Waterfront Access Improvements

Public access is a key component to shoreline development. Public access usually consists of multi-use trails to and along the shoreline of the Bay, and also allows for additional uses as described in the below section.

Streets

- Keep Bay and access areas in view from shoreline streets as much as possible.
- Provide buffers between streets and public access areas such as low berms or on-street parking, and maintain views of the Bay.
- Promote alternative modes of transportation with pedestrian and bicycle facilities adjacent to streets.

Parking and Staging Areas

- Provide off-street parking for shoreline access areas where appropriate, but keep parking areas reasonably sized, away from the Bay, and adequately screened.
- Provide signage to direct motorists to dedicated public access parking spaces.
- Provide convenient access for Bay Area residents and visitors with staging areas near local and regional waterfront parks.



Pedestrian and Bicycle Bridges

- Use bicycle and pedestrian bridges or other connectivity techniques (water shuttles) over waterways and tributaries to close gaps in the Bay Trail.
- Design bicycle and pedestrian bridges that are compatible with surrounding land uses, habitats, and adjacent developments.
- The width of a bicycle and pedestrian bridge should accommodate the expected level of use for that area. Multi-use bridges are usually at least ten feet wide.



Gathering Areas

- Provide gathering places that function as focal areas within larger public access space.
- Create spaces that provide a variety of user experiences ranging from areas that accommodate large group activities to quiet areas away from crowds.
- Provide plenty of seating choices such as fixed benches and chairs, picnic tables, retaining walls, planter seats, grass berms, steps, and moveable chairs. Some shaded seating also should be provided.
- Provide elevated places for viewing the Bay.

- Provide play opportunities for children that have an artistic theme or educational function.

Site Furnishings

- Provide site furnishings that follow the site’s characteristics and overall project design, and are appropriate for anticipated levels of use.
- Provide custom-made site furnishings to help create a “sense of place.”
- Orient seating towards Bay views or vistas of opposite shores or landmarks, such as bridges or towers.
- Provide durable site furnishing to minimize maintenance requirements.
- Provide enough lights to create a sense of safety, but design to control intensity, glare, and spillover.



Source: SF BCDC

Signage³⁴

Proper signage ensures that development projects within its jurisdiction provide maximum feasible public access to the shoreline by:

- Informing the public where public access areas are located and how to read them.
- Describing what recreational opportunities are available.
- Describing how the public can use the area with rules governing appropriate behavior.
- Providing interpretation of natural, historic and cultural features.

Public Shore Signs

Public shore signs should be installed that are in scale with the environment (see inset). There are three preferred sizes of the public shore sign:

- Three inches – Use for narrow trails and when other design elements are small or in rural areas.
- 12 inches – Use for intermittent trails and shoreline markings in developed areas.
- 18 inches – Use for major, distance-view locations such as trailheads located long distances from parking areas.



Source: BCDC
Shoreline
Signage

³⁴ San Francisco Bay Conservation and Development Commission, *Shoreline Signage: Public Access Signage Guidelines*, August 2005.

Parking Identification Signs

Parking identification signs should be installed where needed to identify public shore parking spaces or areas to motorists. Parking signs may be 12 or 18 inches wide.

Directional Signs

Install directional signs where needed to communicate to motorists, pedestrians, or bicyclists (see inset). Directional signs may be 12 or 18 inches wide.



Source: BCDC Shoreline Signage

Regulatory Signs

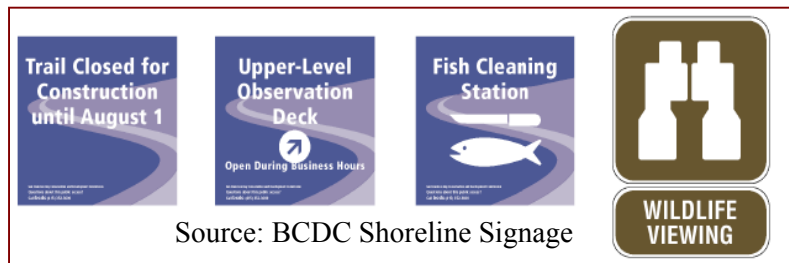
Regulatory signs are used to communicate behavior rules and expectations (see inset above).



Source: BCDC Shoreline Signage

Informational Signs

Informational signs are used to communicate general information, and may be installed on posts with other existing or proposed signs. Information signs may be 12 or 13 inches wide.



Source: BCDC Shoreline Signage

Shoreline Edge Treatments

- Tidal stairs provide visitors with a simple means of getting close to the water, but careful considerations should be given to facilities proposed lower than where algae normally occurs.
- Tidal ramps provide a means for access into the water, especially for windsurfers and persons with disabilities.
- Riprap can be designed to include seating elements with careful placement of appropriately sized rocks and stones.
- Sandy beaches provide convenient access to the water for human-powered watercraft and swimmers.
- Low-profile floats and docks provide safe launching and landing conditions for human-powered watercraft.
- Piers and overlooks enable users to walk out over the water.
- Vertical seawalls and railings provide visitors with the opportunity to stand at the water's edge.



Source: SF BCDC

Trail Design

- Coordinate with local and regional governments or ongoing projects to develop trails that meet current standards.
- Provide trail widths depending on anticipated level and type of use per the “Widths” section in the above Walkways chapter.
- Design trails to enhance experience and quality of movement along the shoreline.
- Use appropriate paving surface materials for the level of use at the site and that relates to adjacent developments.
- Provide pavement markings to direct pedestrian and bicycle traffic.
- Use durable materials to minimize maintenance requirements.



Public Access Across Travel Lifts and Launch Ramps

- Provide public access across boat yards and launch ramps in locations where safety precautions can be implemented.
- Provide overlooks, belvederes, decks or piers to provide the public with opportunities to observe boating activity at boat launch areas.

Plantings³⁵

This section discusses the role of plants to improve habitat and the public access experience and the needs of plants.

Plants can improve the public access experience by:

- Being placed along the shoreline to beautify the landscape and to enhance the visual experience for shoreline visitors.
- Enhancing and preserving views.
- Reinforcing a sense of place by planting native species that characterize the shoreline landscapes.

Plants Stabilize Shoreline

Plants along the Bay shoreline help stabilize the shoreline and reduce erosion. Using vegetation for shoreline stabilization has several advantages over more structural means:

- Lower installation cost.
- No need for heavy equipment access.
- Lower maintenance costs.
- Creation of a natural looking shoreline and wildlife habitat.
- Protection of water quality by filtering sediments and pollutants.

³⁵ San Francisco Bay Conservation and Development Commission, *Shoreline Plants: A Landscape Guide for the San Francisco Bay*, March 2007.

Guard Railings

- Design guardrails to allow for maximum views.
- Design guardrails that relate to the architectural or landscape style of the public access area.



Fishing Facilities

- Provide fishing opportunities along the shoreline, where feasible.
- Design fishing facilities that accommodate people with disabilities.
- Provide public information about potential fishing hazards.



Point Access at Ports and Water-Related Industrial Areas

- Provide the public with opportunities to safely view port activities and the operations of water-related industry.

Interpretive Elements and Public Art

- Provide the public with interpretive elements that add interest to the shoreline and create a varied and rich Bay experience.
- Provide interactive or kinetic site elements that allow people to more fully experience natural, cultural, or historical factors.
- Provide educational opportunities for public access users through identification of unique natural features and historical or cultural attributes.
- Provide public art that complements the Bay setting, adds visual interest to the shoreline, and provides visitors with a sense of discovery.



Appendix A: Guiding Policies

Federal

United States Code

The United States Code is a compilation of the general and permanent laws in the United States, and is divided into 50 chapters, which are known as titles. Title 23 (Highways), Section 217 focuses on bicycle transportation and pedestrian walkways, and states the following requirements:

“(g) Planning and Design. -

(1) In general. - Bicyclists and pedestrians shall be given due consideration in the comprehensive transportation plans developed by each metropolitan planning organization and state in accordance with sections 134 and 135, respectively. Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with all new construction and reconstruction of transportation facilities, except where bicycle and pedestrian use are not permitted.

(2) Safety considerations. - Transportation plans and projects shall provide due consideration for safety and contiguous routes for bicyclists and pedestrians. Safety considerations shall include the installation, where appropriate, and maintenance of audible traffic signals and audible signs at street crossings.”³⁶

Green Book

The American Association of State Highway and Transportation Officials (AASHTO) “Green Book”, which is formally titled *A Policy on Geometric Design of Highways and Streets (2004)*, provides guidance to transportation engineers throughout the country on design issues. One of the key sections that discusses pedestrians states the following recommendation:

“Pedestrians are a part of every roadway environment, and attention should be paid to their presence in rural as well as urban areas...Because of the demands of vehicular traffic in congested urban areas, it is often very difficult to make adequate provisions for pedestrians. Yet provisions should be made, because pedestrians are the lifeblood of our urban areas, especially in the downtown and other retail areas. In general, the most successful shopping sections are those that provide the most comfort and pleasure for pedestrians.”³⁷

Local

The City of Alameda has a unique network of pedestrian facilities. Pedestrian facilities can be found adjacent to the shoreline and lagoons, between residential properties where street intersection exceeds 600 feet, through parks, and on sidewalks. The City, with flat terrain, temperate climate, transit-oriented, dense land uses and waterfront access, is an ideal place to walk.

³⁶ http://www.access.gpo.gov/uscode/title23/chapter2_.html

³⁷ American Association of State Highway and Transportation Officials, *A Policy on Geometric Design of Highways and Streets*, Washington, D.C., Fifth Edition, 2004, p.96.

Alameda Municipal Code

Note that the Public Works Department staff will work with the City Council and other City departments to update the Alameda Municipal Code (AMC) where appropriate to match the pedestrian design guidelines as stated in this document.

Chapter VIII – Traffic, Motor Vehicles and Alternative Transportation Modes

8-20 - Pedestrians

8-20.1 - *Pedestrians' Limited Right to Use Roadway.*

When within a business or commercial district, no pedestrian shall cross a roadway, except at a crosswalk or regularly established pedestrian lane. In other districts throughout the City, if there be no marked crosswalk, no pedestrian shall cross a roadway other than by a route at right angles to the curb or by the shortest route to the opposite curb.

No person shall stand in any roadway, except in a safety zone or in a crosswalk, if such action shall interfere with the movement of traffic. This provision shall not apply to any public officer or employee or employee of a public utility when upon a roadway in line of duty.

(Ord. No. 535 N.S. § 17-271; Ord. No. 1098 N.S.)

8-20.3 - *Establishment of Pedestrian Signals.*

The Public Works Director is hereby authorized, based upon what generally accepted transportation engineering and planning standards indicate for the safety or adequate flow of all modes of transportation, to install pedestrian signals. The Public Works Director may elect to refer the issue to the Transportation Commission to seek its recommendation.

(Ord. No. 2881 § 11; Ord. No. 2973 N.S. § 14)

8-20.4 - *Safe Route to Schools.*

The Public Works Director in consultation with the Chief of Police and the Alameda Unified School District, shall recommend safe routes to schools. The Public Works Director may elect to refer the issue to the Transportation Commission to seek its recommendation.

(Ord. No. 2881 § 11; Ord. No. 2973 N.S. § 14)

8-21 - Crosswalks

8-21.1 - *Establishment and Marking of Crosswalks or Pedestrian Lanes.*

a. The Public Works Director is hereby authorized, based upon what generally accepted transportation engineering and planning standards indicate for the safety or adequate flow of all modes of transportation and pedestrians, to cause markers

or lines to be placed and maintained along the boundary lines of crosswalks or pedestrian lanes at all such street intersections and other points where in his/her judgment there is a need.

b. Except at intersections, no crosswalk shall be established in any block which is less than four hundred (400") feet in length. In blocks of greater length, no more than one (1) additional crosswalk shall be established, and such crosswalk shall be located, as nearly as practicable, at mid block.

(Ord. No. 535 N.S. § 17-281; Ord. No. 1098 N.S.; Ord. No. 2881 § 12; Ord. No. 2973 N.S. § 15)

Chapter XXII – Streets and Sidewalks

Article I. – Streets - 22-6 – Obstructions and Interference.

22-6.6 - Rules Governing the Placing of Building Material and Other Obstructions on Street or Sidewalk.

The following rules relating to the subject of this section are hereby adopted and shall be observed:

a. Such permits shall not authorize the occupation of any sidewalk or street, or part thereof, other than that immediately in front of the premises of the building for the construction of which the permit is issued. During the progress of building operations at least six (6') feet of sidewalk pavement covered by the permit shall be at all times kept clear of rubbish and dirt for the free and unobstructed use of pedestrians.

b. Whenever the conditions are such that the sidewalk must be occupied or removed, a temporary plank walk not less than (3') feet in width, with substantial railings, shall be constructed around the outside of the obstruction and maintained during the obstruction of the sidewalk.

c. If there are excavations on either side of the sidewalk, the sidewalk must be protected by substantial railings not less than two and one-half (2 ½') feet high from the floor of the walk. The railings to be maintained so long as such excavations continue to exist.

d. It shall be permitted for the purpose of delivering material to the basements of buildings, to construct elevated temporary sidewalks not less than six (6') feet in width and of a height not exceeding four (4') feet above the curb level of the street; and in case the sidewalk is so elevated it shall be provided with good substantial steps at each end of the same, and shall have railings as before specified on both sides thereof.

e. All approaches to excavations and depressions must be barricaded.

f. If the building to be erected is more than three (3) stories in height and is set at or near the street line, there shall be built over such sidewalk a roof having a framework and covering composed of supports and stringers of three by twelve (3 x 12) timbers, not more than four (4') feet from centers, covered with two (2) layers of two (2") inch plank. The roof shall be maintained as long as material is being used or handled on the street front and above the level of the sidewalk.

g. In all cases such temporary sidewalks, railings and approaches and the roofs over same shall be made as regards ease of approach, strength and safety, to the satisfaction of the Street Superintendent.

h. All gutters and waterways must be bridged over and kept clear of obstructions to the free passage of water.

i. Material or other obstructions must not be placed within twelve (12') feet of any hydrant of the City, used for fire purposes.

j. Lighted lanterns must be displayed and maintained at each end of every pile of material or other obstruction in the street, and at each end of every excavation, from 6:00 p.m. to 6:00 a.m.

k. Earth taken from excavations and rubbish taken from buildings must not be stored either upon sidewalks or roadways of streets, and must be removed from day to day as rapidly as produced. When dry rubbish, apt to produce dust, is being handled, it must be kept wetted down, so as to prevent its being blown about by the wind.

l. Whenever it becomes necessary for the safety of pedestrians to erect a fence in front of a building under construction, the fence if built upon the street or sidewalk, shall not exceed six (6') feet in height and shall contain no advertising matter.

m. The occupation of the street for the storage of building materials shall never exceed in front of any one (1) building, one-third (1/3) of the roadway of the same, and in streets containing railroad tracks, such occupation shall not come within four (4') feet of such railroad track.

(Ord. No. 535 N.S. § 5-166)

Article II. – Sidewalks - 22-16 – In General.

22-16.1 - Sidewalk Defined.

Sidewalk shall mean and include the space between the property line and the outer edge of the curb as located by ordinance of the City.

(Ord. No. 535 N.S. 5-211)

22-16.2 - Duty to Maintain.

Those persons who hold property interests in areas adjacent to sidewalks (fee or reversionary interest in the sidewalk) shall maintain those sidewalks free of holes, cracks or other defects which may cause persons to trip or fall thereon. The City may, upon failure of said persons to maintain, cause necessary repairs at owner's expense hereunder. Said persons shall indemnify the City for failure to maintain as required herein.

(Ord. No. 2024 N.S.)

Article II. – Sidewalks - 22-20 – Specifications.

22-20.4 - General Width and Location of Sidewalks.

Every public sidewalk must be not less than five (5') feet in width on each side of the street. The location must be adjacent to the property line except where previously established alignment exists or as approved by the Superintendent of Streets.

(Ord. No. 535 N.S. § 5-254; Ord. No. 1735 N.S.; Ord. No. 2537 N.S. § 6)

22-20.5 - Width and Grade of Concrete Sidewalks.

- a. Where the official width of sidewalk is greater than twelve (12') feet the concrete sidewalk portion shall be not less than six (6') feet in width except through special permission of the City Council.
- b. Where the official width of sidewalk is twelve (12') feet or less, concrete sidewalk shall be not less than five (5') feet in width.
- c. The sidewalk shall have a slope toward the top of the curb of one-fourth (1/4") inch to one (1') foot.
(Ord. No. 535 N.S. § 5-255; Ord. No. 1735 N.S.)

Chapter XXIII – Parks, Recreation Areas and Public Property

23-3 - Trees and Shrubbery.

23-3.3 - Trees, Plants, Shrubs that Extend into or Over Sidewalks and Streets.

All persons owning real property in the City of Alameda are responsible for keeping trees, plants, and shrubs which originate on their property from encroaching into the public right-of-way, from impeding pedestrian or vehicle traffic, or from obscuring traffic control devices.

Property owners are responsible for maintaining a minimum eight (8') foot vertical clearance over the width of the sidewalk, which abuts their property. Property owners are also responsible for maintaining a minimum vertical clearance of thirteen (13') feet, six (6") inches over any street adjacent to their property as measured from one (1') foot, six (6") inches from the face of the curb.

(Ord. No. 2887 N.S. § 1; Ord. No. 535 N.S. § 4-233)

Local Action Plan for Climate Change, Final Draft, February 2008

Transportation is the largest greenhouse gas emitter in the City. The City's Local Action Plan for Climate Change recommends the following initiatives to reduce the transportation sector's impact:

- Require that all new major developments' short- and long-term transportation emission impacts are reduced by ten percent;
- Provide transit and shuttles with signal priority lanes and queue jumpers to make transit a more attractive alternative to the automobile;
- Develop and fund alternative transportation strategies in the City's budget;
- Continue to convert the City's fleet to alternative fuel vehicles, such as biodiesel, electric, and other alternative fuels;
- Encourage Alameda employers to provide opportunities for "flex hours," compressed workweek, and telecommuting schedules to reduce vehicle miles traveled, and reintroduce transportation reduction programs;
- Expand the geographic area for Work/Live ordinance to provide greater opportunities for reduced work-related commutes;
- Encourage alternative fuel "Car Share" programs; and
- Develop Park & Ride lots and expand ridesharing opportunities in large-scale developments at major transportation access nodes.

General Plan’s Pedestrian-Related Policies

To preserve and improve the City’s pedestrian-friendly environment, the General Plan provides a number of specific, pedestrian-related guiding policies that relate to the Pedestrian Design Guidelines (Table 1).

Table 1: General Plan’s Pedestrian Design Guideline-related Goals, Objectives and Policies

Policy #	General Plan’s Goal, Objective or Guiding Policy
4.1 Circulation Goal	
<i>Objective 4.1.1: Provide for the safe and efficient movement of people, goods and services.</i>	
4.1.1.f	1. Upgrade existing pedestrian signals by adding countdown, audible, and tactile/vibrational signals. New signals should include these as standard features.
4.1.1.k	Minimize the creation of improvements that would physically interrupt existing grid systems , such as cul-de-sacs or diverters.
4.1.1.m	Develop a set of design criteria for safe passage of transit users, bicyclists, pedestrians, and people with disabilities through or around construction sites .
4.2 Livability Goal	
<i>Objective 4.2.1: Design and maintain transportation facilities to be compatible with adjacent land uses.</i>	
4.2.1.a	Buffer land uses adjacent to high volume streets without the use of sound walls. 1. Where sound walls or buffers exist, breaks for pedestrian access should be provided wherever pedestrian routes would normally occur.
4.2.1.b	Include landscaping in transportation projects to enhance the overall visual appearance of the facility and improve and treat urban runoff.
<i>Objective 4.2.2: Plan, develop and implement a transportation system that enhances the livability of our residential neighborhoods.</i>	
4.2.2.f	Encourage the inclusion of amenities , such as benches or art, in pedestrian improvement projects.
<i>Objective 4.2.3: Plan, develop and implement a transportation system that protects and enhances air and water quality, protects and enhances views and access to the water, and minimizes noise impacts on residential areas.</i>	
4.2.3.c	Identify and pursue opportunities to enhance shoreline access for pedestrians.

Policy # General Plan’s Goal, Objective or Guiding Policy

4.3 Transportation Choice Goal

Objective 4.3.2: Enhance opportunities for pedestrian access and movement by developing, promoting, and maintaining pedestrian networks and environments.

4.3.2.a Include improvements to **pedestrian facilities** as part of City transportation improvement projects (streets, bridges, etc.).

4.3.2.c Identify **gaps and deficiencies** in the City’s existing pedestrian network and develop strategies to rectify them.

1. Wherever possible, establish facilities on all **natural pedestrian routes** (both sides of streets and drives, along visually direct lines to major destinations, etc.).

2. Establish a program to plan for **future pedestrian paths** to connect streets, alleys, paths, etc., that are cut off from others (e.g., at the end of a cul-de-sac).

3. Use observations of common **pedestrian behavior**, from general studies or direct evidence such as informal paths in Alameda, to improve connections where feasible.

Objective 4.3.6: Coordinate and integrate the planning and development of transportation system facilities to meet the needs of users of all transportation modes.

4.3.6.a Review and update multi-modal **design standards** for lane widths, parking, planting area, sidewalks, and bicycle lanes to guide construction, maintenance, and redevelopment of transportation facilities consistent with the street classification system.

4.4 Implementation Goal

Objective 4.4.1: Require developers to reserve and construct (if nexus exists) rights-of-way, transportation corridors, and dedicated transportation facilities through the development process and other means.

4.4.1 1. Develop design guidelines for **pedestrian access** in new development and redevelopment areas, including shopping centers, residential developments, and business parks.

2. In any new development or re-development, safe and convenient **pedestrian connections** between major origins and destinations, including connections within the development and between the development and adjacent areas, should be a high priority in evaluating the site plan.

3. Develop **shoreline access** design guidelines.

Objective 4.4.3: When considering improvements to transportation facilities, the following issues should be addressed: traffic demand, preservation of neighborhood character, impacts to traffic operations including all modes of transportation, protection of historic and natural resources, utility and stormwater needs, the conservation of energy, and maintenance costs

4.4.3.a Utilize **alternative paving materials** and/or root barriers to help prevent sidewalk deterioration.

Traffic Calming Toolbox, February 2003

The *Traffic Calming Toolbox* consists of a summary of traffic calming measures that may be employed through the City of Alameda's Traffic Calming Program. The document shows a profile for each strategy or device, including a description, a list of its major advantages and disadvantages, issues related to its use and a general cost estimate. The measures described here are among the most common ones used around the country. Nevertheless, the omission of a strategy or device from the toolbox does not preclude its use in the City's program. The implementation of this toolbox follows traffic calming procedures developed by the City.

Appendix B: California Manual on Uniform Traffic Control Devices (MUTCD) School Standards

The guidance below discusses state and federal standards for signs, markings and signals in school zones. The City is obliged to follow these standards when considering Safe Route to School pedestrian enhancements.

Signs

Position of Signs

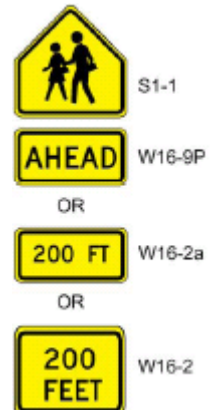
In urban areas, a lesser clearance of not less than 0.6 m (2 ft) from the face of the curb may be used. A clearance of 0.3 m (1 ft) from the curb face may be used where sidewalk width is limited or existing poles are close to the curb.

Sign Color for School Warning Signs

School warning signs shall have a yellow background with a black legend and border unless otherwise stated in this Design Guideline booklet.

Option: All school warning signs in addition to the following signs may have a fluorescent yellow-green background with a black legend and border:

- School Advance Warning sign (S1-1);
- SCHOOL BUS STOP AHEAD sign (S3-1);
- SCHOOL plaque (S4-3);
- XXX FEET plaque (W16-2 series);
- AHEAD plaque (W16-9p);
- Diagonal Arrow plaque (W16-7p); and
- Reduced Speed School Zone Ahead sign (S4-5, S4-5a).



Source: CA MUTCD

When the fluorescent yellow-green background color is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow-green backgrounds within a zone or area should be avoided.

School Advance Warning Assembly

The School Warning Assembly A (CA)

- Shall be used on streets with 40 km/h (25 mph) speed limits that are contiguous to a school building or school grounds.
- Should be posted at the school boundary
- May be posed up to 150 m (500 ft) in advance of the school boundary.



Source: CA MUTCD

The SCHOOL (S4-3) plaque shall not be used alone.

A 300 mm (12 in) reduced size in-street School Advance Warning (S1-1) sign, installed in compliance with the mounting height and breakaway requirements for In-Street Pedestrian Crossing (R1-6) signs:



Source: CA MUTCD

- May be used in advance of a school crossing to supplement the ground-mounted school warning signs.
- May have a 300 x 150 mm (12 x 6 in) reduced size AHEAD (W16-9p) plaque mounted below the reduced size in-street School Advance Warning (S1-1) sign.

School Crosswalk Warning Assembly

The School Crosswalk Warning Assembly E (CA)

- Shall be installed in an overhead location at the marked crosswalk, or as close to it as possible.
- Shall consist of a School Advance Warning (S1-1) sign supplemented with a Double Diagonal Arrows (W66B (CA)) plaque to show the location of the crossing.
- Shall not be used at marked crosswalks other than those adjacent to schools and those on established school pedestrian routes.
- Along with the School Crosswalk Warning Assembly B (CA), shall not be installed on approaches controlled by a STOP sign, a Yield sign, or a traffic signal.

The In-Street Pedestrian Crossing (R1-6 or R1-6a) sign:

- May be used at unsignalized school crossings.
- May be mounted above a 300 x 100 mm (12 x 4 in) SCHOOL (S4-3) plaque when used at a school crossing.



A 300 mm (12 in) reduced size School Advance Warning (S1-1) sign:

- May be used at an unsignalized school crossing instead of the In-Street Pedestrian Crossing (R1-6 or R1-6a) sign.
- May have a 300 x 150 mm (12 x 6 in) reduced size Diagonal Arrow (W16-7p) plaque mounted below the reduced size in-street School Advance Warning (S1-1) sign.”



Source: CA MUTCD

School Bus Stop Ahead Sign

The SCHOOL BUS STOP AHEAD (S3-1) sign shall be installed in advance of an approved school bus stop where there is not a clear view in advance of the stop from a distance of 60 m (200 ft).



S3-1

Source: CA MUTCD

School Speed Limit Assembly

The School Speed Limit Assembly C (CA)

- Shall be used on streets with speed limits greater than 40 km/h (25 mph) that are contiguous to a school building or school grounds.
- May be posted up to 150 m (500 ft) in advance of the school boundary.

Hence, the Specific Time Period Plaque (S4-1), WHEN FLASHING (S4-4) and SCHOOL SPEED LIMIT 20 WHEN FLASHING (S5-1) signs shall not be used in California.



Source: CA MUTCD

Reduced Speed School Zone Ahead Sign

The Reduced Speed School Zone Ahead (S4-5, S4-5a) sign:

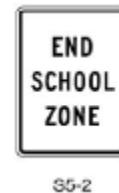
- May be used to inform street users of a reduced speed zone when engineering judgment indicates that advance notice would be appropriate for the School Advance Warning Assembly D (CA).
- Shall be followed by a School Speed Limit sign or a School Speed Limit Assembly C (CA).
- The speed limit shall be identical to the speed limit displayed on the subsequent School Speed Limit sign or School Speed Limit Assembly C (CA).



Source: CA MUTCD

End School Zone Sign

The end of an authorized and posted school speed zone shall be marked with a standard Speed Limit sign showing the speed limit for the section of highway that follows or with an END SCHOOL ZONE (S5-2) sign.



Source: CA MUTCD

Parking and Stopping Signs

Parking and stopping regulatory signs may be used to prevent parked or waiting vehicles from blocking pedestrians' views, and drivers' views of pedestrians, and to control vehicles as a part of the school traffic plan. Typical examples of regulations are as follows:

- No Parking X:XX AM to X:XX PM School Days Only
- No Stopping X:XX AM to X:XX PM School Days Only
- X Min Loading X:XX AM to X:XX PM School Days Only
- No Standing X:XX AM to X:XX PM School Days Only

Street closures are authorized by local ordinance or resolution on streets crossing or dividing school grounds when necessary for the protection of persons attending the school.

Markings

Crosswalk Markings

Crosswalk markings should be designed following the guidelines below:

- Shall be solid white or yellow, marking both edges of the crosswalk, except as noted in the Option.
- Minimum width: 300 mm (12 in).
- Maximum width: 600 mm (24 in).
- Crosswalks in streets contiguous to a school building or school grounds shall be yellow.
- If any one crosswalk at an intersection is required to be yellow, all other marked pedestrian crosswalks at that intersection shall also be yellow.

Option: A marked pedestrian crosswalk may be yellow if:

- The nearest point of the crosswalk is not more than 180 m (600 ft) from a school building or school grounds.
- The nearest point of the crosswalk is not more than 850 m (2800 ft) from a school building or school grounds.
- There are no intervening crosswalks other than those contiguous to school grounds.
- It appears that the facts and circumstances require special marking for the protection and safety of persons attending the school.

Stop and Yield Lines

If used, stop lines (limit lines) should follow the below guidelines:

- Stop lines should be solid white lines extending across approach lanes to indicate the point at which the stop is intended or required to be made.
- Minimum width: 300 mm (12 in).
- Maximum width: 600 mm (24 in).
- Marked crosswalks function as limit lines as well.

If used, yield lines shall consist of a row of solid white isosceles triangles pointing toward approaching vehicles extending across approach lanes to indicate the point at which the yield is intended or required to be made.

Curb Markings for Parking Regulations

Whenever local authorities enact local parking regulations and indicate them by the use of paint upon curbs, the following colors only shall be used, and the colors indicate as follows:

- Red indicates no stopping, standing, or parking, whether the vehicle is attended or unattended, except that a bus may stop in a red zone marked or sign posted as a bus loading zone.
- Yellow indicates stopping only for the purpose of loading or unloading passengers or freight for the time as may be specified by local ordinance.
- White indicates stopping for either of the following purposes:
 - Loading or unloading of passengers for the time as may be specified by local ordinance.

- Depositing mail in an adjacent mailbox.
- Green indicates time limit parking specified by local ordinance.
- Blue indicates parking limited exclusively to the vehicles of disabled persons and disabled veterans.

Regulations adopted pursuant to the above colors shall be effective on days and during hours or times as prescribed by local ordinances.

Pavement Word and Symbol Markings

Word and symbol pavement markings shall be constructed follow the guidelines below:

- Word and symbol markings shall be white or yellow.
- Word and symbol markings shall not be used for mandatory messages except in support of standard signs.

The different types of word and symbol markings shall be constructed following the guidelines below:

- The SCHOOL pavement marking shall be used and it shall be restricted to a single lane.
- If used with the School Assemblies A (CA) or C (CA), the SCHOOL marking shall be yellow.
- The SLOW SCHOOL XING marking shall be used in accordance with the provisions of CVC 21368 in advance of all yellow school crosswalks.
- They shall not be used where the crossing is controlled by stop signs, traffic signals, or yield signs.
- They shall be yellow, with the word XING at least 30 m (100 ft) in advance of the school crosswalk.
- If the SCHOOL XING marking and crosswalks are used at remote locations outside of the school zone, they shall be white.



Source: CA MUTCD

Signals

School Crossing Warrant

The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of school children at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the children are using the crossing is less than the number of minutes in the same period and there are a minimum of 20 students during the highest crossing hour.

Before a decision is made to install a traffic control signal, consideration shall be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.

The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 90 m (300 ft), unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Criterion for School Crossing Traffic Signals

School crossing traffic signals shall be built using the following guidelines:

- The signal shall be designed for full-time operation.
- Pedestrian signal faces of the International Symbol type shall be installed at all marked crosswalks at signalized intersections along the “Suggested Route to School”.
- If an intersection is signalized under this guideline for school pedestrians, the entire intersection shall be signalized.
- School area traffic signals shall be traffic-actuated type with push buttons or other detectors for pedestrians.
- Non-intersection school pedestrian crosswalk locations may be signalized when justified.

Flashing Beacons at School Crosswalks

Flashing beacons at school crosswalks may be installed on State highways in accordance with CVC Sections 21372 and 21373.

Flashing yellow beacons may be installed to supplement standard school signing and markings for the purpose of providing advanced warning during specified times of operation when justified. A flashing yellow beacon may be justified when ALL of the following conditions are fulfilled:

- The uncontrolled school crossing is on the “Suggested Route to School”.
- At least 40 school pedestrians use the crossing during each of any two hours (not necessarily consecutive) of a normal school day.
- The crossing is at least 180 m (600 ft) from the nearest alternate crossing controlled by traffic signals, stop signs or crossing guards.

- The vehicular volume through the crossing exceeds 200 vehicles per hour in urban areas or 140 vehicles per hour in rural areas during the same hour the students are going to and from school during normal school hours.
- The critical approach speeds exceed 55 km/h (35 mph) or the approach visibility is less than the stopping sight distance.

If school authorities are to operate flashing yellow beacon, an inter-agency agreement shall be executed to assure designations of a responsible adult to operate the beacon controls and to provide accessibility for necessary equipment maintenance.

Where traffic signals or flashing beacons are justified only by the School Area Traffic Signal Warrant on a State highway, the installation shall be at 100 percent State expense. When any other warrant also is met, the cost is shared in the usual manner.

Application of Pedestrian Signal Heads

Pedestrian signal heads shall be used in conjunction with vehicular traffic control signals under any of the following conditions:

- If a traffic control signal is justified by an engineering study and meets either Warrant 4, Pedestrian Volume or Warrant 5, School Crossing.
- If an exclusive signal phase is provided or made available for pedestrian movements in one or more directions, with all conflicting vehicular movements being stopped.
- At an established school crossing at any signalized location.
- Where engineering judgment determines that multiphase signal indications (as with split-phase timing) would tend to confuse or cause conflicts with pedestrians using a crosswalk guided only by vehicular signal indications.

Application of In-Street Lights

In-Street Lights are special types of highway traffic signals installed in the street surface to warn street users that they are approaching a condition on or adjacent to the street that might not be readily apparent and might require the street users to slow down or come to a stop. These situations include, but are not necessarily limited to:

- Warnings of marked school crosswalks.
- Marked mid-block crosswalks.
- Marked crosswalks on uncontrolled approaches.
- Marked crosswalks in advance of roundabout intersections as described in Sections 3B.24 and 3B.25.
- Other street situations involving pedestrian crossings.