

# SAN FRANCISCO BAY TRAIL

DESIGN GUIDELINES  
AND TOOLKIT

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ASSOCIATION OF BAY AREA GOVERNMENTS

FEBRUARY 22, 2016  
PUBLIC REVIEW DRAFT







# SAN FRANCISCO BAY TRAIL DESIGN GUIDELINES AND TOOLKIT

ASSOCIATION OF BAY AREA GOVERNMENTS

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Public Review Draft

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PlaceWorks

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**FUNDED BY:**

State of California Coastal Convergency

# ACKNOWLEDGEMENTS

## BAY TRAIL BOARD OF DIRECTORS

A 28-member board that governs the Bay Trail. The Board of Directors represents a broad range of public agency, non-governmental organizations, and private interests.

A smaller steering committee of the Board addresses program, planning, design, use, and management issues particular to the Bay Trail.

## BAY TRAIL STAFF MEMBERS

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# Introduction

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*These guidelines offer direction and define goals to facilitate the design and development of a San Francisco Bay Trail system that is safe, connected and continuous; provides a positive user experience that encourages people to use the trail; and maximizes access to and use by the broadest spectrum of people possible. The guidelines are general in scope due to the varied conditions through which the San Francisco Bay Trail passes and the variety of users and types of uses that occur along the trail. They are applicable to all development of the San Francisco Bay Trail and are intended to complement national, state, and local design standards and guidelines. Different segments of the San Francisco Bay Trail will likely need to address different site opportunities and constraints.*

*Background: Berkeley*

## WHAT IS THE SAN FRANCISCO BAY TRAIL?

San Francisco Bay, one of the largest estuaries in North America, influences and enhances the natural, aesthetic, and economic vitality of the entire Bay region, much to the benefit of millions of residents and visitors. The San Francisco Bay is the dominant open space amenity of the Bay Area.

When completed, the San Francisco Bay Trail (the Bay Trail) will be a 500-mile green transportation and recreation route for walking and cycling around the entire San Francisco Bay. The Bay Trail will run through all nine Bay Area counties, 47 cities, and across seven toll bridges. As a long-distance trail, the Bay Trail links communities and people with each other, links people with their environment, and links people with their own sense of well-being and health. Because the Bay Trail leads to and runs along the shoreline of the Bay, it also provides access for fishing, picnicking, windsurfing, boating, nature education, and other waterfront activities.



## WHY IS THERE A SAN FRANCISCO BAY TRAIL?

### Legislative History

Senate Bill 100, authored by then-state Senator Bill Lockyer and passed into law in 1987, created the vision of the Bay Trail and directed the Association of Bay Area Governments (ABAG) to develop a plan for a “ring around the Bay”. The Bay Trail Plan, adopted by ABAG in July 1989, includes a proposed alignment, a set of policies to guide the future selection and implementation of routes, and strategies for implementation and financing. Since its inception, the Bay Trail Plan has enjoyed widespread support. The majority of counties and cities through which the Bay Trail passes have included the Bay Trail in General Plans, specific plans, bicycle plans, and/or pedestrian plans.



### Needs and Public Benefits

The importance of the Bay Trail to the quality of life for millions of Bay Area residents and visitors cannot be overstated. The San Francisco Bay Trail is a one-of-a-kind signature amenity for the Bay Area. At over 500 miles in length the completed Bay Trail and the benefits it provides will be unparalleled in the nation. Public benefits of the Bay Trail include:

- **Transportation:** As a transportation facility, the Bay Trail serves as an important commute alternative for cyclists and pedestrians, and connects to numerous public transportation features, including ferry terminals, airports, light-rail lines, bus stops, Caltrain, Amtrak, and BART.
- **Recreation:** The Bay Trail provides scenic recreation for a wide variety of users including hikers, joggers, bicyclists, skaters and wheelchair users, among others.
- **Health:** The Bay Trail facilitates physical activity through settings that provide multiple benefits for the body and mind.
- **Natural Resources:** Following the Bay’s shoreline, the Bay Trail allows the public to discover, experience and appreciate the Bay’s waters and wildlife. The Bay Trail fosters public support for Bay resource protection, including habitat acquisition and restoration.
- **Connections:** The Bay Trail offers access to commercial, industrial and residential

neighborhoods; points of historic, natural and cultural interest; and recreational areas like beaches, marinas, fishing piers, and boat launches. The Bay Trail connects over 130 parks and wildlife areas totaling over 57,000 acres of open space. It links highly urbanized areas like downtown San Francisco to remote natural areas like the Don Edwards San Francisco Bay National Wildlife Refuge.

- **Tourism:** The Bay Trail is a scenic route that visitors from throughout the world use to experience the Bay.

### BAY TRAIL FACTS

- Over 2.7 million people, nearly 40% of the local population, live within 2 miles of the Bay Trail.
- There are now 1.6 million jobs within the same 2-mile side area, accounting for over 50% of all the jobs in the Bay Area.
- The completed Bay Trail will be accessible to over 7,000,000 people living in the Bay Area in 2015 and over 9,250,000 projected to live in the area by 2040.



Richmond Marina  
Source: Flickr (San Francisco Bay Trail Project)

## PURPOSE OF THESE DESIGN GUIDELINES AND TOOLKIT

The purpose of these guidelines and toolkit is to provide the San Francisco Bay region with a design resource applicable to any projects that include the San Francisco Bay Trail. These guidelines provide goals and direction for site planning and trail design to facilitate achievement of the Bay Trail vision. These guidelines establish a set of design principles aimed at developing and managing the San Francisco Bay Trail while providing for the protection of Bay resources, regional livability, and local economic prosperity.

These Guidelines and Toolkit reflect a Bay Trail that:

- is intended to be a system of shoreline multi-use paths separated from vehicular traffic.
- consists of either dedicated bicycle lanes or cycle tracks with complementary pedestrian walkways and promenades in some areas where a shoreline, off-street, multi-use trail may not be achievable.
- is to be sustainable over time, reflect current safety standards, accommodate future use levels when the entire Bay Trail system is completed, and recognize changing needs and environmental conditions such as sea level rise.

These guidelines and tools should not constrain inspiration when an opportunity exists for a trail design that is visionary.

## WHO WILL USE THESE GUIDELINES AND TOOLKIT?

The Bay Trail Design Guidelines and Toolkit have been developed for use by:

- **Design Team** – Developers, land planners, landscape architects, engineers, architects and other members of professional teams designing projects along the shoreline with access to and along it.
- **Public Agencies** – Cities, counties, special districts, and regional, state, and federal agencies involved in resource protection, land use planning, and the development of transportation and recreation trail facilities.
- **San Francisco Bay Conservation and Development Commission** – Staff, Design Review Board members, and Commission members when considering the siting and design of shoreline public access proposals.
- **The Public** – Community groups and individuals where understanding the goals of the Bay Trail and ways it may be implemented will encourage completion of the trail system and upgrading trail facilities over time.

## HOW TO USE THESE GUIDELINES AND TOOLKIT

The Design Guidelines are broad statements about trail dynamics that should be considered in designing any segment of the Bay Trail. The Toolkit presents design scenarios for the Bay Trail and general performance specifications.

The four-step process below should help everyone plan, design, and evaluate the Bay Trail for its effectiveness in creating a valuable multi-use trail.

1. Comprehend the **Design Approach** considerations outlined in Section 2.
2. Meet the **Design Principles and Objectives** found in Section 3.
3. Understand the variety of settings and context for the Bay Trail as characterized in Section 4: **A Gallery of Settings**.
4. Refer to The **Design Toolkit** in Section 5 and, along with referencing other national, state, and local guidelines, develop a Bay Trail design that reflects the setting within which it occurs while meeting the Bay Trail Design Principles and Objectives.

## THE BAY TRAIL, PUBLIC ACCESS, AND THE SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

The San Francisco Bay Conservation and Development Commission (BCDC) was created by the California Legislature in 1965 under the McAteer-Petris Act in response to broad public concern over the future of the San Francisco Bay. The Commission is charged with, among other activities, regulating new development within 100 feet of the Bay shoreline to ensure that maximum feasible public access to the Bay is provided. As defined by the Commission's *San Francisco Bay Plan*, "public access" includes physical public access to and along the shoreline of the Bay and visual public access (views) to the Bay from other public spaces. In most cases, this public access involves accommodating the San Francisco Bay Trail.

The BCDC publication *Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay* provides general guidance about the design variables that the Commission addresses in conducting its design review of permit applications, including reference to the Bay Trail. The Bay Trail Design Guidelines and Toolkit are intended to be complementary to those of BCDC relating to shoreline access.

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# Design Approach

*Background: Emeryville | Source: BCDC*



## UNDERSTAND WHO USES THE BAY TRAIL

The Bay Trail, simply defined, accommodates pedestrian, bicycle and other non-motorized forms of movement. However, Bay Trail users cannot be easily characterized as simply bicyclists or pedestrians. The goal of the Bay Trail is to accommodate and provide access to the largest spectrum of non-motorized users possible.

Bay Trail users can be:

- any age with any level of physical, audial, and visual ability
- solo travelers, small groups that might be traveling side-by-side, or part of a bicycle club or large group led by a docent or teacher.
- on individual bicycles, tandem bicycles, bicycles with trailers, or tricycles.
- using skateboards, rollerblades, or non-motorized scooters.
- carrying nothing or carrying picnic baskets, coolers, fishing equipment, surf and windsailing equipment, or kayaks.
- pushing strollers or pulling wagons with children in them.
- walking, running, or bicycling with one or more dogs.

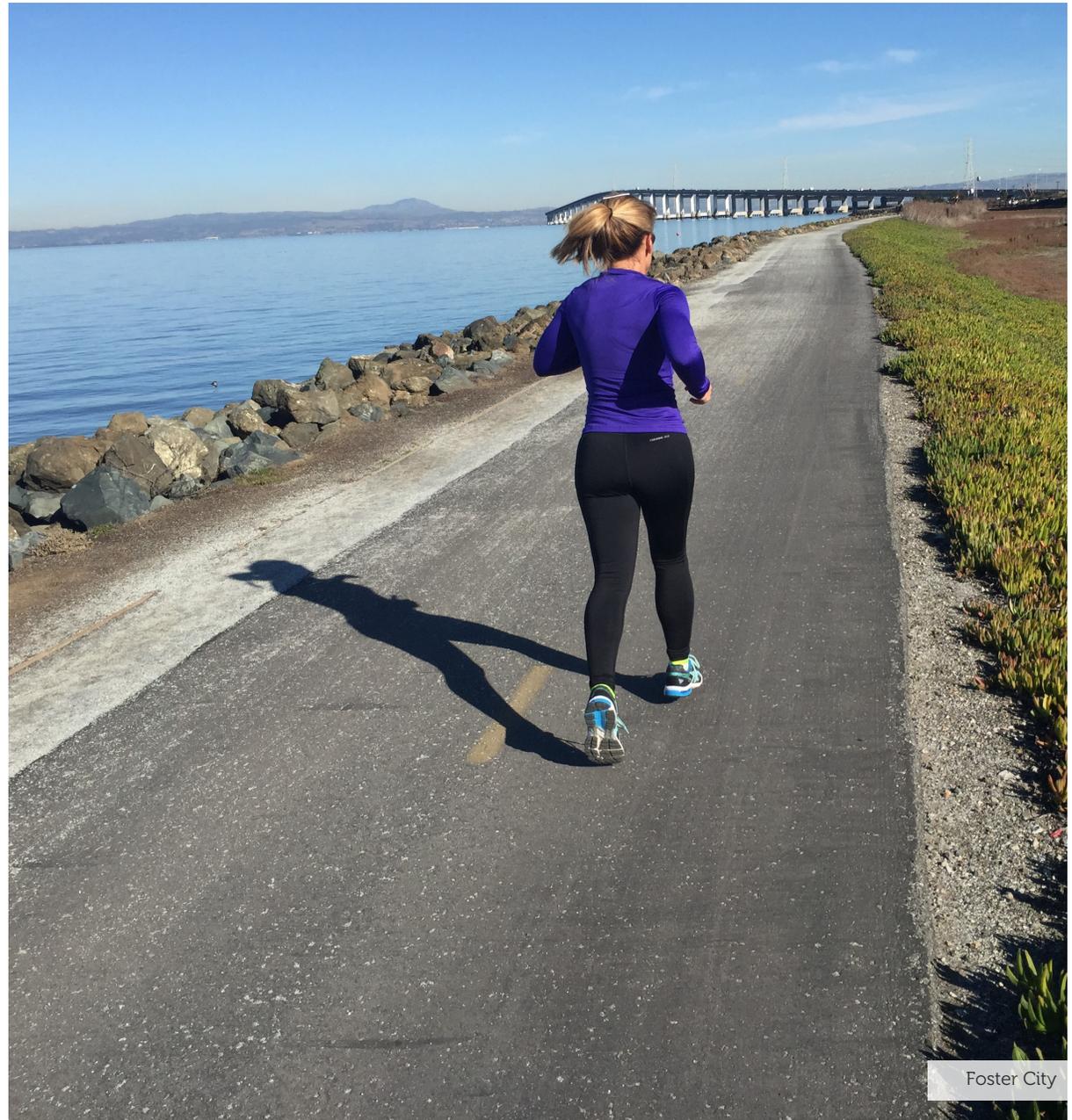
1. Oakland | Source: Flickr (SF Bay Trail Project)
2. Novato | Source: Pamela via marinmommies.com
3. San Francisco
4. Berkeley
5. Oakland | Source: Flickr (Robert Prinz)
6. Richmond | Source: Flickr (SF Bay Trail Project)
7. San Francisco
8. Palo Alto Bayland | Source: Flickr (SF Bay Trail Project)
9. Oakland
10. Berkeley
11. Crissy Field | Source: Presidio Trust
12. Foster City

## UNDERSTAND BAY TRAIL USE DYNAMICS

Bay Trail users can be:

- moving quickly such as when commuting to work on a bicycle.
- not moving at all to take in views of the Bay and the activities occurring on it.
- moving along at any speed in between.

Because of this varied use, the paramount design consideration related to the Bay Trail is understanding the dynamics of shared-use and user safety. The most significant design challenge is that trail use cannot be easily categorized. A chief Bay Trail design goal is to provide sufficient future capacity, width, line of sight, and in some cases delineating the trail corridor to accommodate this variety of use and help minimize conflicts among uses. A critical concept in design of the Bay Trail is consideration of its use level when the entire Bay Trail system is completed and linked to nearby communities.



Foster City

The Bay Trail surface will typically be paved but may also include non-paved jogging shoulders. In sensitive habitat areas, the surface can be constructed of stabilized natural materials.



Berkeley Marina

## DESIGN COMPREHENSIVELY

Design implies intent, and each segment of the Bay Trail involves a wide range of opportunities and constraints requiring careful investigation and thoughtful design decisions.

Sometimes trail design choices are clear and straightforward, as when a perennial stream must be crossed and a bridge is needed. Sometimes the choices are more complex. Key design considerations include:

- **Collaboration:** Designing the Bay Trail should not be done in a vacuum. There are numerous local and regional agencies whose individual policies and standards about the Bay Trail and its setting need to be considered. These will vary from trail segment to trail segment. Communication among involved professionals is paramount to a successful design that can be both permitted and constructed.
- **Width and Sight Lines:** With some exceptions, the Bay Trail rarely travels in a straight line. It turns because of topography, to avoid obstacles, or to capture important views of the Bay. The Bay Trail travels up and down slopes, over and under roads, railroads, and streams, and follows the contours of the Bay itself. The Bay Trail corridor, i.e., the right-of-way around the actual trail, should be planned and designed to be wide enough

to accommodate the expected future level of use when the Bay Trail system is fully completed.

- **Surface:** The Bay Trail surface will typically be paved but may also include non-paved jogging shoulders. In limited cases, such as in areas of sensitive habitat or on levees with particular maintenance conditions, the entire trail tread may be composed of stabilized natural materials. See also Section 5.1.
- **Water Quality:** To protect the Bay, storm water runoff from the trail should be managed with sheet drainage directed to a system of water quality control features or through use of permeable paving materials.
- **Constrained Right-of-Way:** On occasion, the planning and design of the Bay Trail involves accommodating physical limitations. In these instances, creative solutions are required such as reducing the width of adjacent road travel lanes, eliminating trail shoulders, or adding signage or other safety measures.



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# Design Principles and Objectives

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*Background: Berkeley*



Benicia State Recreation Area

In designing the Bay Trail, there are seven essential principles that should be considered and addressed for any trail segment. These principles include:

- 3.1** User Experience and Safety
- 3.2** Continuity and Connectivity
- 3.3** Universal Access
- 3.4** Proximity to the Bay
- 3.5** Expected Levels of Use
- 3.6** Compatibility with Wildlife
- 3.7** Sea Level Rise

The following sections elaborate on each of the above principles and provide design objectives for each.

## 3.1 USER EXPERIENCE AND SAFETY

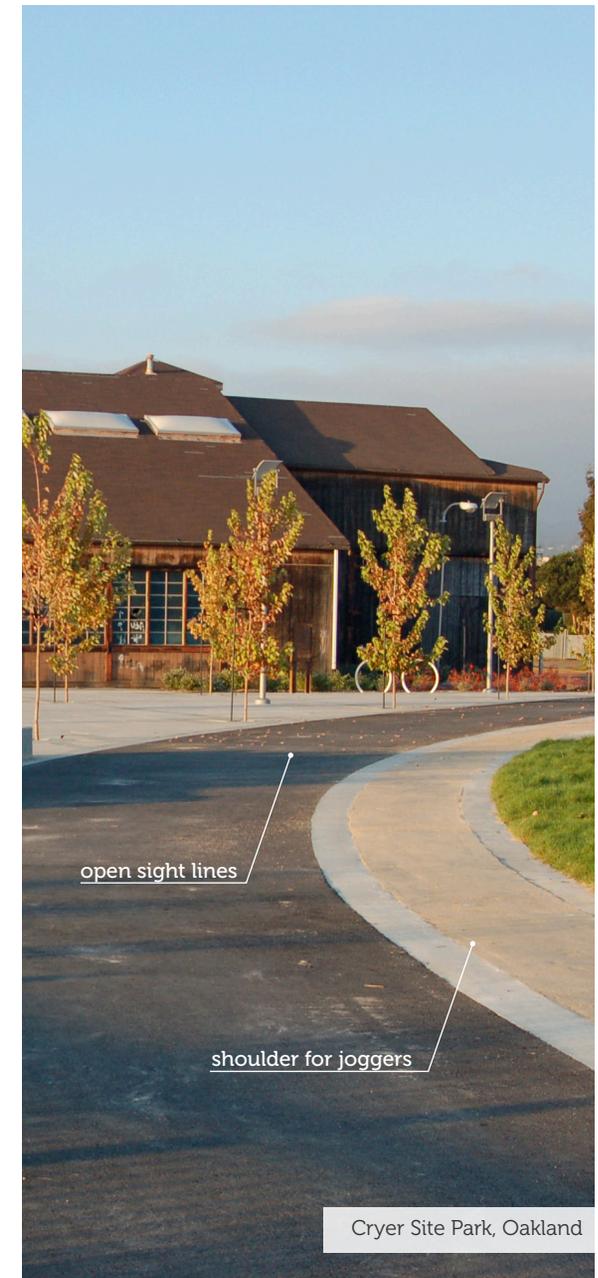
### MAKE THE BAY TRAIL ENJOYABLE AND SAFE FOR ALL

Safety will always be the prime directive of Bay Trail design. A well-designed trail is a safe trail that minimizes conflicts between trail users and other nearby activities. At the same time a well-designed trail encourages use, improves the user experience, and reduces the managing agency's liabilities.

#### OBJECTIVES TO ACCOMPLISH THIS PRINCIPLE:

- Developing a complete trail around the Bay that is separate from motor vehicles.
- Providing an adequate buffer to create a safe and positive user experience that considers design elements of sights, sounds and fresh air.
- Designing a trail wide enough to accommodate expected future levels and types of use, and to provide adequate capacity in order to minimize conflicts between trail users.
- Developing the Bay Trail with open sight lines to accommodate existing and future users avoiding obstructions and also for personal safety.

- Specifying trail and shoulder surfaces that accommodate different users such as bicyclists and joggers.
- Avoiding constraining trail conditions such as being enclosed by fences or other vertical features that reduce the functional width of the trail
- Providing safety and security lighting to accommodate 24 hours a day, 7 days a week access.
- Providing essential public amenities such as benches, drinking fountains, bike repair stations, and restrooms that encourage and support long-distance travel.
- Providing clear and visible wayfinding and distance signage at all decision-making points to identify the Bay Trail and at regular intervals as needed when the Bay Trail is located on-street.





Bay Trail design considering continuity of travel, lines of sight, turning movements, and physical obstructions

San Mateo

## 3.2 CONTINUITY AND CONNECTIVITY

### ASSURE A CONTINUOUS LINEAR EXPERIENCE

The Bay Trail is about continuous linear travel. The Bay Trail will be fully functional when it provides a continuous loop around the Bay and connects all 9 counties of the Bay Area and the 47 cities that front the Bay. From a functional standpoint, the Bay Trail design must consider all the dynamics involved with two-way circulation for bicyclists and pedestrians including continuity of travel, lines of sight, turning movements, user interactions, traffic signs and signalization, physical obstructions, and connections to nearby destination points.

Direct pedestrian and bicycle connections from adjacent cities, activity centers, park and recreation areas, and public transit facilities, including BART, light rail, and ferry service, will exponentially increase Bay Trail use by the general public.

### OBJECTIVES TO ACCOMPLISH THIS PRINCIPLE:

- Incorporating the Bay Trail into all shoreline projects and providing clear, continuous and seamless transitions to adjacent segments of the Bay Trail and local and regional trail systems.
- Working with property owners and local jurisdictions to provide clear transitions to the Bay Trail from other bicycle and pedestrian facilities.
- Providing clear transitions when bicycle and pedestrian facilities shift between Class I multi-use pathways, Class II bicycle lanes, Class IV cycle tracks, and sidewalks.
- Connecting the Bay Trail to all transit sources within walking and bicycling distance, such as water taxis, ferries, buses and rail systems.
- Connecting the Bay Trail with schools, civic areas and government offices, commercial districts, businesses, and other activity centers in adjacent cities.
- Coordinating Bay Trail staging areas and access points with regional parks and open spaces and local municipal parks.
- Providing clear wayfinding signs at all decision points.

## 3.3 UNIVERSAL ACCESS

### ACCOMMODATE ALL USER GROUPS

The Bay Trail in its entirety, including all associated trail features, should be designed to be usable by everyone including all the user types described in Chapter II.

#### OBJECTIVES TO ACCOMPLISH THIS PRINCIPLE:

- Incorporating accessibility into the design of the Bay Trail and all related trail amenities. For additional information, refer to the *U.S. Access Board's Design Guidelines* ([www.access-board.gov](http://www.access-board.gov)), the California Building Code, and local regulations on accessibility.
- Designing the trail for all forms of non-motorized use.
- Ensuring the trail design width accommodates bi-directional bicycle and pedestrian use for the expected level of future use when the Bay Trail is completed.
- Recognizing the role of the Bay Trail as a commuter route that can be used all the time and that may benefit from specialized signs and lighting.





## 3.4 PROXIMITY TO THE BAY

### PROVIDE ACCESS TO THE BAY AND ITS SHORELINE

Access is both physical and visual. Development of the Bay Trail should take maximum advantage of opportunities to see the Bay and use its waters for a variety of recreational and educational activities.

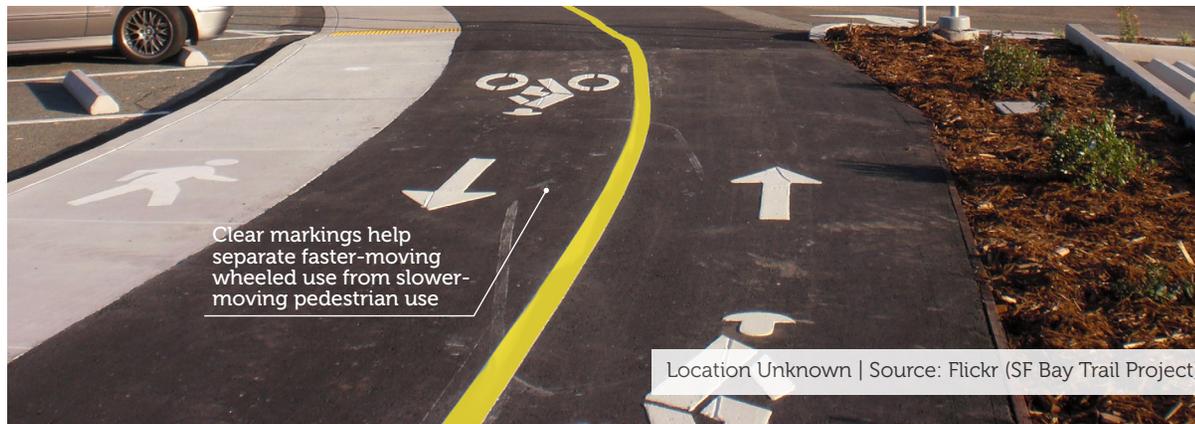
#### OBJECTIVES TO ACCOMPLISH THIS PRINCIPLE:

- Locating the trail as close to the shoreline as possible.
- Providing the public with opportunities to safely view:
  - Wildlife
  - All kinds of water-based recreation activities such as swimming, sail boating, wind surfing, kite-surfing, kayaking, and the like
  - Airplane comings and goings
  - Port activities
  - Bridges
  - City skylines, mountain peaks, and ridgelines
- Ensuring that the design affords views to the water and provides access to shoreline amenities, such as beaches, tidal stairs, ramps, and floating docks where possible.
- Encouraging designs where shoreline structures do not visually separate the Bay Trail from the Bay or opposite shores and landmarks, such as islands, bridges, city skylines and backdrop mountains.

## 3.5 EXPECTED LEVELS OF USE

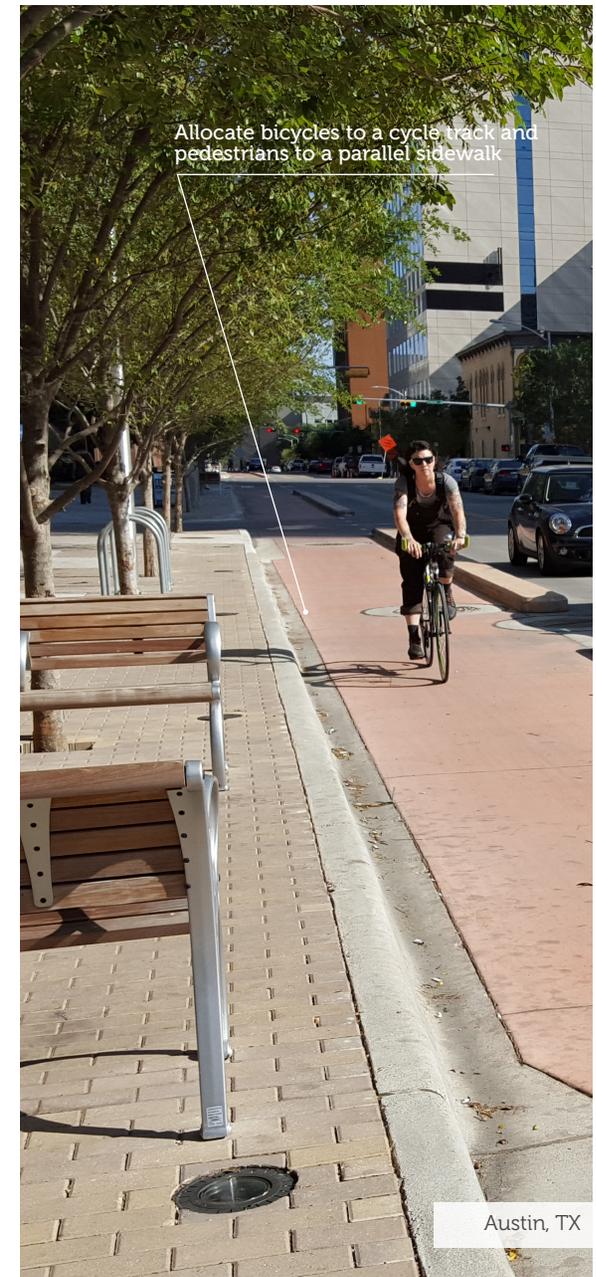
### REFLECT FUTURE USE CONDITIONS

Since its inception, the Bay Trail has drawn a growing number of users each year. With every additional segment of the Bay Trail completed, and more direct connections from other bicycle and pedestrian systems being made, more connectivity is created and even more use occurs. The higher the user numbers and the greater the variety in users traveling at different speeds for different purposes, the more the need will increase for designs that expand the capacity and width of the Bay Trail. The trail must be designed to accommodate the growing population of the Bay Area and the expected increased use of the Bay Trail system. Once it is fully completed, the idea of embarking on a trip around the entire 500-mile loop will draw a significant number of people onto the Bay Trail.



### OBJECTIVES TO ACCOMPLISH THIS PRINCIPLE:

- Providing a wider trail where the anticipated volume of use is expected to be higher than typical.
- Utilizing various types of surfacing to accommodate different user types.
- Separating faster-moving wheeled use (bicycling, rollerblading, or skateboarding for example) from slower-moving pedestrian use employing one of the following options.
  - Providing striping.
  - Providing two physically separate trails, one for bicycles and other faster-moving wheeled use and one for pedestrians.
  - Allocating bicycles to a cycle track within a road right-of-way while directing other users to a parallel promenade or sidewalk.



## 3.6 COMPATIBILITY WITH WILDLIFE

### ENSURE THE BAY TRAIL IS COMPATIBLE WITH WILDLIFE THROUGH SITING AND DESIGN

In some locations, the Bay Trail's setting is composed of the Bay's open waters, tidal mudflats and wetlands, seasonal wetlands, and upland edges used by migratory waterfowl and resident wildlife species, some of which are threatened or endangered. In these instances, thoughtful trail siting and design will minimize or eliminate public access and wildlife compatibility issues. In some cases, the Bay Trail directs use away from random informal access that disrupts habitat.



### OBJECTIVES TO ACCOMPLISH THIS PRINCIPLE:

- Locating the Bay Trail and related use areas to avoid habitat fragmentation, vegetation trampling, and erosion.
- Employing appropriate design features within the Bay Trail corridor to minimize or eliminate adverse human and wildlife interactions. See also Section 5.8.
- Using durable materials to reduce erosion impacts on adjacent habitats. See also Section 5.9.
- Providing designated trails in desirable areas to deter users from creating informal access into and through more sensitive locations.
- Directing trail lighting away from habitat areas.
- Incorporating educational and interpretive elements about the value of habitat resources and related species.





## 3.7 SEA LEVEL RISE

### ADDRESS SEA LEVEL RISE THROUGH TRAIL DESIGN

While there is still scientific uncertainty regarding the pace and amount of future sea level rise, mid-century and end-of-century forecasts currently exist for the San Francisco Bay. While scientific uncertainty remains regarding the pace and amount of future sea level rise, the Bay Trail design should accommodate use the most current regional sea level rise projections available.

#### OBJECTIVES TO ACCOMPLISH THIS PRINCIPLE:

- Siting the Bay Trail to:
  - Be elevated above expected extreme tides, storm surges, and flood levels.
  - Where needed, designed to tolerate occasional flooding.
- Where possible, dedicating a linear public access corridor for the Bay Trail with sufficient width to allow the trail in the future to migrate to higher elevations should sea level rise threaten the trail.
- Integrating the Bay Trail into the design of new protection structures and assuring that the top elevations are sufficiently wide enough to accommodate the Bay Trail.
- Involving knowledgeable geotechnical and civil engineering professionals in the design of the trail.
- Including adjacent structural (e.g., levees or seawalls) and non-structural erosion control protective measures (e.g., wetlands, vegetative buffers) to protect the Bay Trail from damage.

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# A Gallery of Settings

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*A combination of diverse urban growth patterns and active resource stewardship actions in the San Francisco Bay Area over the last fifty years has created a wide diversity of settings through which the Bay Trail navigates. The design of the Bay Trail should respect and understand the spectrum of surroundings and the intended land uses through which it traverses.*

*Background: South San Francisco | Source: Corinne DeBra*



landscaped buffer for privacy

Near Park Street Bridge, Oakland | Source: Flickr (SF Bay Trail Project)

## GENERAL LOCALE

### Urban Land Use Fabric

Located within the highly urbanized Bay Area, the Bay Trail often passes by, and sometimes through, urban residential, office, retail, hotel, and industrial land uses. For most of these settings, connecting to the Bay Trail is desirable as the trail is both a recreational and commute amenity for residents and workers alike. At the same time, design solutions need to address privacy and security concerns that may exist.

### Urban Parklands

The Bay Trail is used to access the many national, state, regional, county, and city parks and recreation areas that front the Bay. These range in scale from thousand-acre urban parklands to parks less than one acre. These lands provide opportunities for both active and passive recreation.



opportunities for passive recreation

1,300-acre Presidio, San Francisco | Source: Presidio Trust



0.8-acre Cryer Site Park, Oakland

## Secure Land Uses

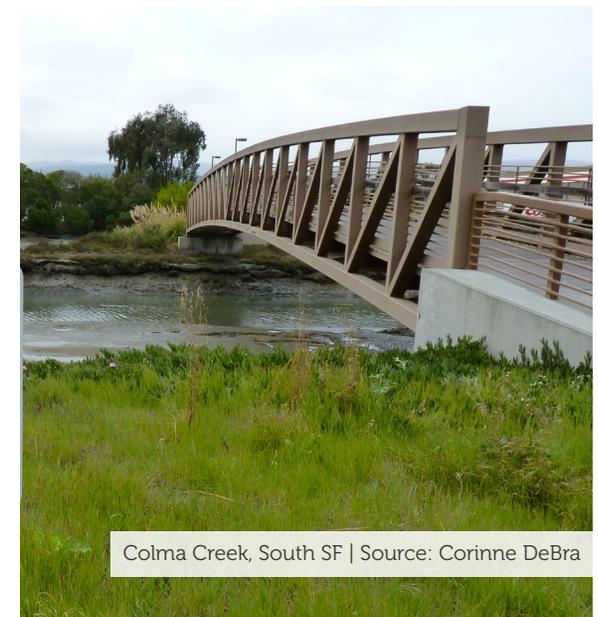
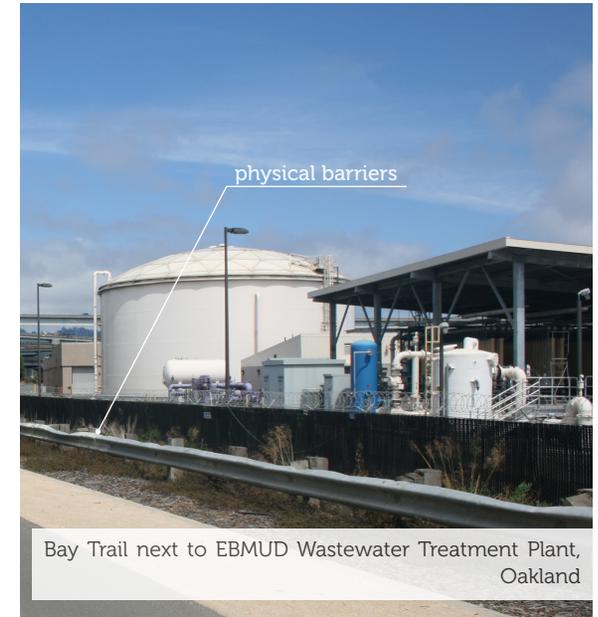
There are many land uses along the margins of the Bay that fall directly under the policies of the Department of Homeland Security or warrant extraordinary security considerations. These include military bases, ports, airports, highways, refineries, and energy production facilities among others. There may be design requirements for the Bay Trail such as setbacks and physical buffers, fencing, and user information to consider.

## Rural and Agricultural Lands

The Bay's margins include privately held farms and ranchlands used for a variety of purposes. These include rural residential developments, grazing lands, and active agriculture such as vineyards or grain production. These land uses may necessitate that the Bay Trail design along these areas includes privacy and security measures.

## Wildlife Habitats

The open space system of the Bay Area provides for passive recreation in a variety of natural, relatively undeveloped settings rich in habitat resources. Access provided by the Bay Trail and conservation of wildlife habitat are both important concepts that support each other. Wildlife and its varied habitats attract Bay Trail users, enhance the outdoor human experience, and in turn build public support and interest in protecting wild areas and funding restoration projects. The design of the Bay Trail and adjacent habitat areas should complement each other.

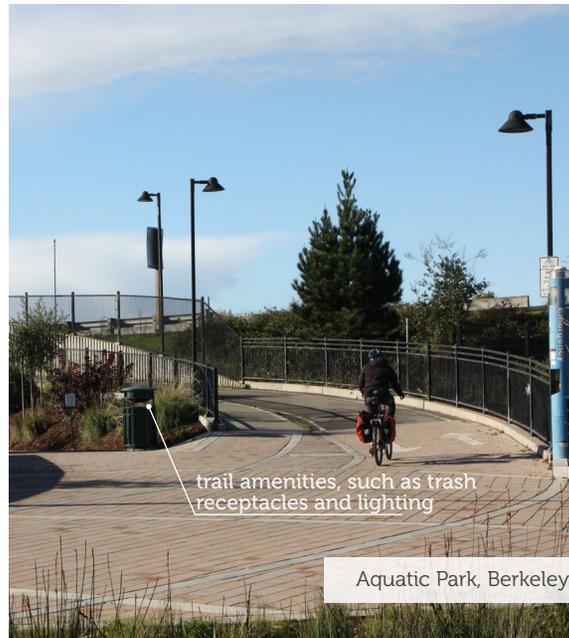




66th Avenue Gateway, Oakland



Cryer Site Park, Oakland  
Source: Flickr (San Francisco Bay Trail Project)



Aquatic Park, Berkeley

## SPECIFIC CONDITIONS

### Levees and Boardwalks

Anticipating the advent of sea level rise is an important design scenario for the Bay Trail. Parts of the existing Bay Trail are built on levees around the margins of the Bay and the rivers and streams that drain into it. As new Bay Trail segments are designed or existing segments are redeveloped, there will be a need to raise the Bay trail to a benchmark elevation that will accommodate sea level rise, such as through the use of levees or boardwalks.

### Plazas

The Bay Trail may be part of civic, memorial or historic places. There may be a plaza that is part of the Bay Trail such as at intersections with connector trails where gathering places, wayfinding information, or other trail amenities are provided. Visually informing the trail user about congested areas and providing clear cues as to where the trail is located are necessary design considerations.

## Promenades

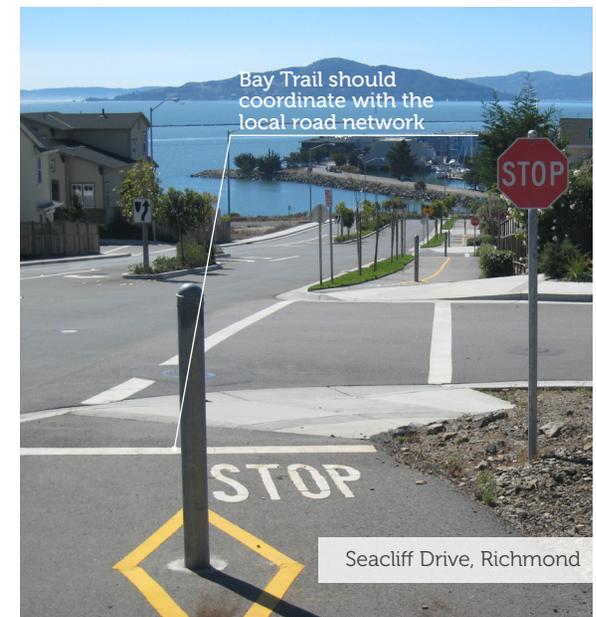
More and more cities around the Bay are developing linear promenades that promote civic functions and support the local economy. Land uses along promenades can range from office industrial parks to multi-use family and apartment complexes to shops and restaurants taking advantage of the Bay views. The Bay Trail user's speed will vary as some may want to sit and rest, some window-shop, some stop and talk, and some want to just be able to pass through easily and quietly.

## Streets

There will be some urban segments along the Bay Trail route where a corridor for a shared-use trail cannot be created that is sufficiently wide to accommodate the anticipated volume of use without affecting existing development patterns. In these circumstances, either sidewalks with a Class IV on-street cycle track or a designated Class II bicycle lane will be required to assure trail connectivity.

## Street Intersections and Crossings

As one component of a comprehensive transportation system, the Bay Trail's circulation function needs to interact with local pedestrian and bicycle systems that connect with it and with the surrounding road network. At-grade connections and transitions present different design challenges that need to be coordinated using traffic control devices such as signs, crosswalks, flashing lights, or signalization depending on the circumstances.



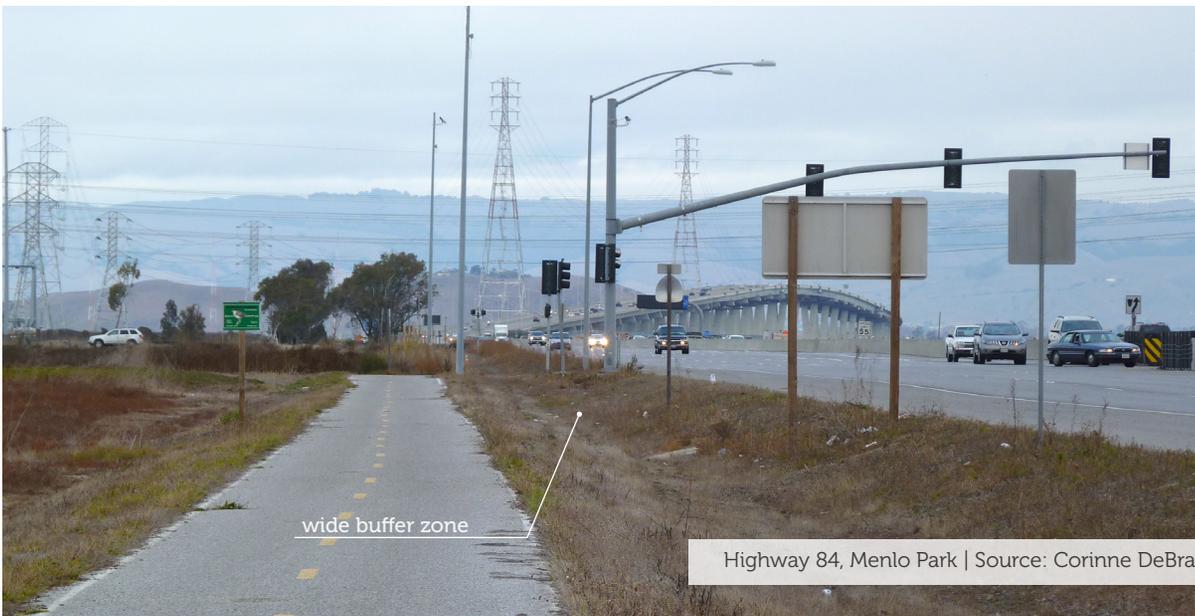


## Highways

In some locations, the Bay Trail will be adjacent to freeways, highways and major thoroughfares. Traffic safety for both motorized vehicles and trail users will be of foremost importance. Typically a barrier will be required. Line of sight, noise, visual distractions, air quality, personal and physical safety, and other issues will need to be investigated and resolved. This often involves analysis by a traffic engineer in consultation with Caltrans and the roadway owner.

## Bridges and Undercrossings

There are many barriers to the Bay Trail that must be surmounted through design to have a continuous transportation facility and user experience. Often these are natural barriers like the Bay itself or the hundreds of creeks that flow into it. Sometimes they are freeways, major thoroughfares, or train or light-rail rights-of-way. The design choices are relatively straightforward, either to go over or under these facilities. Each has implications for accessibility, views, experience, capital cost, and operations.





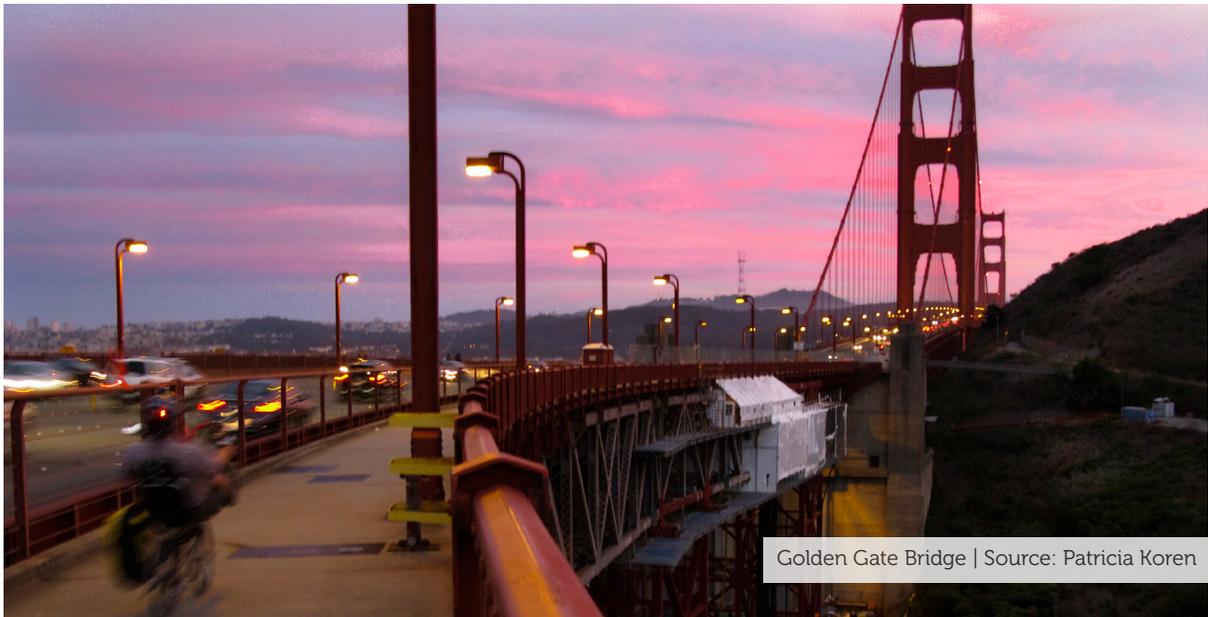
Bay Bridge  
Source: Flickr (San Francisco Bay Trail Project)



Heron's Head Park, San Francisco



San Mateo Shoreline Parks  
Source: Flickr (Martin Taylor)



Golden Gate Bridge | Source: Patricia Koren

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