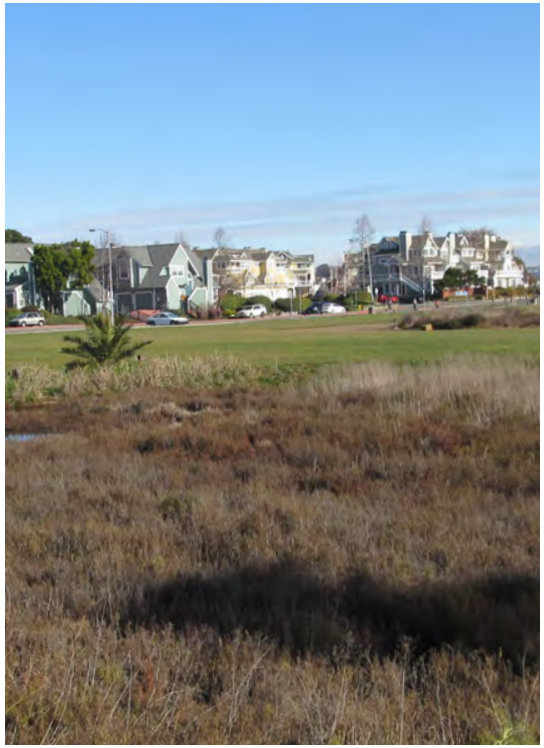
City of Benicia
May 10, 2013



Urban Waterfront Enhancement and Master Plan
Existing Conditions Analysis

THE PLANNING CENTER
DC&E

in association with
Balance Hydrologics, Inc.
Environmental Collaborative

Existing Conditions Analysis

A. PLANNING AREA CONTEXT

The City of Benicia is a residential community of 26,997 in Solano County along the Carquinez Strait of San Francisco Bay. The City is approximately 15 square miles, located east of the City of Vallejo and across the water from the City of Martinez, as shown in Figure 1.

The City of Benicia has undertaken the development of an Urban Waterfront Enhancement and Master Plan for the City's Downtown Waterfront Area; the Project Area is illustrated in Figure 2. The approximately 16-acre site is owned by the City of Benicia and includes wetlands, small sandy beaches, vacant uplands, a community green, the First Street Peninsula, remnants of a shoreline railroad, and the adjacent City Streets.

In the 1960s, the San Francisco Bay Conservation and Development Commission designated the shoreline east of Point Benicia, along the Carquinez Strait, exclusively for port use. Benicia Industries purchased the land, but later sold it to the City of Benicia in 1975 when the company came to the realization that it was not possible to develop the parcel for port or industrial uses. Following the Bay Conservation and Development Commission's adoption of Special Area Plan No. 3: Benicia Waterfront in 1977, the City proceeded with developing the area for marina, residential, commercial, and recreation uses. The marina and adjacent condominiums were constructed between 1980 and 1995. Turnbull Park was completed in 1990, and the First Street Promenade was built in 1993. The First Street Peninsula (Point Benicia Spit) was modernized to its current state in 2005.

Figure 1 - Regional Context

B. PROJECT GOALS

The Benicia Waterfront is a beloved community asset. The proximity to the historic downtown and the Benicia Marina make the Waterfront a highly visible area and an ideal location to create a focal point for the downtown area. The location is already a regional destination because it is one of the few downtowns in the Bay Area that provides public access to the Waterfront, and as a result enhancing the Waterfront can bolster the local economy.

The First Street Green, the existing lawn area within the Project Site, is currently used for recreation activities such as picnicking, walking, and for special City events. However, the site and the greater Project Area lack unifying design and community amenities. The design for the project will be intended to improve and enhance the existing First

Figure 2 - Project Area Context

Street Green, expand the current trail access, incorporate public amenities such as public art, observation platforms, seating areas, and interpretive kiosks, and restore the wetlands. The City of Benicia has outlined the following goals for this planning project and the site.

- Improve public access to and along the shoreline.
- Improve amenities for visitors, such as interpretive and educational displays.
- Increase passive recreation and non-motorized boat use of the area.
- Explore the potential for developing a launch site for the San Francisco Bay Area Water Trail.
- Protect and restore existing tidal wetlands and other fish and wildlife habitat.
- Improve stormwater management and integrate it with other project objectives.
- Plan for adaptation of all project elements to rising sea level.
- Ensure that the Plan is cost-effective and affordable.
- Achieve other objectives that may be identified during consultation with stakeholders.

C. EXISTING CONDITIONS ANALYSIS

1. RELEVANT PLANNING POLICIES/DOCUMENTS

a. General Plan

The Project Area is primarily designated as Parks Open Space in the General Plan, as illustrated in Figure 3. The areas surrounding the project area are designated as commercial and residential.

The General Plan includes a number of Parks and Recreation Goals, Policies, and Programs which outline the City's vision for improving and maintaining the City's park and recreation network. There are a number of Policies that will influence the design of the Project Area, including policies regarding resource conservation, access, protection of biologically important resources, and involving the community. Of particular relevance to this Plan is the policy to "Continue to develop and enhance recreational benefits of the shoreline and seek public access along the Waterfront (Policy 2.32.2)."

The General Plan also identifies the Project Area as having important biotic resources, including Marshland/Northern Coastal Salt Marsh/Coastal Brackish Marsh. These resources are further discussed in the Biological Resources and Wetlands section below. The General Plan includes Goals, Policies, and Programs to preserve, protect, and enhance special status plants, animals, and native vegetation, and to protect and enhance wetlands to ensure that no net loss of wetlands occurs. Implementing these goals and policies will entail protecting and enhancing special vegetation, habitats, and wetlands that occur in the Project Area, which is discussed in detail below.

Figure 3 - General Plan Land Use

b. Zoning

As illustrated in Figure 4, the Project Area is zoned Open Space. The Project Area is adjacent to the historic Southern Pacific Depot and the A Street Parcel, which are zoned as Town Core as part of the Downtown Mixed Use Master Plan (DMUMP). The Point Benicia Spit and First Street parcels adjacent to the Project Area are also zoned as Town Core. The areas within the DMUMP zoning designations are subject to the land use regulations and development standards of the DMUMP. Per the DMUMP the goal of the Town Core zoning designation is to "enhance the vibrant, pedestrian-oriented character of First Street…[and] mixed use within this zone primarily refers to vertical mixed use where retail or commercial are on the ground floor and residential or commercial are above." The condominiums at B Street west of East Second are zoned Medium Density Residential (8-14 Development Units per acre). Finally, the Marina Condominiums east of East Second Street and the Harbormaster's office are zoned Waterfront Commercial.

c. San Francisco Bay Conservation and Development Commission (BCDC) Resolution No. 46 (adopted May 19, 1997)

Resolution No. 46 was adopted by the SF Bay Conservation and Development Commission (BCDC) to rectify inconsistencies between the adopted San Francisco Bay Plan of 1969, and the later adopted Benicia Waterfront Plan of 1976 (Comprehensive Plan Amendment and amendment to the Open Space Plan). The City undertook a special area planning process with the BCDC, forming the Benicia Waterfront Plan. Within this plan, the City proposed to improve and protect the wetland marsh as a wildlife preserve, while the 45-acre area located immediately behind the wetland was to be developed "as a public marina with some 309 berths and related commercial uses." When the Plan was adopted, it became part of both the comprehensive Plan of Development for Benicia and the Bay Plan. The City adopted the supplemental zoning measures and land use controls the Plan recommended.

d. BCDC Permit 5-77

Part of the Benicia Waterfront Area falls within the jurisdiction of the BCDC, which has jurisdiction on the first 100 feet inland from the shoreline around San Francisco Bay, including the Carquinez Strait.

In June of 1977, the City received approval from BCDC to proceed with a number of projects in the Waterfront Area, including construction of a marina, riprap, fishing pier, public boardwalks, tidal marsh, commercial and residential uses, public walkways and bikeways, parking areas, and overlooks. The permit has been amended thirty-four times since it was issued in 1977.

Any proposed changes to the Waterfront Area that fall within BCDC jurisdiction require approval from the BCDC and amendment to the permit, or a new permit. Since the establishment of the first permit, the U.S. National Geo-

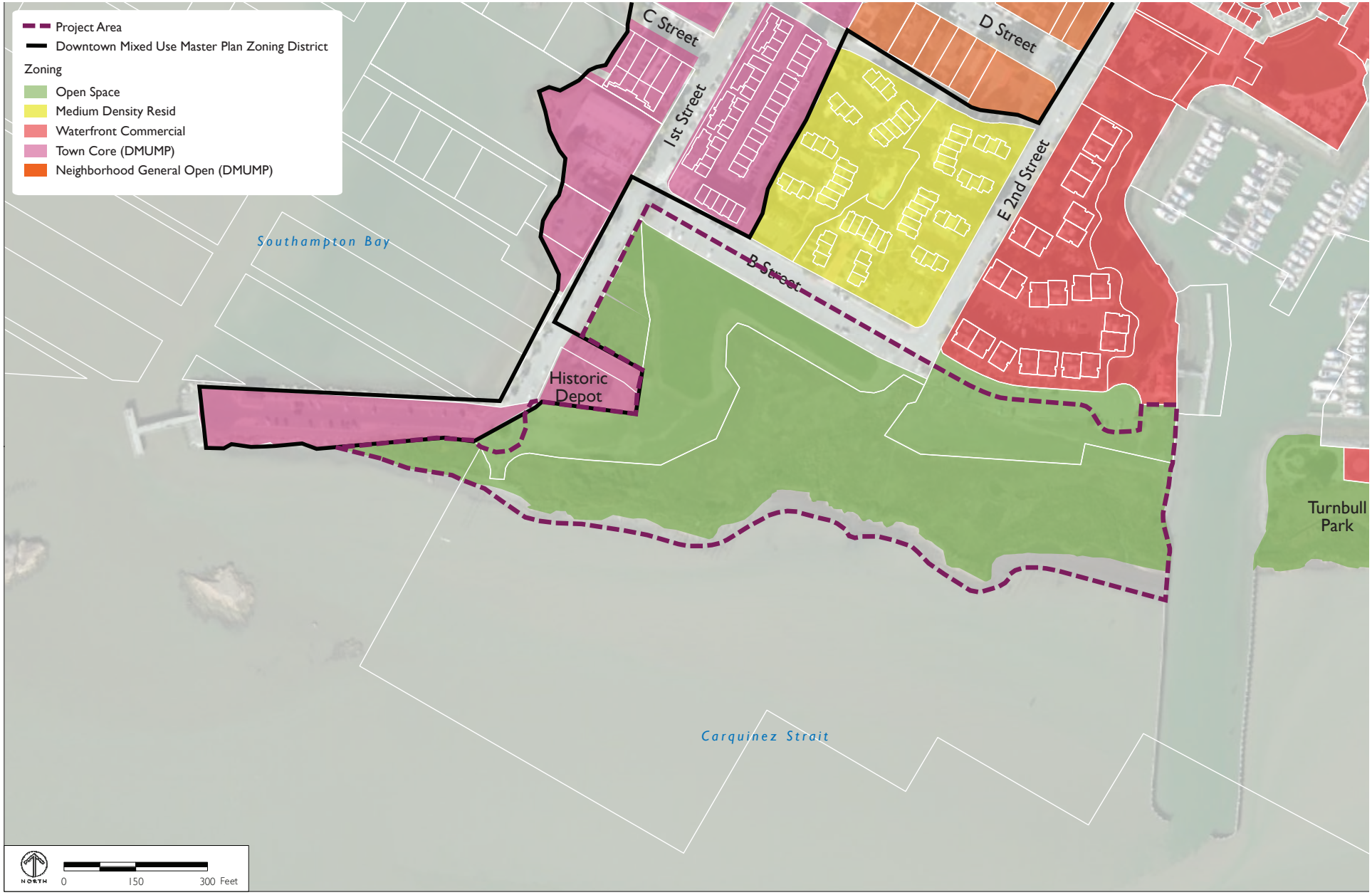
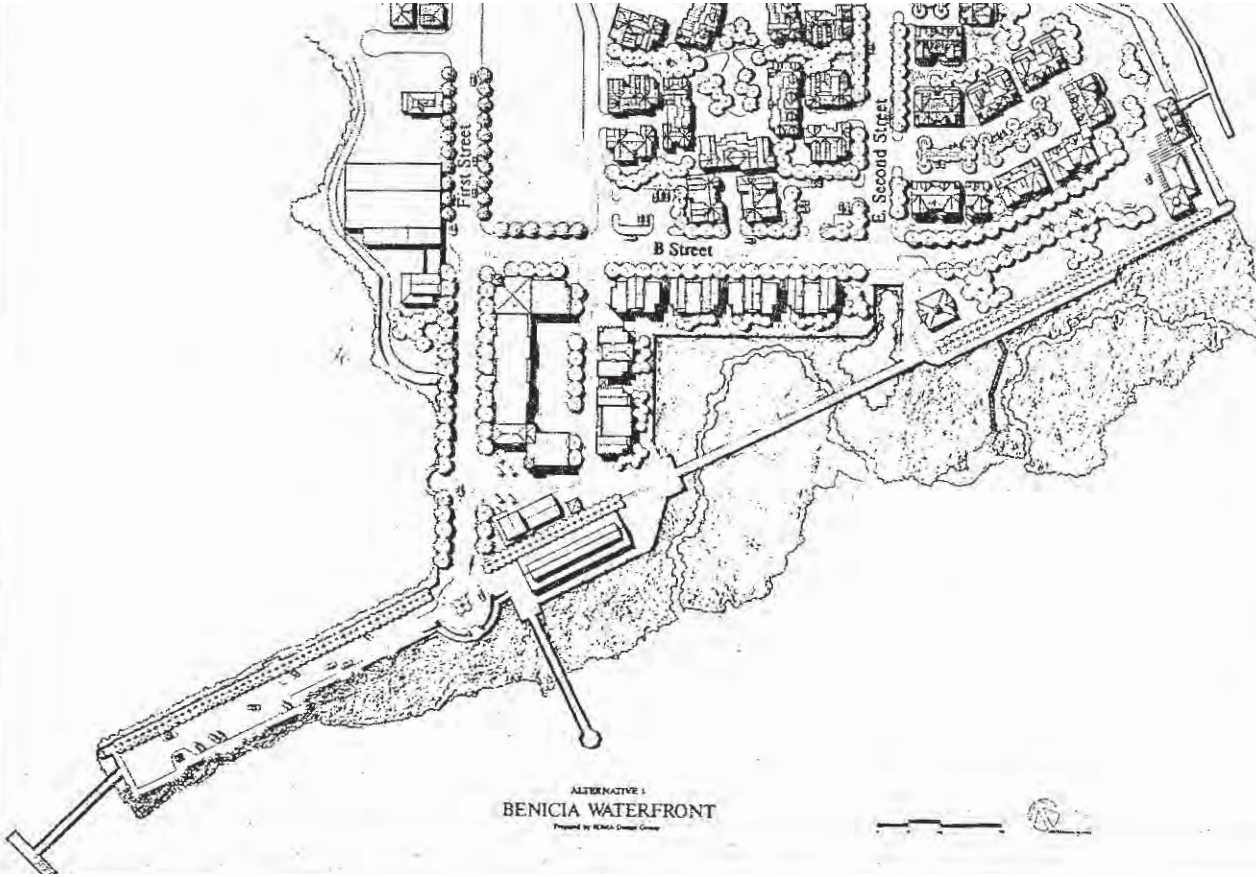


Figure 4 - Zoning

detic Survey has changed its base elevation measurement system from National Geodetic Vertical Datum (NGVD) of 1929 to North American Vertical Datum (NAVD) of 1988. These elevation measurement changes may affect the jurisdictional boundary of BCDC and will need to be addressed with BCDC in advance of any new permitting.

e. 1991 Urban Waterfront Restoration Plan

The Benicia Urban Waterfront Restoration Plan established coordinated involvement between the City, the State, and the private sector in order to actively pursue more comprehensive use of Benicia's underutilized Waterfront. The Plan actively sought to preserve open space and important historical characteristics of the site, increase access to the Waterfront, and create opportunities for new activities and commerce. A specific implementation program was included to ensure that the goals of improved access and Waterfront utilization were achieved without compromising any of the site's vital existing views and environmental resources. The public space component was to include a major open space system "with continuous Waterfront pedestrian access linking large areas of passive and active

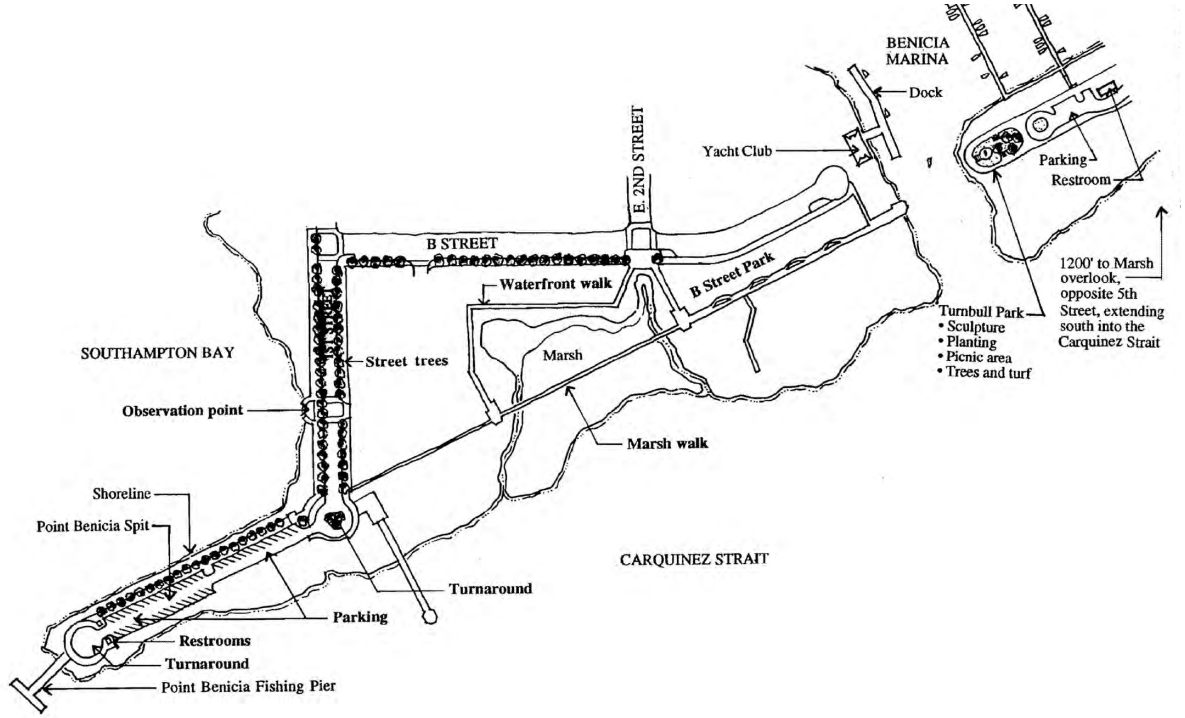


Benicia Waterfront Plan - 1991 Urban Waterfront Restoration Plan

recreation." The Urban Waterfront Restoration Plan included an array of projects to be completed in phases. The first two phases included public improvement projects to be implemented in the near term, while the third phase included public/private improvements to be undertaken once the necessary entitlements were obtained. As a result of the Plan, the First Street Promenade project was designed and constructed.

f. The 1997 Benicia Parks, Trails, and Open Space Master Plan

This document is the City's guiding document for parks, open space, and trails. This master plan incorporates the 1991 Urban Waterfront Restoration Plan's proposals for the portion of Benicia's Waterfront located between First Street Peninsula (Point Benicia Peninsula) and Turnbull Park. The recommended Waterfront improvements included three marsh overlooks, a neighborhood park, improvements to First Street Peninsula, and an extension of the Benicia Waterfront Path. Phase One included marsh improvements and the creation of the Marsh overlook Train Walk. Phase Two envisioned a pier marsh overlook, First Street Peninsula improvements, a Waterfront trail, and the Turnbull Park marsh overlook.



Plan for Point Benicia Spit and Turnbull Park -1997 Benicia Parks, Trails, and Open Space Master Plan

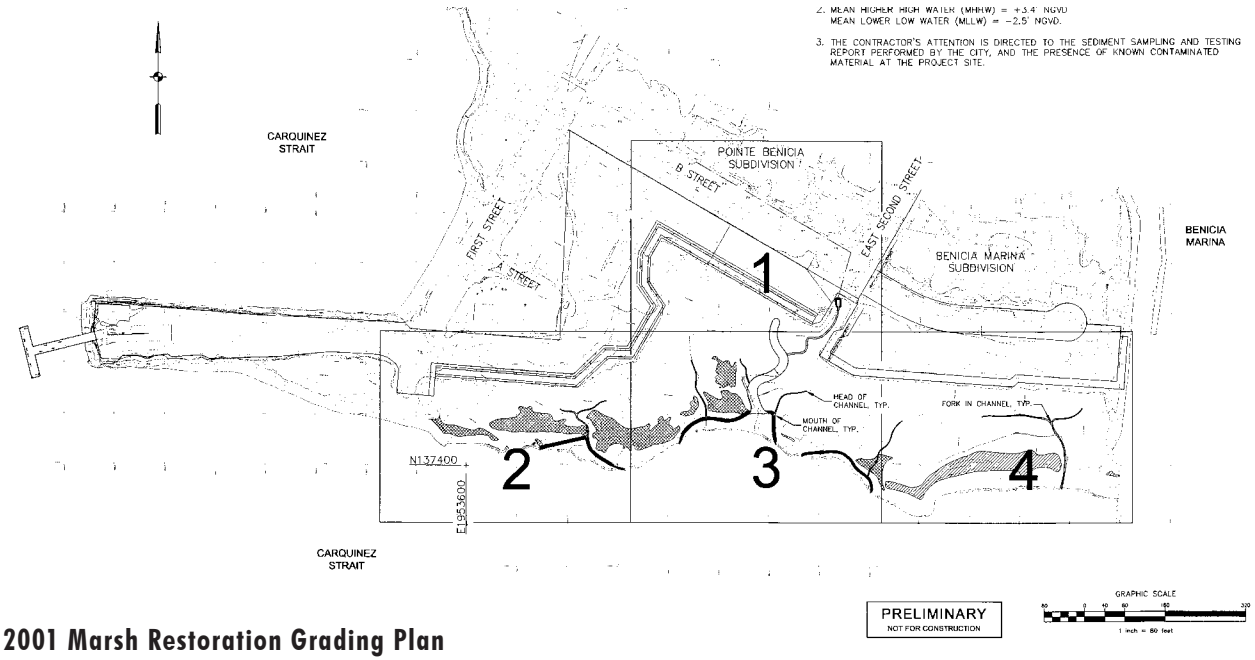
In 2004, the City of Benicia implemented the First Street Peninsula improvements, which built upon the previously implemented First Street Promenade project. This project included paved parking areas, street lights, an ADA-accessible restroom, storm drain improvements, a turnaround, interpretive signage, curbs, and striping.

g. 1997 Mayor's Waterfront Task Force

This report developed goals that represented guiding principles for the Benicia Waterfront, from the Benicia State Recreation Area to Suisun Bay. It reaffirmed the 1991 Waterfront Restoration Plan as the planning document for the First Street Green area. The report called for the development of a "Benicia Waterfront Trail" that runs adjacent to the water's edge, connecting the Benicia State Park with Lake Herman Road, and ultimately linking to other Bay trails. Within the current Project Area, the report called for the provision of a formal trail connection between Benicia Spit (First Street Peninsula) and the Marina public access area.

h. Benicia Waterfront Marsh Restoration Project

The Department of Parks and Community Services worked with environmental planning consultants in 1998- 2001 to develop the Benicia Waterfront Marsh Restoration Project, which was funded by CALFED. The goal of the project was to improve the wetland and marsh habitat. The City applied for grant funding to implement the Plan. However, funding was not received and the project has not yet been implemented.



2001 Marsh Restoration Grading Plan

i. 2003 Storm Water Management Plan

The Benicia City Council adopted the Storm Water Management Plan (SWMP) on August 5, 2003. The City of Benicia intends to manage its storm water in compliance with the provisions of the Phase II General Permit, regulated by the State Water Resources Control Board San Francisco Bay Region 2. The SWMP is a "five-year program that implements the General Permit through a series of measures and practices that are designed to address storm water pollution before it is discharged into the receiving water." The plan outlines a series of minimum control measures to achieve this goal, including:

- Public Education and Outreach
- Public Participation/Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management
- Pollution Prevention for Municipal Operations

j. 2004 Benicia Waterfront Park Initiative ("Measure C")

By citizen petition, the Benicia Waterfront Park Initiative was proposed to amend the City of Benicia General Plan for a section of Benicia's Waterfront. City Council approved the measure in 2004. The purpose of the measure was to "establish a Waterfront park on the City-owned land south of B Street, between First Street and the Harbormaster's Office, and extending the water's edge, but excluding the site upon which the 'Depot' sits." The Initiative prohibits permanent sports fields, courts, or equipment. It also prohibits permanent buildings, except for a public restroom or similar amenities. However, the Initiative does permit walkways, benches, drinking fountains, and trash receptacles. It also calls for the preservation of marshlands within the Waterfront park. The measure included provisions that the area only be allowed to serve park uses as a community gathering space for local festivals and other low impact recreational uses. The General Plan and Zoning had previously allowed for a variety of commercial uses. When the City Council adopted the measure with Resolution No. 04-178, the affected land was re-zoned from "Waterfront Commercial" or "Downtown Commercial" to "Parks," requiring voter approval to further change the designation.

k. 2007 Benicia Downtown Mixed Use Master Plan, Opticos

The Downtown Mixed Use Master Plan (DMUMP) area includes a large portion of the Downtown Historic District centered along First Street, adjacent to Benicia's Waterfront. It provides "strategies for improvements in the First Street Historic District," and aims to implement a "mix of compatible uses adjacent to the Downtown, upgrading of existing buildings, preservation, and adaptive reuse of historic buildings, and introduction of new, compatible mixed-use buildings." The DMUMP zoning for the Peninsula, Depot, and A Street parcel is Town Core, which allows a

variety of commercial and other uses. Included in the Circulation and Transportation Element of the Plan's Design Proposals chapter is a recommendation that if the City were to restore ferry service to Benicia, the Historic Pier located at the Waterfront would likely be the best location for a new ferry terminal. This chapter also recommends that the City continue its Shoreline Trail around the Marina and west side of Downtown Benicia for a more complete bicycle connection, and proposes new bus routes to provide access to the Waterfront.

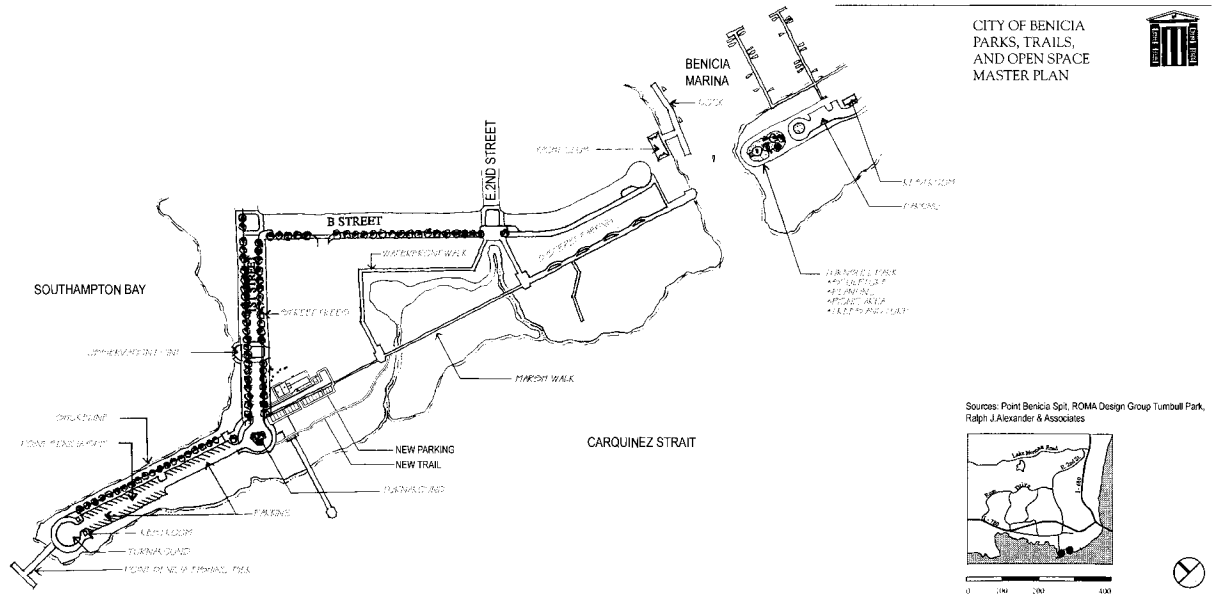
I. 2008 Waterfront Park Plan

The purpose of this Plan was to implement the 2004 Benicia Waterfront Park Initiative, "to preserve and enhance the marsh and its transition into an urban Waterfront park," and to "envision a multi-purpose asset for all citizens that addresses sustainability, tourism, downtown revitalization, habitat restoration, Benicia history, the Arts, and public recreation." This Plan was developed by a Waterfront Park Committee of volunteers who worked to develop a vision for the 2004 initiative. The 2008 Waterfront Park Plan envisioned "an inviting entrance, drawing people down from First Street into the park. There will be walkways from the entrance adjacent to and over the marsh, a bridge over the East 2nd Street storm drain channel, and an extension of the grassy area to the harbormaster's office….The park will also highlight public art, link the multi-use Bay Trail from First Street to the Harbor, and have two overlooks out over the marsh where walkers can pause to learn more." This Plan still exists as a Committee draft, but has not been considered by the Parks, Recreation and Cemetery Committee or City Council. The drafting of this concept plan is a precursor to our current planning process.

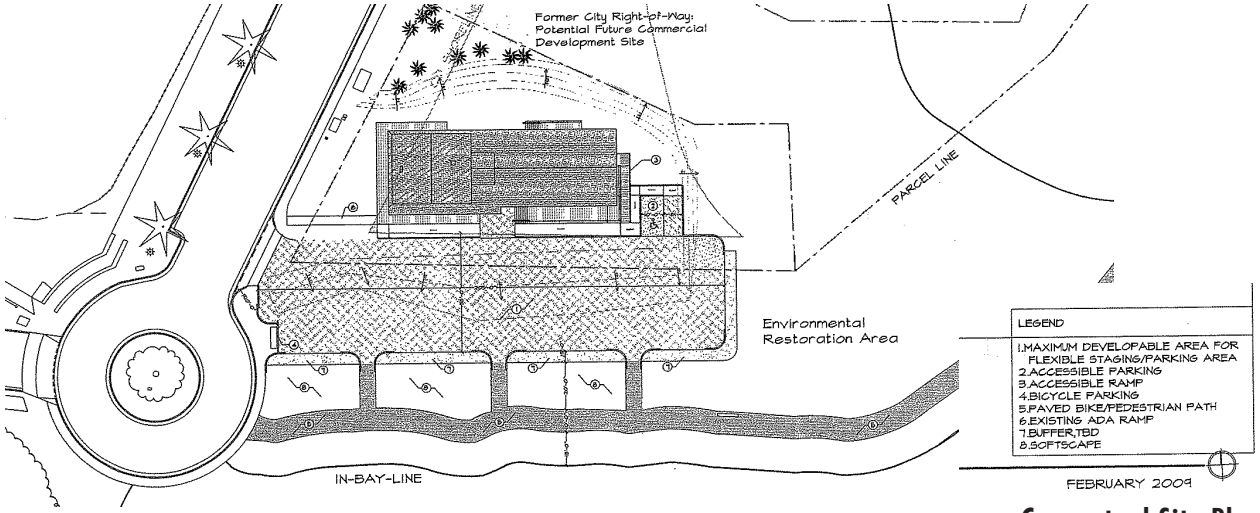
First Street Waterfront Park Plan - 2008 Waterfront Park Plan

m. 2009 Historic Depot Site Plan

The 2009 Depot schematic site plan includes a plaza and parking area that extend into the current Project Area. The plan also calls for a pathway connection from the roundabout at the foot of First Street to the existing unpaved pathway that runs along the marsh within the First Street Green.



Southern Pacific Railroad Depot Site Plan



Conceptual Site Plan

2. RECREATION ASSESSMENT

a. Park and Recreation Standards

Traditionally, park and recreation standards have been based on the ratio of parkland provided to population (i.e. X acres/1,000 people). The 1975 Quimby Act (California Government Code §66477) authorizes cities and counties to pass ordinances that require developers to contribute to parkland acquisition. The Quimby Act set standards of 3-5 acres of parkland per 1,000 residents. This standard has been adopted by many local governments, and the National Recreation and Park Association (NRPA) also uses this type of measure. NRPA recommends that communities provide 6.25 to 10.5 acres of parkland per 1,000 people. This recommendation is significantly higher than Quimby Act standards.

The Benicia Parks, Trails and Open Space Master Plan was prepared for the City of Benicia in 1997. It provided an analysis of the existing parks and included recommendations for improvements to the parks and open space system as well as goals, policies and objectives for the development of new parks and open space. The Master Plan includes the following more specific standards for the acreage of different park types:

- Regional parks 10 acres/1,000 people
- Community parks 2.5 acres/1,000 people
- Neighborhood parks 3.5 acres/1,000 people

The City currently maintains and operates 123 developed park and landscaped acres, or approximately 4.6 acres per 1,000 residents. The City therefore meets and exceeds the Quimby Act requirements. If the 577-acre Lake Herman Regional Park is included, the ratio would be further increased to 25.9 acres per 1,000 residents, far exceeding both the Quimby Act and the National Recreation and Park Association Standards. Based upon a current estimate, the City has the following ratios of open space:

- Regional parks 35 acres/1,000 people
- Community parks 1.9 acres/1,000 people
- Neighborhood parks 2.7 acres/1,000 people

Per this assessment, the City achieves the Regional Open Space standard set out in the Parks, Trails and Open Space Master Plan, and is very close to achieving the Community and Neighborhood Parks Standards.

b. *Trends of Park and Recreation Needs*

A park's location, amenities, overall quality, and other characteristics affect the level of use it receives, and therefore its contribution to a community. In recent decades, park and recreation trends have evolved to reflect demographic and recreation patterns. This has resulted in a greater interest in providing more passive recreation opportunities. Active recreation uses such as organized sport areas and playgrounds are still in very high demand. However, there is an increase in the relative demand for facilities that offer passive recreation opportunities, such as walking, nature viewing, and picnicking.

Park and Recreation Trends in California 2005: An Element of the California Outdoor Recreation Planning Program by California Department of Parks and Recreation discusses trends affecting recreation in the State. The report identified that recreation will have to adjust for overall population increase, a more culturally and racially diverse population, a doubling of seniors (those over the age of 60), baby boomers approaching retirement, 18- to 40-year-old young adults creating new ways to experience the outdoors, and increasing numbers of households with children. With consideration to specific activities, walking for fun and fitness is the most favored outdoor recreation activity and is expected to continue to be the most popular activity for Californians. The report suggests that an "expanded network of trails is needed to connect parks and green space."

California State Parks published a Technical Assistance article, "Recreation Trends Worth Talking About" that identifies activities with the highest participation rates. They include walking, driving for pleasure, visiting historic sites and museums, attending outdoor cultural events, beach activities, visiting nature oriented museums, picnicking, wildlife viewing, hiking, and using turfed areas.

The City's Parks, Trails and Open Space Master Plan does not set standards for the differentiation between active and passive open space. With the exception of the two regional parks, Lake Herman Regional Park and Benicia State Recreation Area, the majority of the parks in Benicia are designed for active use, and there is a need for more passive recreation space. The First Street Green, located within the Project Area, is currently considered a passive recreation space. The Benicia Urban Waterfront Enhancement and Master Plan is intended to build on this space and identify new opportunities within the Project Area.

3. BIOLOGICAL RESOURCES AND WETLANDS

Below is a summary of the site's biological and wetland resources, based upon a review of background information and field reconnaissance of the site. A more in-depth discussion of the site's biological and wetland resources can be found in the Assessment and Environmental Baseline prepared by Environmental Collaborative, attached as an appendix to this memo.

Given the timing of the field work in the early spring, it was difficult to accurately identify some plant species and determine their wetland indicator status. However, the preliminary wetland assessment does provide an initial indication of the possible extent of jurisdictional waters on the site (see Figure 6, or Figure 2 in the Biological Site Assessment). A thorough wetland delineation would still be necessary to provide additional information on potential wetlands, which would then have to be confirmed by the U.S. Army Corps of Engineers (Corps) to officially determine the extent of jurisdictional waters on the site. No protocol surveys for special-status species was performed as part of the field reconnaissance, although habitat conditions were evaluated to determine the likelihood of occurrence on the site.

a. Vegetation

The location of the site along the shoreline of Carquinez Strait and edge of the developed downtown area of Benicia are major influences on the existing vegetation and wildlife resources. Natural coastal salt marsh, brackish water marshlands, and open water habitat of the Strait occupy the southern, lower elevations of the site. As part of past development in the area over the past 150 years, fills were placed to improve human access and reduce the potential for flooding in parts of the northern portion of the site, reducing the original extent of marshland habitat. Upland areas are now covered with impervious and gravel surfaces, or support irrigated turf and areas of ruderal (weedy) grassland.

b. Wildlife

The site supports a wide diversity of wildlife given the interface of upland and aquatic habitat along the shoreline of Carquinez Strait. Upland areas of turf and landscaping have only limited habitat value, but the irrigated turf areas are frequently grazed by Canada geese and provide occasional foraging opportunities for birds found in urban habitat. The shoreline and open water of Carquinez Strait provides foraging opportunities for a number of species of birds, and aquatic habitat for fish, mollusks, and invertebrates. The mudflats support a diverse assemblage of benthic macro-invertebrates, which in turn attracts large numbers of migrating and wintering shorebirds.

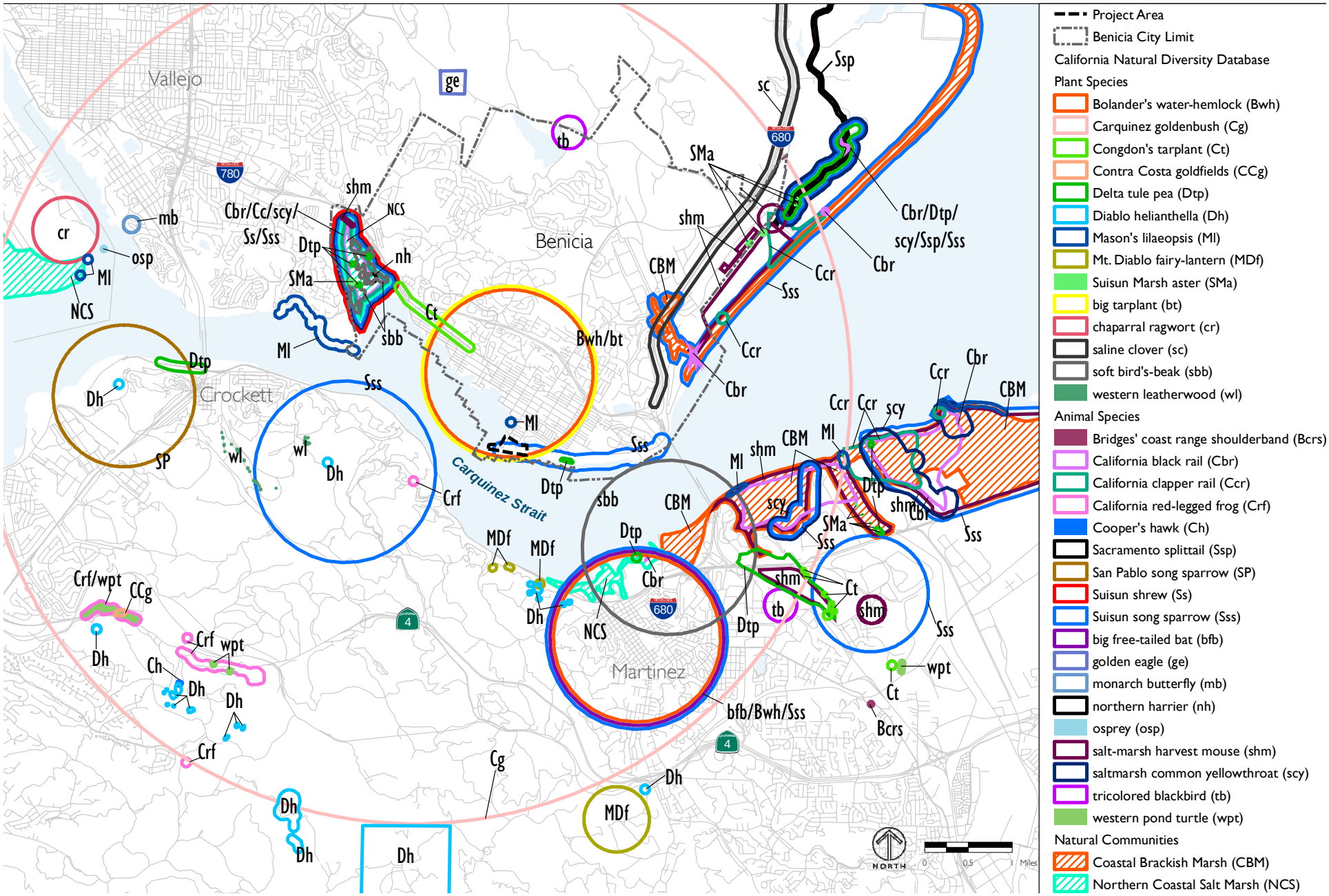


Figure 5 - CNDDB Occurrences of Special-Status Species and Sensitive Natural Communities

c. *Special-Status Species*

Figure 5 shows the distribution of special-status plant and animal species monitored by the California Natural Diversity Data Base (CNDDB). Past development has eliminated suitable habitat for special-status species in upland areas on the site. However, areas of intact coastal salt marsh and open water habitat support a number of special-status species, including known occurrences of special-status bird species such as the Suisun song sparrow and saltmarsh common yellowthroat, numerous special-status fish species that migrate and forage through the open waters of the Strait, and possibly other special-status species as well. Suitable habitat for a number of special-status plant species also occurs in the marshland and exposed shoreline of the site, including Mason's lilaeopsis, Delta tule pea, and soft bird's-beak. Detailed surveys would be required to confirm presence of or absence of these and other species where natural habitat remains. A number of special-status bird species are known to forage in the marshlands on the site, such as northern harrier, white-tailed kite, and possibly California black rail and California clapper rail as they disperse along the shoreline of the Strait. Similarly, there is a remote possibility that the salt marsh harvest mouse and Suisun shrew could disperse along the shoreline of the Strait and utilize the protective cover of the marshlands on the site, although it is unlikely that sustainable populations would be present given the relatively small extent of suitable habitat and lack of protective upland refuge areas. Nevertheless, the marshland and open water habitats on the site are an important resource for special-status species and must be accommodated in future planning and enhancement plans.

d. *Sensitive Natural Communities*

In addition to species-oriented management, protecting habitat on an ecosystem-level is increasingly recognized as vital to the protection of natural diversity in the state. The CNDDB also monitors the locations of natural communities that are considered rare or threatened, known as sensitive natural communities. The CNDDB has compiled a list of sensitive natural communities that are given a high inventory priority for mapping and protection (CDFG, 2010). Although these natural communities have no legal protective status under the State or federal Endangered Species Acts, they are provided some level of protection under the CEQA Guidelines.

The coastal salt marsh and brackish water marsh on the site are considered sensitive, natural community types. Areas of potential seasonal wetlands and upland areas of turf and ruderal grasslands are dominated by non-native species and are not considered a sensitive natural community type. However, the areas of potential seasonal wetland may qualify as jurisdictional waters of the U.S. and if determined to be regulated features, would be regulated by the Corps and any modifications subject to agency authorization as discussed below.

Note: Mapping is preliminary based on limited vegetation data and assumed hydrologic and soils criteria. A final determination on all boundaries of jurisdictional waters would require a wetland delineation and verification by the U.S. Army Corps of Engineers.

Figure 6 - Potential Jurisdictional Wetlands

e. *Jurisdictional Waters*

Although definitions vary to some degree, wetlands are generally considered to be areas that are periodically or permanently inundated by surface or ground water, and support vegetation adapted to life in saturated soil. Wetlands are recognized as important features on a regional and national level due to their high inherent value to fish and wildlife, use as storage areas for storm and flood waters, and water recharge, filtration, and purification functions. Technical standards for delineating wetlands have been developed by the Corps and the United States Fish and Wildlife Service (USFWS), which generally define wetlands through consideration of three criteria: hydrology, soils, and vegetation.

Based on the results of the preliminary wetland assessment, jurisdictional waters on the site consist of areas of coastal salt marsh and possible areas of seasonal wetlands and scalds. Scalds are areas that pond mineralized water for long enough periods that very little vegetation can become established. Crusts form once the water dries during the late spring and summer months. In this case, the salts are from the brackish waters of Carquinez Strait. Figure 6 shows the extent of assumed potential jurisdictional waters on the site. Areas of coastal salt marsh have strong wetland indicators and would be regulated waters. Wetland indicators associated with potential seasonal wetland areas are less conspicuous. In some locations these features could be considered hydrologically isolated by the Corps, or vegetation criteria may not meet the Dominance Test or prevalence index for wetlands under the Wetland Delineation Manual for the Arid West Region used by the Corps. Field indicators were difficult to determine during the field reconnaissance due to the timing of the site visit in early spring when many of the dominant grasses could not be positively identified. However, the features mapped in Figure 6 do contain one or more characteristics of seasonal wetlands and should be considered as such as part of the site planning exercises until a formal wetland delineation is prepared and verified by the Corps.

Figure 6 also shows the Mean High Water elevation, which is typically used by the Corps in determining the limits of their jurisdiction under Section 10 of the Rivers and Harbors Act. On the site, the Mean High Water Elevation generally occurs at the edge of the marshlands and remaining shoreline areas.

4. HYDROLOGY

A summary of the flooding and drainage and the assessment of the sea level rise potential of the Project Site is presented below. A more in-depth discussion of the site's hydrologic character is summarized in the Draft Hydrologic Site Assessment and Environmental Baseline for the Urban Waterfront Enhancement and Master Plan prepared by Balance Hydrologics and attached as an appendix to this memorandum.

Note: Based on currently-effective base flood elevation of 9 feet NAVD and sea level rise projections from SFBCDC, 2011
Note: Topography shown on this map was derived from 2004 LiDAR data developed for the FEMA SF Bay Coastal Study. Raw .LAS files were downloaded from the USGS LiDAR web portal. The raw data points were minimally post processed within the study area boundary to remove trees, buildings and other extraneous features. LiDAR point features covering areas with low lying vegetation (grasses, bushes) were not modified in any way. Areas outside of the study area were also left as is.

Figure 7 - FEMA Based Flood Elevation with and without Projected Sea Level Rise

a. *Flooding and Drainage*

The Flood Insurance Rate Map, issued by the Federal Emergency Management Agency (FEMA) designates base flood elevations for the Carquinez Strait and surrounding areas at 9 feet North American Vertical Datum (NAVD). As shown in Figure 7 the majority of the Project Area would be inundated by the 1-percent chance flood event (base flood that has a 1% chance of happening in any given year). Flooding would be expected to cover the entire central and southeastern portions of the site, including most of the lawn area, several hundred feet of B Street, and the lowermost part of East 2nd Street.

The pervious portions of the Project Area (including the lawn and wetland areas) slope toward the Carquinez Strait and drain by gravity through overland flow. The impervious portions of the Project Area are generally drained by engineered storm drain lines (see Figure 2, Hydrologic Site Assessment). The B Street storm drain system is subject to frequent localized street flooding for most significant storm events that occur during high tide.

b. *Sea Level Rise Assessment*

Located directly adjacent to the Carquinez Strait, the Benicia Urban Waterfront is susceptible to significant changes in sea level over broader periods of time. As part of the project grant requirements, the Urban Waterfront Enhancement and Master Plan must consider potential sea level rise affecting the Project Site.

The need to appropriately prepare for the implications of rising sea levels has led the State of California to set standards to frame adaptive planning activities in coastal areas. The San Francisco Bay Conservation and Development Commission has identified scenarios of sea level rise for various time horizons; using values of 16 inches of sea level rise by 2050 and 55 inches by 2100.

Figure 7 illustrates potential future base flood scenarios using both the value of 16 inches for 2050 as well as the longer-term scenario of 55 inches of sea level rise at 2100, equivalent to a base flood elevation (BFE) of 13.6 feet (e.g. 9 feet current BFE + 4.6 feet sea level rise). As shown, the higher base flood conditions would inundate progressively more areas. With 16 inches of sea level rise (BFE = 10.3 feet), the entire Urban Waterfront would be subject to flooding during a 1-percent chance event, the only exceptions being First Street upslope of the Depot and the northwest portion of B Street. With 55 inches of sea level rise, all of B Street and all areas to the south would be susceptible to inundation during a 1-percent chance event.

Figure 8 - Parks, Open Space, and Trails

5. SITE USE AND DESIGN ANALYSIS

The site use and design analysis items discussed below are illustrated in Figures 8 and 9.

a. Views

The Benicia Waterfront provides sweeping views of the Carquinez Strait. On most days, Mt. Diablo and Martinez are visible to the southeast, the rolling hills of Port Costa and Crockett are visible to the south, and the Carquinez Bridge and the San Pablo Bay are visible to the west. These extraordinary views are one of the reasons visitors are drawn to the Waterfront, and future planning for the Waterfront should highlight and preserve the views.

b. Vehicular Circulation

The Project Area is located east of First Street and South of East B Street. First Street terminates at the water's edge. The southern terminus of First Street has a roundabout that efficiently allows cars to either drive into the Pier parking area or turn around and head north back onto First Street. B Street terminates at the water, at the Marina inlet, to the east. To the west, B Street terminates at First Street. The only through traffic in the area is on B Street between First and East Second Streets.

c. Trails and Bicycle Access

The Project Area includes a gap in the 500 mile shoreline San Francisco Bay Trail. As illustrated in Figure 8, the trail is currently implemented to the west of the Project Area as a Class III bike route on First Street. East of the Project Area, the SF Bay Trail is already implemented as a shared-use, off-street path encompassing the Waterfront at the Benicia Marina.

Both the SF Bay Trail Plan and the City of Benicia General Plan conceptually identify a multi-use path (Class I Bikeway) though the First Street Green. However, there is no defined location for the path within the Project Area.

The Benicia Waterfront Trail continues to be developed in segments along the Waterfront west of First Street, as development and redevelopment projects necessitate Waterfront trail development. An existing segment along the lower downtown Waterfront ends at the north end of the First Street Promenade, across First Street from the Project Area.

d. Water Access

The Benicia Marina is located directly adjacent to the Project Area, and provides long-term and transient access for power and sailboats. The San Francisco Bay Water Trail Plan also identifies four potential launch sites along the

Note: Topography shown on this map was derived from 2004 LiDAR data developed for the FEMA SF Bay Coastal Study. Raw .LAS files were downloaded from the USGS LiDAR web portal. The raw data points were minimally post processed within the study area boundary to remove trees, buildings and other extraneous features. LiDAR point features covering areas with low lying vegetation (grasses, bushes) were not modified in any way. Areas outside of the study area were also left as is.

Figure 9 - Opportunities and Constraints

Benicia Waterfront, including one in the Project Area, which would provide access for small non-motorized watercraft. One of the key objectives of this plan is to assess the potential for locating one Water Trail destination and/or launch site within the Project Area.

e. Parking

There is on-street parking within and surrounding the Project Area. The Benicia Pier includes 64 parking spaces, which includes three ADA accessible spaces. Adjacent to the First Street Green, there are a total of 46 parallel parking spaces on both sides of First Street.

There are two less formal parking areas along the south side of East B Street. The western parking area has a gravel surface of approximately 40 feet deep by 540 feet long. It is separated from the street by a curb, and is used for perpendicular parking. In this portion of the road; parallel parking is also permitted adjacent to the curb on East B Street. The eastern parking area is less formal, has a gravel surface, and is approximately 400 feet long by 40 feet wide. East B Street terminates at the Waterfront, adjacent to the Benicia Marina, and includes 10 formal paved parking spaces, one of which is ADA accessible.

The First Street Green and area adjacent to the Historic Depot are also used for parking for the annual Benicia Classic Car Show. It is estimated that several hundred cars are parked in the area for the event.

f. Public Access and Connectivity

The First Street Promenade includes a formal sidewalk and an elongated plaza area along the western portion of First Street. There are 4-foot sidewalks on the east side of First Street, adjacent to the First Street Green. There is also a 4-foot wide asphalt path that is located around the entire edge of the Pier. There are 4-foot formal sidewalks along the north side of East B Street; however, there are no sidewalks on the south side of the street, adjacent to the First Street Green.

There are no formal paths within the First Street Green. However, as illustrated in Figure 9 there is an unpaved informal walking path that also serves as a service road for special events at the First Street Green, which is 10 feet wide at its narrowest and twenty feet wide at its widest.

At the southern end of First Street, just south of the turnaround, there is a public beach access point. The "beach" is a gently sloped rocky area without major vegetation, and with a sandy beach exposed at low tide.

D. KEY OPPORTUNITIES AND CONSTRAINTS

The Plan presents a number of opportunities and constraints, almost all of which are interrelated. The opportunities and constraints are illustrated in Figure 9. These include the following:

- **Enhanced Recreation Space.** The adjacency of the Project Area to the City's Downtown creates a unique opportunity to expand the First Street Green's role as a local and regional destination that also better meets the daily needs of the adjacent business and residential community. The proximity to the wetland resources presents an opportunity to create a park that enhances the wetland resources and includes interpretive and viewing opportunities. The City also has a need for more passive recreation areas, and the site presents the opportunity to create spaces and public amenities that increase regular usage of the park.

- **Connectivity.** The Project Area presents an excellent opportunity to fill in gaps in both the regional (Bay Trail) and local pedestrian and bicycle network that greatly enhances the visibility of and access to Benicia's growing Waterfront trail system. The project will also assess the potential to link the First Street Green and First Street to other Bay shoreline amenities through designation as a destination for the proposed San Francisco Bay Water Trail, which is intended to enhance human-powered boating opportunities and amenities throughout the Bay system.

- **Sensitive Natural Communities.** The site supports a diversity of plant and animal species, and its location along the shoreline of Carquinez Strait provides important habitat for both aquatic and terrestrial species. Future uses on the site must recognize the constraint that sensitive biological and wetland resources pose to some activities, as well as the opportunities to further enhance existing habitat values that have been compromised by past development activities, the spread and establishment of invasive species, and disturbance to natural habitat and native wildlife use caused by the activities of humans and pets. Access should be carefully controlled through the use of interpretive signage and other mechanisms.

- **Special-Status Species.** Modifications to areas of marshland and open water habitat would require consultation with resource agencies, and may require authorizations under the State and federal Endangered Species Acts. This would include disturbance to marshland and open water habitat associated with installation of new piers or elevated boardwalks, or placement of fill or other modifications within or at the edge of marshland habitat. Although a special status species protocol survey was not performed, it is safe to assume that there is the potential for one or more of the salt marsh dependent species and improvements should minimize disturbance in the marsh zone.

- **Jurisdictional Waters.** Any modifications to jurisdictional wetlands and other waters of the U.S. would require authorization from jurisdictional agencies. This would include modifications to areas of marshlands to improve

habitat values, and possibly fill or modify areas considered to be potential seasonal wetlands if these features are confirmed to be jurisdictional wetlands. A formal wetland delineation must be prepared and verified by the Corps to confirm the extent of jurisdictional waters on the site, particularly the areas mapped as potential seasonal wetlands. Depending on the nature of the proposed modification, compensatory mitigation may be required.

- **Sea Level Rise Adaptation**. The site will be potentially impacted by any significant increases in sea level as discussed previously. However, unlike many other sites adjacent to tidal influence, there is substantial space to adapt to and mitigate for increases in sea level over the projected time frames of those impacts. Such measures may include protective features such as seawalls, levees, or wetland modifications. A noted constraint in this regard would be the need to provide storm water pumping capacity at some point in the future to assure effective drainage in the face of rising high tide levels, particularly for the B Street storm drain line.

- **Flood Protection.** B Street experiences frequent localized flooding for most significant storm events that occur during high tide. The performance of the storm drain system at B Street can be expected to decline with any increases of sea level. The localized flooding can be mitigated with infrastructure improvements such as a tide gate and other storm drain upgrades. Though situated along the shores of the Carquinez Strait, which drains much of the land area of California, the site is not exposed to exceedingly high flood risk because the Strait is very wide at this location (over 4,000 feet), and as a result of this capacity large storms do not cause much rise in flood elevations. Additionally, the site shows no obvious signs of excessive subsidence that is typical of many locations throughout the Bay Area and Delta.

- **Wetland Preservation and Restoration**. The site includes extensive existing wetland areas that are characterized by relatively low frequency of hydroperiods (the period of time during which a wetland is covered by water) that reflect the relatively uniform elevations within the wetlands. There are opportunities to enhance the diversity of these areas with tidal channels and other similar features, potentially as part of an adaptation strategy that accommodates future sea level rise.

- **Storm Water Quality.** The lack of storm water quality best management practices (BMPs) on the storm drain lines in the project area creates the opportunity to provide remedial water-quality benefits. These can take many forms and range from trash control devices, to bioretention facilities such as rain gardens, to other "green street" design enhancements.