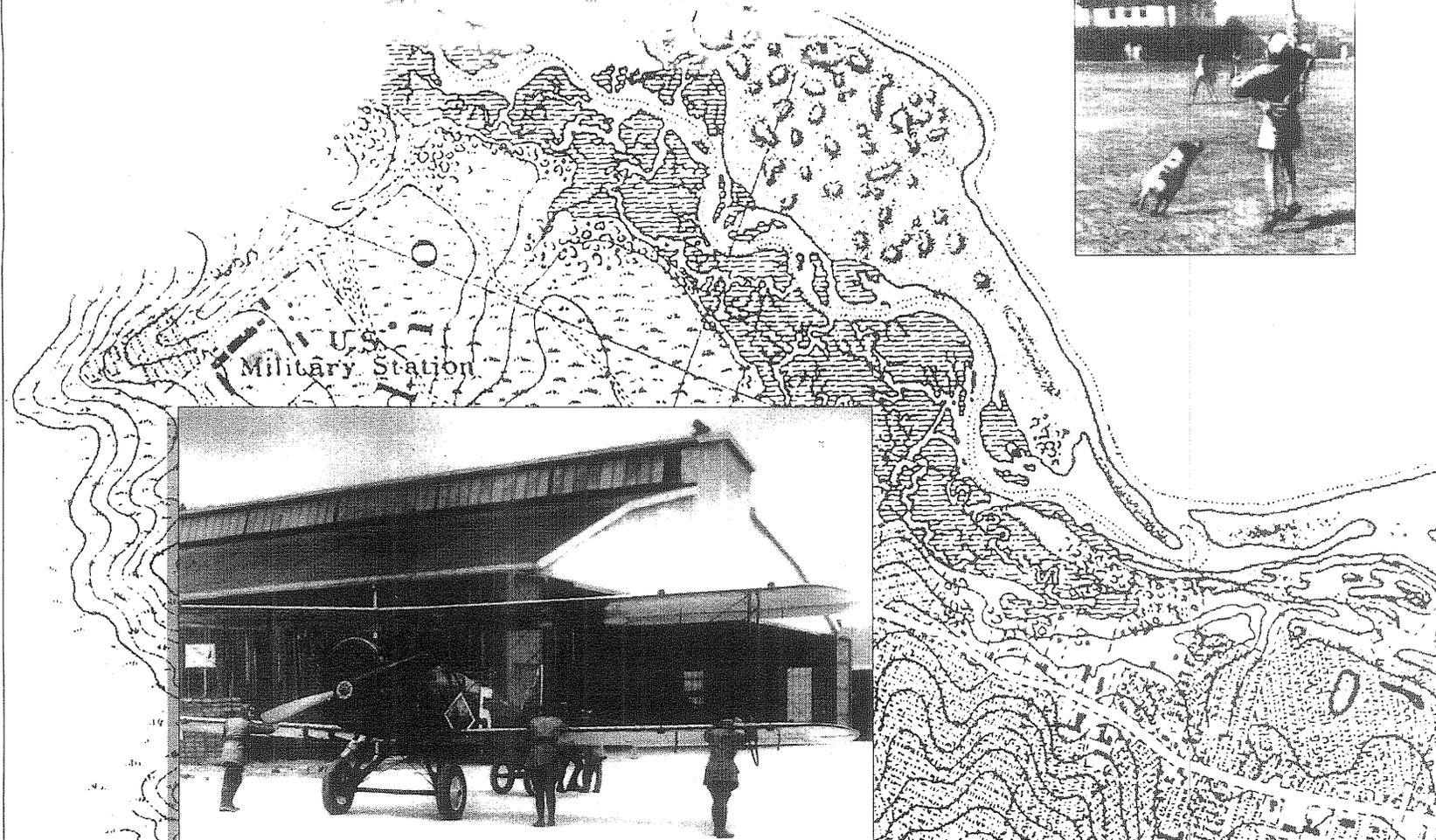


*K. Hadley  
Do Not Remove*

**ENVIRONMENTAL ASSESSMENT**

**June 1996**

# **Crissy Field Plan Golden Gate National Recreation Area**



*The fundamental purpose of all units of the National Park System is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.—From National Park Service Organic Act, 1916 as amended 1988.*

**Environmental Assessment for  
Crissy Field Plan**

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June 1996

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Section 1.0  
Purpose and Need  
for the Proposed Action

---

# 1.1 Introduction

## *1.1.1 Summary of the Proposed Action*

The 100-acre Crissy Field site is situated on the shore of San Francisco Bay, the northernmost waterfront of the Presidio of San Francisco (Presidio). The project area occupies a flat plain bounded by the bay to the north, Mason Street to the south, Lyon Street to the east, and a cluster of structures to the west of the former U.S. Coast Guard station. It is a unique site in very close proximity to a highly urbanized area.

The rehabilitation of Crissy Field, from the broad expanse of deteriorating surfaces and restricted access, will be accomplished through the restoration of historic military airfield elements, as well as reintroduction of ecological systems that once dominated and shaped the landscape of the site. The overall goal of the site plan is to accomplish this cultural and ecological restoration of the site consistent with the National Park Service (NPS) mission of conservation, while maintaining and enhancing Crissy Field as a "people place", which welcomes a variety of recreational activities.

## *1.1.2 Site Significance*

The Presidio is a valuable component of the Golden Gate National Recreation Area (GGNRA) because of its open space, unique ecological characteristics and potential, distinctive historic features, and views of San Francisco and its bay and ocean (Figure 1-1). As a part of the Presidio, Crissy Field exemplifies each of these qualities.

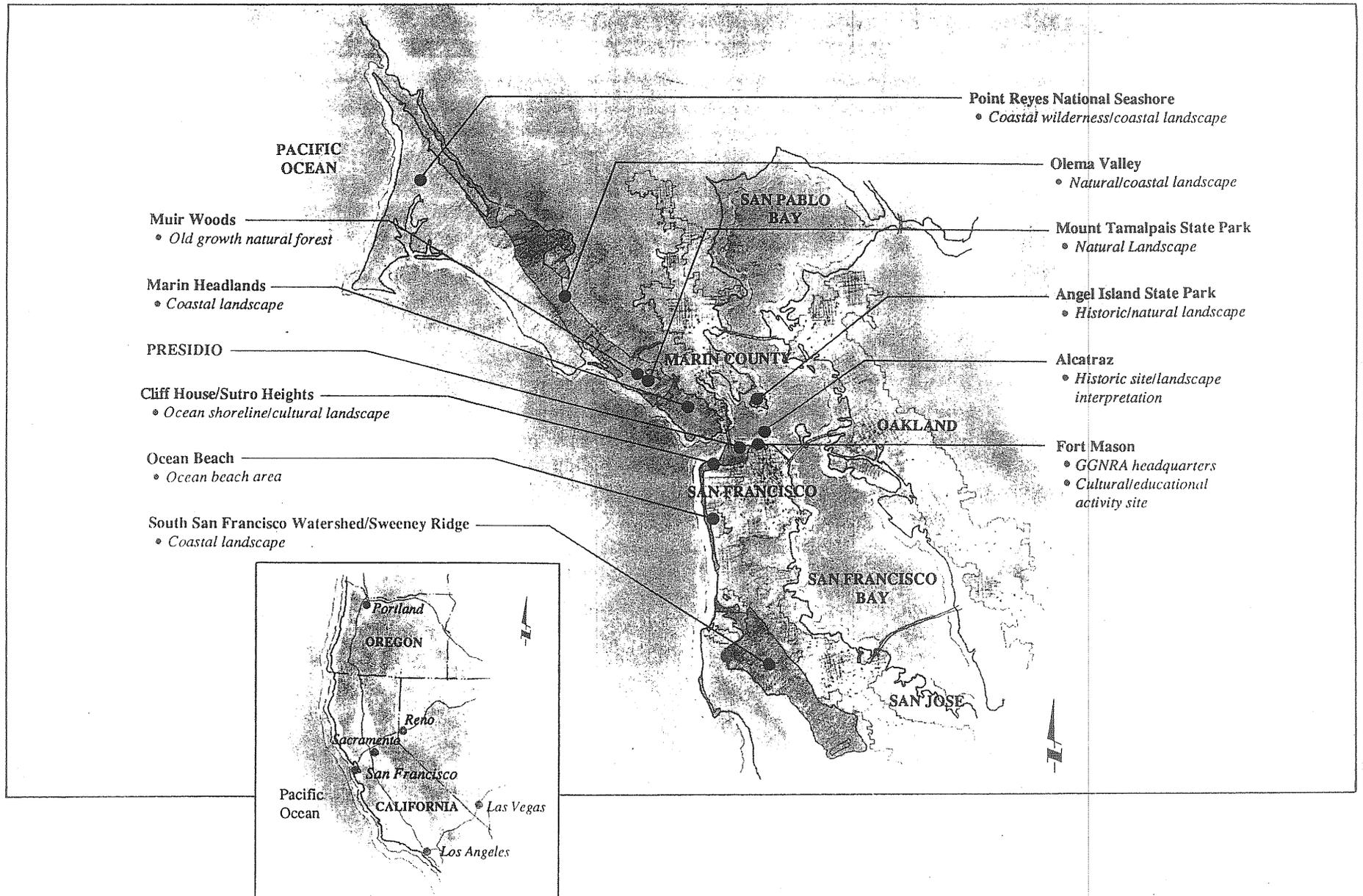
Crissy Field is also an important area for various types of recreational uses. It is a staging and launch point for world class boardsailing activities; a connection between Marina Green and Fort Point for pedestrians and bicyclists; and a secure and safe place for jogging, bird watching, dog walking, and general enjoyment of the shoreline. Crissy Field is also a popular location for special events. Because much of Crissy Field is currently inaccessible to the public, an opportunity exists for greatly enhancing use of Crissy Field by improving its recreational amenities and incorporating features that will unify Crissy Field with the rest of the Presidio.

Crissy Field has existing dune habitat associated with the sandy beach on the northern edge of the area, including the last remnant of native dune grass within San Francisco Bay and the most intact bay foredune community on the San Francisco Peninsula. A portion of the dunes is currently being restored, and the potential exists for dune restoration on a larger scale. Additionally, Crissy Field has considerable potential as a tidal marsh restoration site. Before Crissy Field was developed for military use, a large tidal marsh extended over much of this area. Favorable conditions could be recreated at Crissy Field for a tidal marsh that would have both educational and ecological value. Especially considering the fact that the San Francisco Peninsula is a densely inhabited urban area, this opportunity for restoration of natural systems is rare.

In the 1920s, a grass-surfaced airfield at Crissy Field served as the first Army coastal defense airfield on the Pacific coast and the only continually operating airfield in the western United States. Historic structures and the generally intact footprint of the former airfield still exist at Crissy Field. The existing airfield area includes several layers of construction representing continual growth of the Presidio through time. An existing large asphalt runway is the last of a series of landing strips that became successively larger and longer over three distinct periods of airfield usage starting with its initial designation as a military airfield in 1919 and ending with its final closure in 1974. Remaining within the existing airfield area are all of the original hangars, support structures, and other elements of the early airfield that not only contributes to two National Historic Landmarks but is of national significance in its own right as the site of numerous aviation milestones, the first air coast defense station on the Pacific Coast, and the only such airfield in the entire nation that retains integrity.

An excellent opportunity exists to enhance the historic qualities of the airfield and to provide interpretive education opportunities by removal of some of the later-constructed structures in the airfield area and restoration of the 1920s grass landing and takeoff field.

Additionally, the San Francisco Bay waterfront location offers spectacular views of San Francisco Bay, the Golden Gate Bridge, and the city of San Francisco. Crissy Field itself is a prominent feature that can be viewed by those entering San Francisco from the bay or the Golden Gate Bridge.



**Figure 1-1**  
**Golden Gate National Recreation Area Context**

### *1.1.3 Scope of the Proposed Action and Environmental Assessment*

The Proposed Action consists of a site plan for the development of the approximately 100-acre portion of Crissy Field generally including Mason Street and the site to the north. Two site plan alternatives and a No-Action Alternative are described and evaluated for site improvements that are based on the NPS General Management Plan Amendment for the Presidio of San Francisco (GMPA) approved in 1994 (Figure 1-2). The site plan alternatives were formulated based on a public involvement process that gathered input from numerous community organizations, public agencies, and private citizens.

This proposed plan does not include the uses of historic structures south of Mason Street, the former U.S. Coast Guard station, or the water shuttle described in the GMPA. Plans for these components will be developed in the future once tenants, uses, and programs are selected for adjacent buildings (e.g., hangars) and the feasibility of a water shuttle is determined. Intersection improvements at the east entrance will be fully addressed in future plans for Doyle Drive reconstruction.

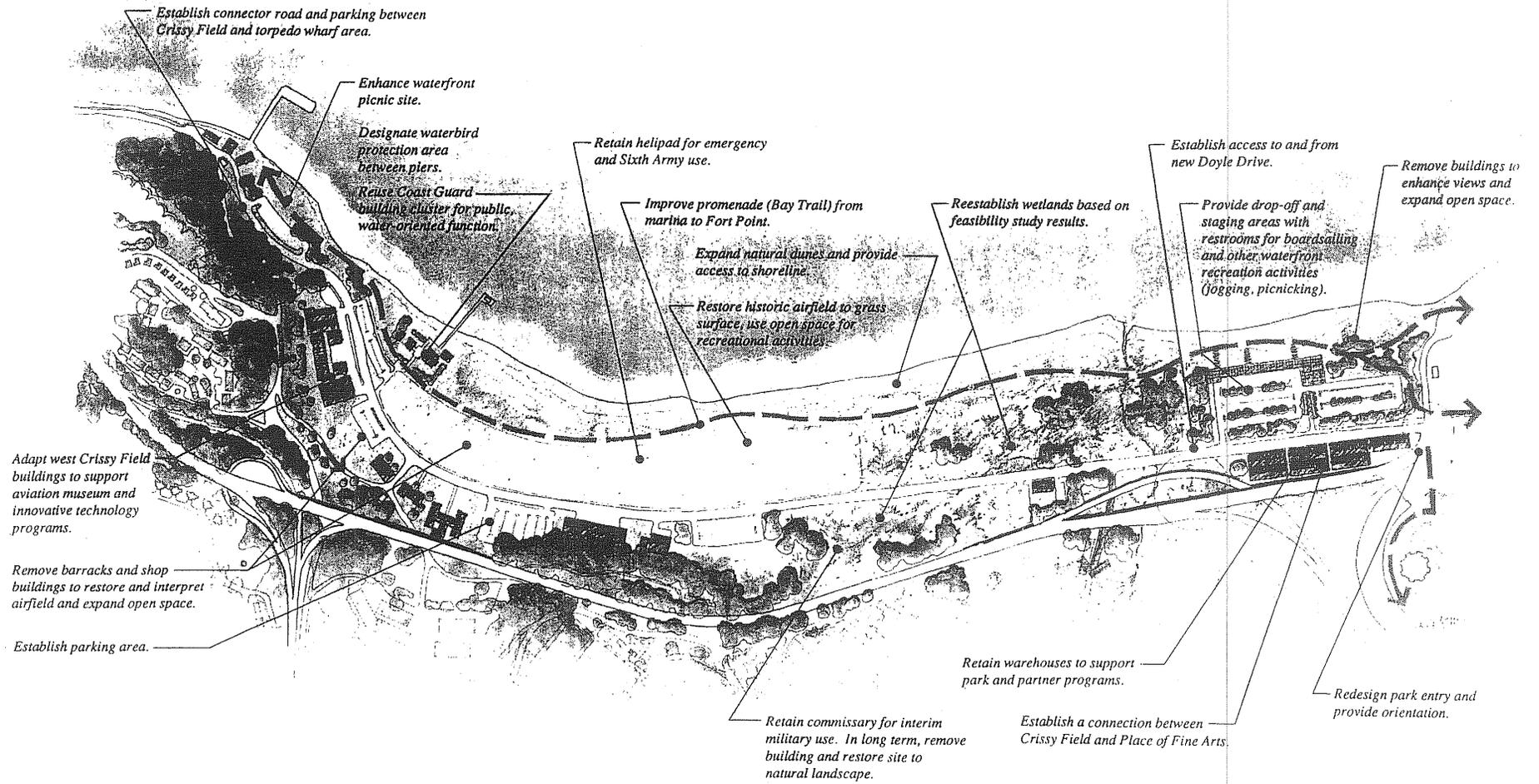
This environmental assessment (EA) is a project-level document that evaluates the environmental consequences associated with the Proposed Action and alternatives. It includes a full discussion of environmental impacts that would be induced by implementation of either of the alternatives and environmental commitments to avoid or reduce these effects.

This EA is based on the GMPA, a planning document that provides guidelines for NPS regarding the management, use, and development of the Presidio for the next 15 years. The GMPA was analyzed in its entirety in a final environmental impact statement (EIS), which was approved in September 1994 (National Park Service 1994a) and can be viewed at park headquarters, Building 201 Fort Mason, San Francisco, California. The EIS is incorporated by reference into this EA.

Because this EA for Crissy Field is tiered from the GMPA EIS, the broader program-level analysis contained in the EIS is not repeated in this EA.

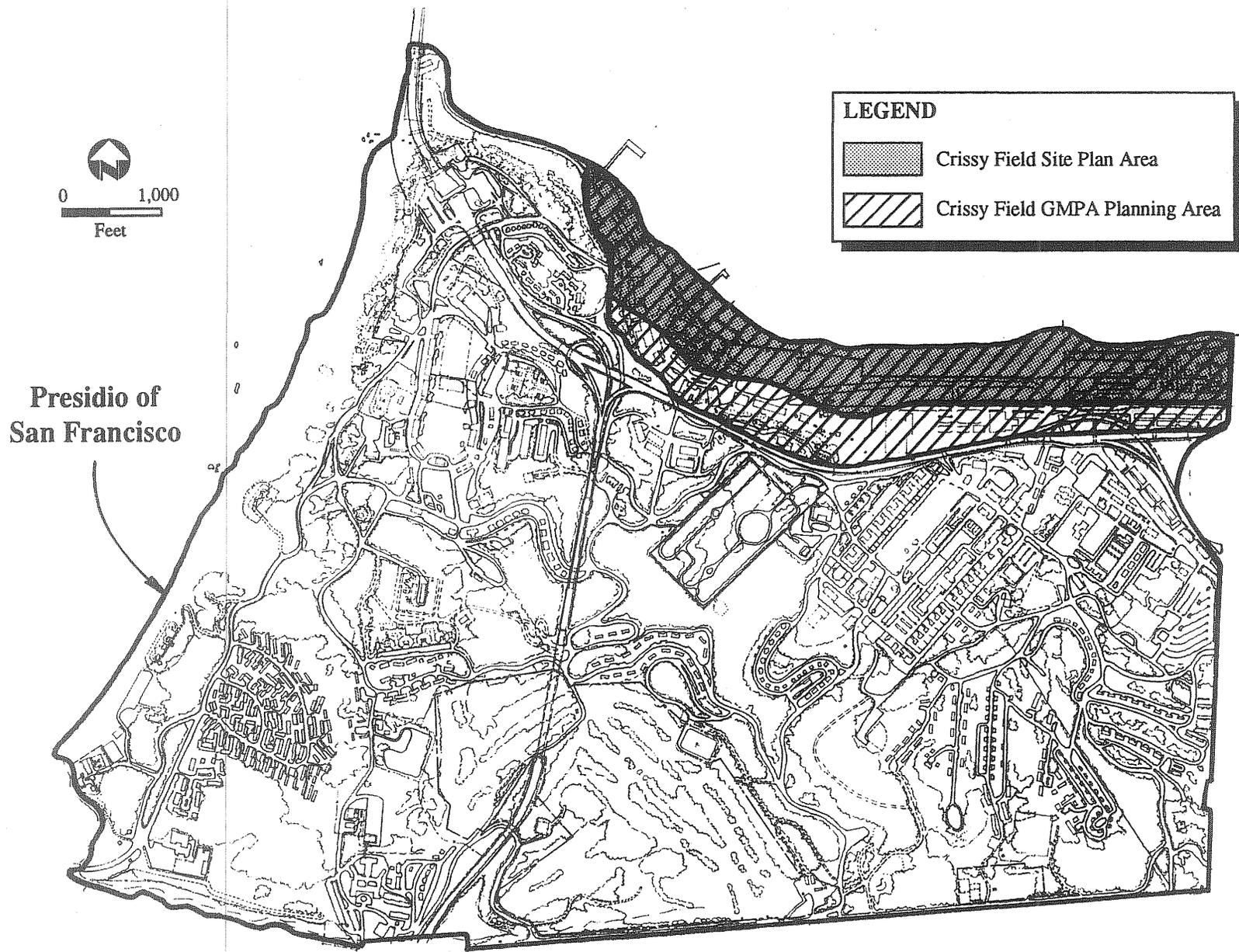
However, some of the most relevant information is presented in summary form. This EA has a narrower and more detailed focus than the GMPA EIS, concentrating on the specific issues associated with the development of Crissy Field according to the site plan alternatives. This EA has been prepared in compliance with the requirements of the National Environmental Policy Act (NEPA) and the regulations of the Council on Environmental Quality.

Figure 1-3 shows the relationship of the specific Crissy Field site plan area, included in this Proposed Action, to the larger Crissy Field planning area and the entire Presidio, as shown in the GMPA.



Approved July 1994

Figure 1-2  
GMPA Crissy Field Planning Area Concept



**Figure 1-3**  
**Planning Unit Boundaries**

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## 1.2 Purpose and Need

### 1.2.1 Plan Objectives

The GMPA for the Presidio envisions a global center dedicated to addressing the world's most critical environmental, social, and cultural challenges and a working laboratory to create models of environmental sustainability. It calls for a setting to provide a respite for reflection and renewal.

The underlying purpose of this action is to implement development of the northern portion of Crissy Field consistent with the planning area concept and actions described for Crissy Field in the approved GMPA. The GMPA vision for Crissy Field is that it become the "front yard" of the Presidio:

The Bay, the long stretch of shoreline ideal for all forms of movement and recreation, and the impressive views all contribute to experiences that draw visitors from throughout the world. Crissy Field will be managed to enhance the setting for those experiences while rehabilitating and preserving important historic resources and natural systems. (National Park Service 1994b.)

The GMPA specifies that the design for Crissy Field will incorporate a grass landing strip restored to its historic appearance. It also specifies that, based on results of a feasibility study, a tidal marsh will be reestablished. The parallel processes of restoring cultural and ecological resources and accommodating existing recreational activities into an integrated and sustainable design are the single largest opportunity of the Crissy Field reclamation.

In developing the site plan consistent with the GMPA vision for Crissy Field, NPS seeks to achieve the following overall goal and objectives.

**Goal:** *Enhance the setting for recreation and visitor enjoyment while rehabilitating and preserving important historic resources and natural values.*

**Objective 1:** *Enhance the setting and opportunities for visitors and recreational and educational uses.*

This objective includes:

- retaining and enhancing important existing qualities of the site;
- providing parking improvements and site amenities for waterfront recreational activities;
- providing facilities such as restrooms, outdoor showers, bicycle racks, picnic tables, benches, and educational wayside exhibits;
- improving the Golden Gate Promenade (Promenade) to accommodate a variety of recreational uses and users;
- creating an appropriate park entry at the east entrance;
- designating space within the restored airfield to accommodate small to moderate-sized events;
- providing access to accommodate people with physical disabilities; and
- enhancing environmental and cultural educational opportunities by including hands-on education and volunteer stewardship opportunities.

**Objective 2:** *Enhance and expand existing natural resource values and capitalize on opportunities to restore dunes and a remnant of the historical tidal marsh.*

This objective includes:

- reestablishing an ecologically viable self-sustaining tidal marsh requiring a minimum of human intervention and providing high-quality educational and interpretive opportunities;
- providing for connection of the future restored riparian corridor to the marsh and allowing for future expansion of the marsh south of Mason Street;
- restoring and enhancing native plant communities, expanding the native dune community to allow viable biological and coastal processes to

## PURPOSE AND NEED FOR THE PROPOSED ACTION

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occur, removing non-native vegetation, and providing access through sensitive dunes along designated paths; and

- providing adequate protection for wildlife currently on the site and anticipated to occur as a result of planned improvements.

### *Objective 3: Preserve and enhance cultural resources.*

This objective includes:

- restoring the historic grassy airfield to be consistent with the airfield's period of greatest significance (1920-1930) and
- protecting the historic and prehistoric archeological resources located on and adjacent to Crissy Field.

### *Objective 4: Improve transportation and circulation.*

This objective includes:

- providing automobile access to the Torpedo Wharf area in a non-intrusive manner, reducing cut-through traffic, simplifying overall circulation patterns, and improving safety for all modes of transportation;
- providing parking, as defined in the GMPA, that supports uses of the site, while minimizing visual impact and maximizing compatibility with other plan elements and future recreation;
- establishing bike lanes along roadways to separate fast bicycle traffic from more leisurely travel, as well as from automobile traffic; and
- improving pedestrian connections to the east, west, and south.

### *Objective 5: Develop a sustainable design.*

This objective includes:

- incorporating sustainable design practices such as incorporating native plant materials requiring low maintenance and providing habitat values, creating a self-sustaining landscape that minimizes maintenance needs, and using appropriate excavated materials onsite to create topographic variation and eliminate the need for offsite disposal;
- incorporating design features built of durable materials;
- eliminating unnecessary paving and impervious surfaces and removing excess asphalt, rubble, and concrete; and
- incorporating best management practices for stormwater management.

## ***1.2.2 Existing Conditions***

The following paragraphs briefly describe existing conditions and issues for those elements relevant to the objectives described above.

### ***1.2.2.1 Recreational Setting and Opportunities***

Existing conditions at Crissy Field are not consistent with the GMPA concept for this area. Crissy Field is the setting from which to enjoy expansive views and is a prominent site at the entrance to San Francisco from both land and water. However, much of Crissy Field has a derelict and transitional appearance, created by large areas of deteriorated concrete and asphalt, and fencing and building demolition.

A wide variety of recreational uses and a relatively high level of use exist at Crissy Field. Crissy Field in its current condition is a popular recreational destination. However, currently only two-thirds of the site plan area is accessible for public use. Other portions of the site are closed to public use.

Much of the open space currently accessible to the public is vegetated with weedy non-native grasses or has surfaces of asphalt, concrete, or hard-packed earth. The Promenade connection around the U.S. Coast Guard station is confusing and crosses through parking lots and access roads. The condition of the Promenade at the east and west ends of the site is poor and the trail at the east end is often buried by sand and storm debris following winter storms and high tides. Blowing sand is a problem in the East Beach parking area. Rubble covers about 3,100 linear feet of beach.

The site offers few amenities (such as restrooms, showers, benches, picnic tables, wind shelter, wayside exhibits) to support existing and proposed uses of the site. Trail connections to other areas of the Presidio and the city are not clear. Opportunities for interpretive education associated with the airfield and natural features of the site are limited. Opportunities to accommodate the growing interest in volunteer restoration activities at the site are currently limited to the relatively small natural area of dunes.

The current configuration of the helipad eliminates a large area from other uses.

### **1.2.2.2 Natural Resources**

There is currently no tidal marsh at Crissy Field. The former tidal marsh that extended from this site constituted a portion of a 130-acre tidal marsh that was unique in the Bay Area. Similar to the fate of over 90% of California's wetlands, the former tidal marsh was completely obliterated. Between 1912 and 1915, the marsh was filled with sand pumped from offshore to provide a site for the 1915 Panama-Pacific International Exposition. Based on an evaluation of the feasibility of restoring a portion of this ecosystem at Crissy Field, it has been determined that marsh restoration is feasible and can provide an ecologically valuable, self-sustaining tidal marsh, requiring minimal human intervention and providing high-quality educational and interpretive opportunities and improved aesthetics.

With about 15 acres of Crissy Field covered with asphalt, concrete, or buildings undergoing removal, vegetated areas are limited to about 3 acres of natural dune and 18 acres of non-native grassland. In addition, there are a number of palm trees southwest of the Promenade along Mason Street and along the airstrip. A few Monterey pines, cypress trees, and eucalyptus trees

grow in clusters throughout the site plan area. Native plant communities at Crissy Field are small and ecologically separated from other natural communities. This limits wildlife habitat, as does the level of human activity that has occurred and is still occurring at Crissy Field. Offshore waterbird habitat is not protected. Although dunes are expanding in some areas north of the Promenade, in areas where the beach is covered with rubble or where development encroaches onto the beach, dunes are not able to form and sand blows onto the backshore areas.

### **1.2.2.3 Cultural Resources**

Crissy Field contains substantial remnants of a grassy military airfield that was originally constructed in the 1920s. This airfield is a nationally significant historic resource because of its place in the history of military aviation. Although much of the open space and associated historic structures remain, later additions of paving and structures have damaged or obscured the historic airfield, and in its current condition it is very difficult to interpret. The building demolition program, in its final stages, has resulted in removal of structures not related to the airfield's period of significance, allowing for the restoration of its historic appearance, enhancing the historic context of the original Army Air Base and providing high-quality educational opportunities.

### **1.2.2.4 Parking, Transportation, and Circulation**

Parking and traffic circulation at Crissy Field are also problematic. The oversized width of Mason Street and its straight alignment encourage excessive speeds and invite cut-through traffic by travelers wishing to avoid more crowded travel routes. These conditions on Mason Street are detrimental to recreational use of the site and are not conducive to pedestrian travel between Crissy Field and other parts of the Presidio. Duplicate alignments of Mason Street and secondary access routes provide unnecessary and confusing travelways through the site. No safe bicycle route through Crissy Field currently exists. Excessive paved areas at Crissy Field encourage its use as a site for special event and shuttle parking for activities that could be served by parking elsewhere on the Presidio away from the highly visible waterfront setting. The location of parking at the west end requires vehicle traffic to cross the Promenade.

## PURPOSE AND NEED FOR THE PROPOSED ACTION

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At the east end of the site, parking to serve recreational uses is spread out in an unstructured space with a variety of surfaces, much in badly deteriorated condition and not screened from view. Areas of parking at the east end are too close to the beach to allow for protection from storm wave overwash and are often buried beneath sand. Parking in this location also prevents the formation of dunes of sufficient size to capture blowing sand and provide protection for recreational facilities along the waterfront from storm waves.

### *1.2.3 Issues and Concerns*

The issues and concerns described in this section were identified during public meetings, workshops, and scoping sessions concerning development of Crissy Field. They represent the challenges and opportunities associated with developing a plan that achieves multiple objectives.

#### **1.2.3.1 Restoration of Tidal Marsh**

Throughout the scoping process and afterward, tidal marsh restoration at Crissy Field was the greatest issue of public concern. Comments were expressed in support of and in opposition to including a tidal marsh in the design. Strong support for tidal marsh restoration was voiced, along with concerns that the tidal marsh be of adequate size to function naturally and provide ecological and educational values. Comments supportive of a tidal marsh also emphasized the importance of demonstrating the feasibility of and commitment to future expansion of the marsh south of the current planning area, and questioned the location and size of parking areas at the east end of the site.

Many concerns were also raised regarding compatibility of a tidal marsh with existing and proposed recreational uses. Some commenters strongly voiced concerns about the uncertainty of viability of a constructed tidal marsh, the potential to create unwanted conditions conducive to pests such as mosquitos, the cost of construction and maintenance, and future evolution of the tidal marsh. The space allocated for a tidal marsh was seen by some as detrimental to existing uses of the site and introducing the potential for conflicts between natural resource preservation and recreational uses, especially off-leash dog walking.

#### **1.2.3.2 Plant and Wildlife Habitats**

In addition to the tidal marsh issues, a number of other issues related to the natural environment were brought up during the scoping process. Most comments related to natural plant and wildlife habitats were in favor of keeping the natural elements in the site plan. Support for retaining and/or expanding the dunes was voiced, along with maintaining native vegetation and removing non-native grasses and trees. Concerns about the potential conflict between dogs and natural areas were also expressed. Commenters both in support of and against establishing the waterbird protection area voiced opinions.

#### **1.2.3.3 Restoration of the Historic Airfield**

Most comments relating to cultural resources focused on the issue of restoring the historic airfield. Most commenters were supportive of having an airfield component to the plan, but there were varying opinions about how that component should be implemented. Some wanted a new grass multipurpose airfield restored to historic dimensions, and others wanted the existing airstrip to be retained. Opinions about various lengths and accuracy to an important historic time period were voiced. Concerns about "intrusion" of the tidal marsh into the airfield area, and vice versa, were expressed. Supporters of restoring the airfield to its historic dimensions were concerned that creating a large tidal marsh in the central/east portion of the site were competing objectives.

#### **1.2.3.4 Providing for Existing and Planned Recreational Uses**

Use of Crissy Field for recreational activities was also of great public interest and concern. A huge amount of public support was expressed for maintaining access and facilities for existing activities at Crissy Field, including walking, running, bicycling, rollerblading, picnicking, bird watching, photography, and other activities. Proponents of maintaining these current recreational uses voiced support for incorporating features that support these activities, such as the Promenade, other pathways, beach and shoreline access, and parking, into the plan. Strong support for retaining off-leash dog walking was voiced, along with desires to reduce or eliminate dog

activities at Crissy Field. Commenters also expressed support for, and opposition to, accommodating boardsailing activities.

### **1.2.3.5 Transportation and Parking**

During scoping, the issues of greatest concern related to transportation and parking were the amount of parking that should be supplied and the amount of traffic traveling through Crissy Field. The greatest number of comments emphasized reducing the amount of traffic and parking included in the site plan. Some people wanted a special event parking/staging area to be maintained. Commenters also suggested screening parking areas with vegetation. Others commented that all parking should be south of Mason Street. Concerns about parking overflowing into adjacent neighborhoods were voiced.

Other transportation issues related to concerns about access. Support for and opposition to retaining connections to the Palace of Fine Arts, Fort Point, Doyle Drive, and Fort Mason shuttle parking were expressed.

### **1.2.3.6 Built Environment**

Overwhelmingly, commenters voiced support for removing buildings, the helipad, concrete, fences, pipes, rubble, etc., to enhance open space and views from Crissy Field. However, there was also support for providing a fenced dog-running area and retaining a facility to accommodate emergency helicopter landings.

## **1.2.4 Public Involvement and Scoping**

Identification of the issues and concerns summarized above resulted from an extensive amount of public input. Although earlier planning efforts for a smaller portion of the site took place before base closure, public involvement for planning the entire Crissy Field area began in 1991 with the vision workshops held for the GMPA. It continued with the environmental scoping for the GMPA EIS and with the series of public workshops and meetings held to address site planning issues specifically for Crissy Field.

Public involvement for the current plan began with two public workshops held in 1995 to solicit input on developing the site plan and identifying environmental issues and alternatives. Approximately 150 people attended the initial public workshop in January 1995. Then in June 1995 approximately 130 people attended the public scoping workshop.

In addition to the larger general public meetings, more focused meetings were held with representatives of public agencies and special interest groups. Two interagency meetings were held in 1995 and 1996 to discuss environmental compliance and permit issues. Six agencies were represented, including the U.S. Environmental Protection Agency (EPA) Region 9, the U.S. Fish and Wildlife Service (USFWS), the U.S. Army Corps of Engineers (Corps), the Bay Conservation and Development Commission (BCDC), and the California Department of Health Services.

Several meetings were also held with each of the following agencies and groups: the San Francisco Recreation and Park Department, the California Coastal Conservancy, the Neighborhood Association for Presidio Planning, the Society for the Prevention of Cruelty to Animals (SPCA) and representatives of Crissy Field dog walkers, the San Francisco Boardsailing Association, People for the Presidio, and the GGNRA Advisory Commission Presidio Committee.

NPS also met with several environmental groups, including the Marin and Golden Gate Audubon Societies, Point Reyes Bird Observatory, Gulf of the Farallones National Marine Sanctuary, National Parks and Conservation Association, California Native Plant Society, Fort Point Environmentalists, Environmental Forum of Marin, Sierra Club Presidio Task Force, Save San Francisco Bay Association, Bay Area Wetlands Group, and People for a GGNRA.

Preservation groups involved in scoping included San Francisco Landmarks Preservation Board; the Fort Point and Presidio Historical Association; American Aviation Historical Society; the National Trust for Historic Preservation; and American Institute of Architects, San Francisco.

PURPOSE AND NEED FOR THE PROPOSED ACTION

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Section 2.0  
Alternatives, Including  
the Proposed Action

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## 2.1 Proposed Action

### 2.1.1 Introduction

The Proposed Action (Proposal) (Figure 2-1) for Crissy Field envisions sweeping environmental changes from the prevailing conditions of deteriorated surfaces, fenced-off areas, and rubble-lined sections of beach. It incorporates revitalized ecological communities, such as sand dunes and a tidal marsh, which once characterized the northern Presidio shoreline and weaves them into an areawide treatment that complements the nationally significant cultural values of the historic airfield and the popular recreational values of the shoreside open space. The Proposal creates a visual link between the Presidio and the bay by creating a natural transition of open space (Figure 2-2). It expands the scope and richness of public use through the vast, 100-acre site, integrating and amplifying the significant cultural, scenic, and natural influences that have all served to shape the site over time.

The site plan Proposal consists of implementing site improvements and changes to the landscape on the portion of Crissy Field north of Mason Street consistent with the concepts and actions described in the GMPA for the Crissy Field planning area. Approximately 100 acres, generally the area north of Mason Street, would be improved under this Proposed Action. The Proposal and the Dune Alternative are distinguished from each other by the treatment of the central portion of the site. The Proposal includes a 20-acre tidal marsh. The Dune Alternative includes a 20-acre gently rolling landscape with dune scrub vegetation in the central portion of the site and no tidal marsh.

This EA evaluates the effects associated with the Proposed Action, the Dune Alternative, and the No-Action Alternative. The sections below describe the common features of the two site plan alternatives (the Proposed Action and the Dune Alternative), followed by the unique features associated with the individual alternatives. The No-Action Alternative is also described.

### 2.1.2 Elements Common to Both Site Plan Alternatives

Many elements are common to both site plan alternatives. These common elements involve the following features:

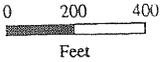
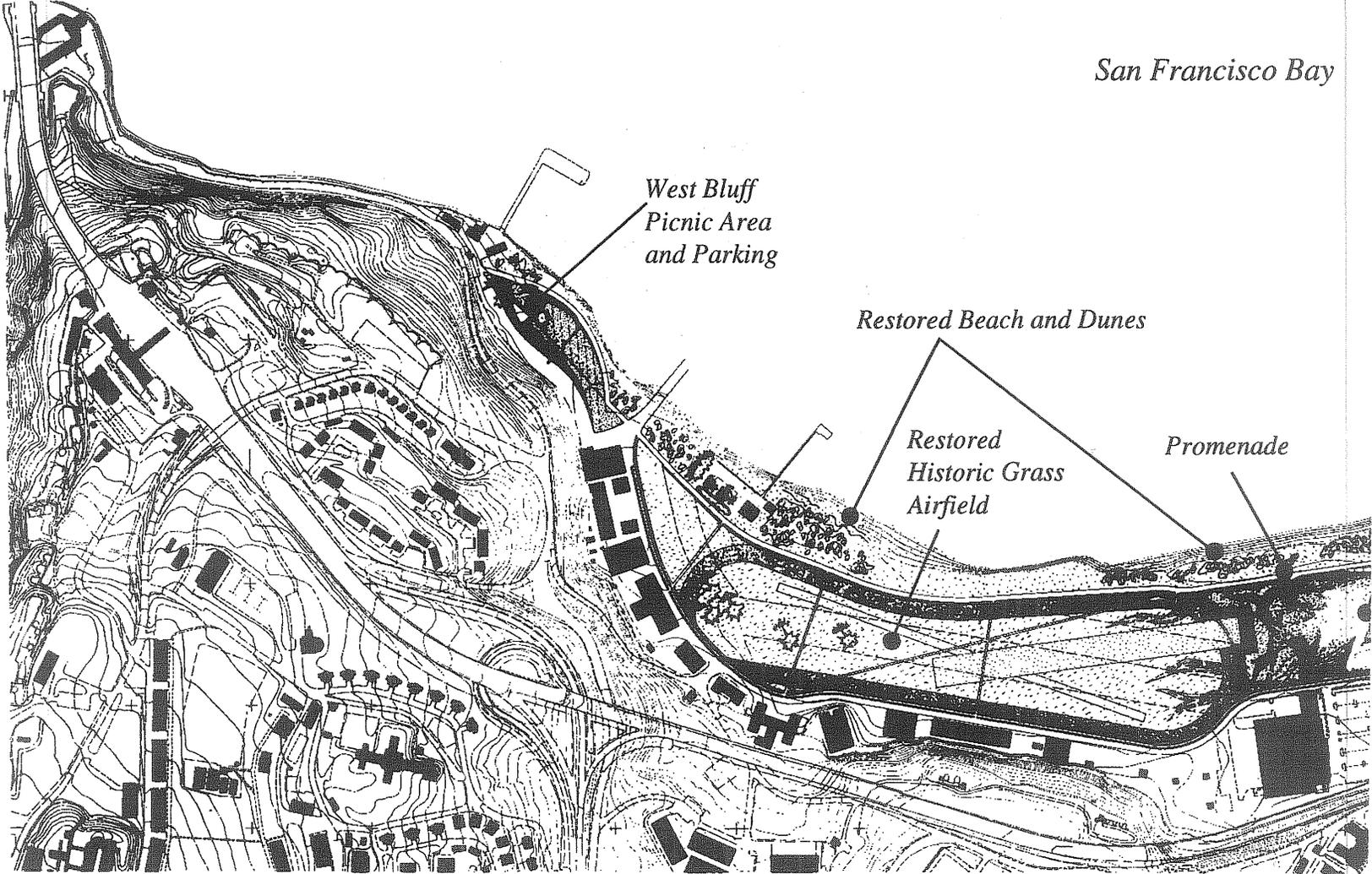
- Promenade improvements and realignment;
- Mason Street modifications;
- coastal dune restoration;
- East Beach and entry improvements;
- airfield restoration;
- West Bluff improvements (passive recreation area and parking);
- rubble removal, shore protection, and beach reconfiguration;
- retention and removal of existing vegetation;
- official designation of the waterbird protection area; and
- establishment of allowable off-leash dog use areas.

Table 2-1 summarizes the main components of each alternative. Each of the common components is discussed separately below.

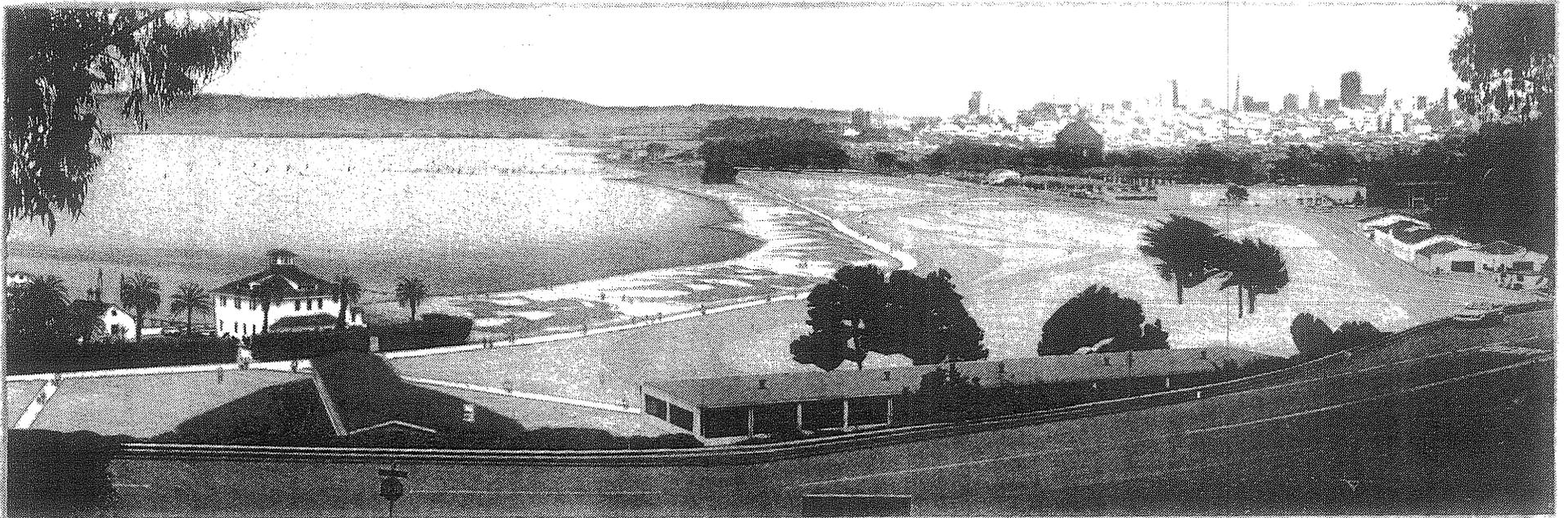
#### 2.1.2.1 Golden Gate Promenade Improvements and Realignment

The existing Promenade varies in width from 6 feet to 30 feet and is surfaced with a combination of crushed stone, asphalt, and asphalt gravel (Figure 2-1). Portions of the existing pathway surface are in poor condition. The Promenade would be resurfaced to create an enhanced pedestrian route.

*San Francisco Bay*







**Figure 2-2**  
**Proposal Overview from Lincoln Boulevard Overlook**

**Table 2-1. Summary Comparison of Major Elements of the Site Plan Alternatives**

Element	Site Plan Alternatives		
	Proposed Action	Dune Alternative	No-Action Alternative
Golden Gate Promenade improvements and realignment	Yes; a bridge would be constructed on the Promenade to cross the tidal marsh channel to the bay	Yes	Existing Promenade alignment would remain
Mason Street redesign	Yes	Yes	No
Coastal dune restoration	Yes; existing dune restoration areas would be expanded to approximately 8 acres north of the Promenade	Yes; existing dune restoration areas would be expanded to approximately 8 acres north of the Promenade	No new dune restoration work would occur
Central dune field construction	No	A 20-acre stabilized dune field vegetated in dune scrub would be created in the central portion of the site	No
East Beach and entry improvements			
East entry	Yes; a 2-acre entry grove of Monterey cypress would be planted inside the east entrance. Stabilized dune landforms would screen parking from Mason Street and Little Marina Green	Yes; a 2-acre entry grove of Monterey cypress would be planted inside the east entrance. Stabilized dune landforms would screen parking from Mason Street and Little Marina Green	No
Boardsailing access	Improved and expanded facilities; beach extended by rubble removal	Improved and expanded facilities; beach extended by rubble removal	Unchanged from current conditions
Parking	Approximately 120 paved oversized spaces would be accommodated in the boardsailing area; additional parking on grass would accommodate approximately 280 spaces; 100 spaces would be provided south of Mason Street	Approximately 120 spaces would be accommodated in the boardsailing area; additional parking on grass would accommodate approximately 280 spaces; 100 spaces would be provided south of Mason Street	Unchanged from current conditions (space for approximately 560 vehicles located in the boardsailing area and associated with structures on the northeast corner of the site)

Table 2-1. Continued

Element	Site Plan Alternatives		
	Proposed Action	Dune Alternative	No-Action Alternative
Airfield restoration	Yes; the grassy surfaced airfield would be restored on 28 acres	Yes; the grassy surfaced airfield would be restored on 28 acres	No
West Bluff improvements			
Passive recreation area	Yes; approximately 2.5 acres would be developed for picnicking and small gatherings	Yes; approximately 2.5 acres would be developed for picnicking and small gatherings	No
Parking	Approximately 160 spaces would be created at the west end of the plan area	Approximately 160 spaces would be created at the west end of the plan area	Unchanged from current conditions (approximately 25 spaces located near Torpedo Wharf )
Rubble removal and beach reconfiguration	Yes; rubble along 800 feet of the shoreline would be removed or graded	Yes; rubble along 800 feet of the shoreline would be removed or graded	No
Retention and removal of existing vegetation	Most of the existing non-native vegetation would be removed, except for Monterey pine and cypress, the row of eucalyptus along Lyon Street, and the vegetation along the edge of the U.S. Coast Guard compound	Most of the existing non-native vegetation would be removed, except for Monterey pine and cypress, the row of eucalyptus along Lyon Street, and the vegetation along the edge of the U.S. Coast Guard compound	Existing vegetation would remain
Waterbird protection area	Yes; 1,600 feet of shoreline and adjacent waters	Yes; 1,600 feet of shoreline and adjacent waters	No
Tidal marsh construction	A 20-acre tidal marsh would be constructed in the central portion of the site	No wetland construction would occur; however, some partial excavation would occur in the central dune field construction area to allow for the option to construct wetlands as part of a future project	No
Total area	100 acres	100 acres	100 acres

## ALTERNATIVES, INCLUDING THE PROPOSED ACTION

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Seating areas and overlooks would also be added as amenities associated with the Promenade (Figures 2-3 and 2-4). A uniform width of 20 feet would be provided to allow ample room for walkers, runners, and slower-moving bicyclists. Crushed oyster shell or stabilized aggregate would be used as a standard surfacing material to provide adequate, uniform surfacing for users while discouraging use by high-speed bicyclists. The surface would meet minimum standards of the Americans with Disabilities Act (ADA).

At the eastern end of Crissy Field, the Promenade would be shifted slightly southward to accommodate dune restoration, rubble removal, and beach reconfiguration and to relieve problems of storm wave damage and wind-blown sand. It would also shift southward at the West Bluff area.

### 2.1.2.2 Mason Street Modifications

Mason Street generally forms the southern boundary of the site. Mason Street currently averages 51 feet in width, consisting of two 20-foot-wide travel lanes and an 11-foot shoulder. The proposed changes in Mason Street are to slow automobile traffic, to improve recreational uses and safety, and to restore cultural resources to accommodate the historical shape of the airfield.

Under both site plan alternatives, Mason Street would be restriped so that the travel lanes would be narrowed in width to a standard 12 feet each. Along the north side of the roadway, a 5-foot-wide median and a 10-foot-wide separated bikeway and separate pedestrian path would be created. The median would be provided to ensure physical separation between vehicular travel lanes and bicycle traffic on the bikeway. The bikeway is expected to draw high-speed bicycle traffic away from the pedestrian-oriented Promenade. A second 5-foot-wide median strip would be constructed to physically separate the bikeway from the 8-foot-wide pedestrian path that would be created along the north side of the roadway (Figure 2-5).

Both of the alternatives include minor alterations to the alignment of Mason Street. The street would be shifted slightly at its west end to restore the configuration of the historic airfield. New curves in the alignment are also intended to reduce traffic speeds through the area. Mason Street would be extended from Crissy Field Avenue along the front of historic airfield hangars to the West Bluff parking lot. This alignment represents a

restoration of the historical road corridor for Mason Street, which has been cut off for some time.

### 2.1.2.3 Coastal Dune Restoration

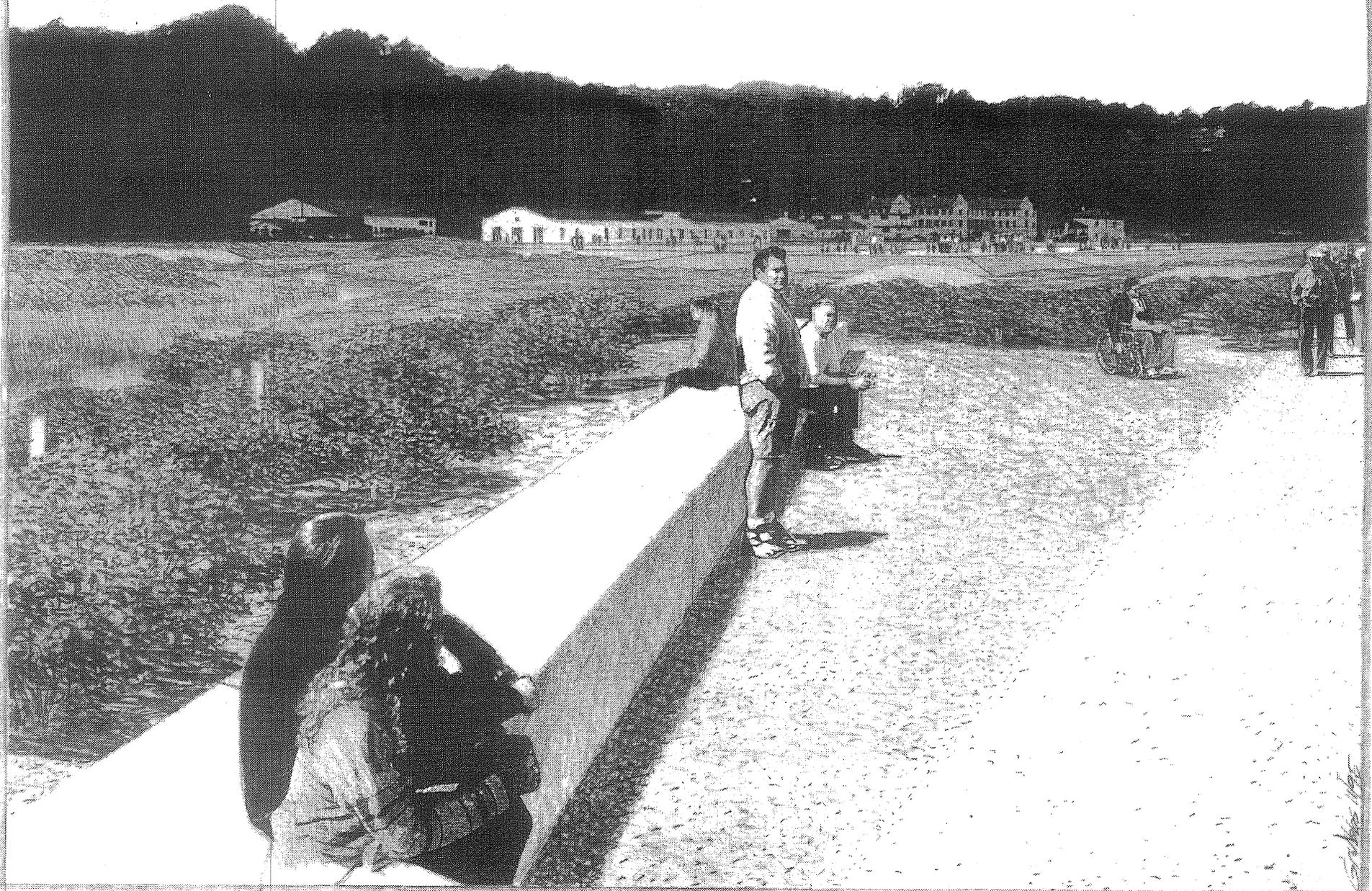
Existing coastal dunes (referred to as northern foredune in Holland [1986]) along the north side of portions of the Promenade would be expanded and protected along approximately 1,400 linear feet of the shore. Pedestrian access would be provided on defined paths and post-and-cable fencing would provide protection. No permanent irrigation or soil amendments would be used for the restored dunes; however, irrigation may be necessary during the plant establishment phase. Native vegetation approved by NPS will be planted on the restored dunes. Common northern foredune species include beach primrose (*Camissonia cheiranthifolia*), coastal sand verbenas (*Abronia latifolia* and *Abronia umbellata*), beach bur (*Ambrosia chamissonis*), American dune grass (*Leymus mollis*), and California poppy (*Eschscholzia californica*). A species list is provided in Appendix A. Restoration of dunes would include community participation through volunteer restoration work.

### 2.1.2.4 East Beach and Entry Improvements

The East Beach currently consists of a grid of asphalt streets and parking in various degrees of disrepair interspersed with unpaved grassy areas. This area would be enhanced for use by visitors for picnicking, parking, and staging recreational equipment (Figures 2-6 and 2-7). All existing streets would be removed, along with most of the existing pavement in this area. Two new entry travelways would be paved, as well as two travelways parallel to the Promenade (Figure 2-8). One row of parking would be paved closest to the Promenade, providing parking spaces for roughly 120 automobiles to meet normal daily parking needs. All other parking would be on turf south of the paved parking. This grass would allow for flexibility of use, allowing for automobile parking as well as providing a soft surface for boardsailor setup, picnicking, or other recreational activities. The grass surface would also minimize the visual effect of providing for parking in this area when parking demand is low. The turf area would provide overflow capacity for up to 280 cars. The total area for parking and rigging that would be provided would be roughly equivalent to the area presently used for these activities.

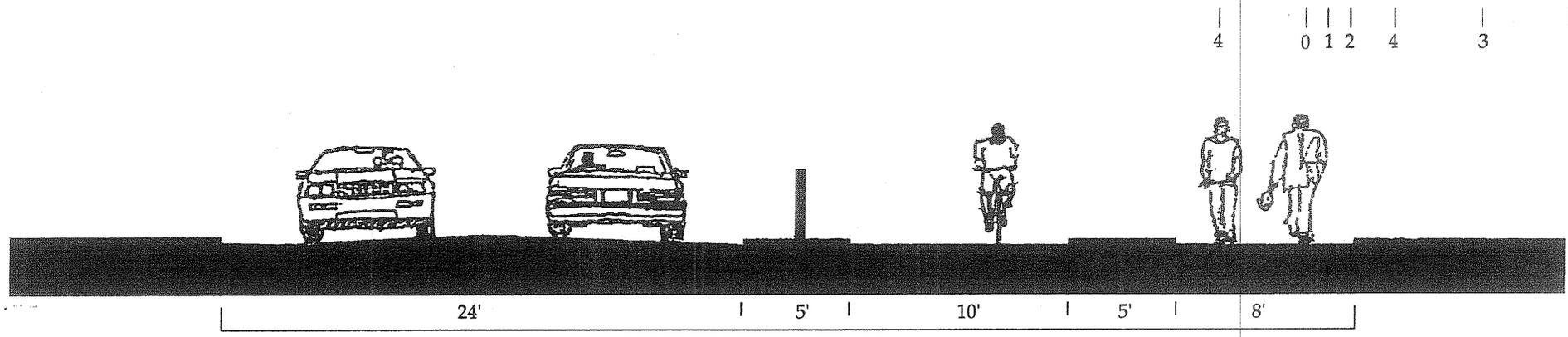


**Figure 2-3**  
**Improved Views, Marsh Overlooks, and Shoreline Promenade**



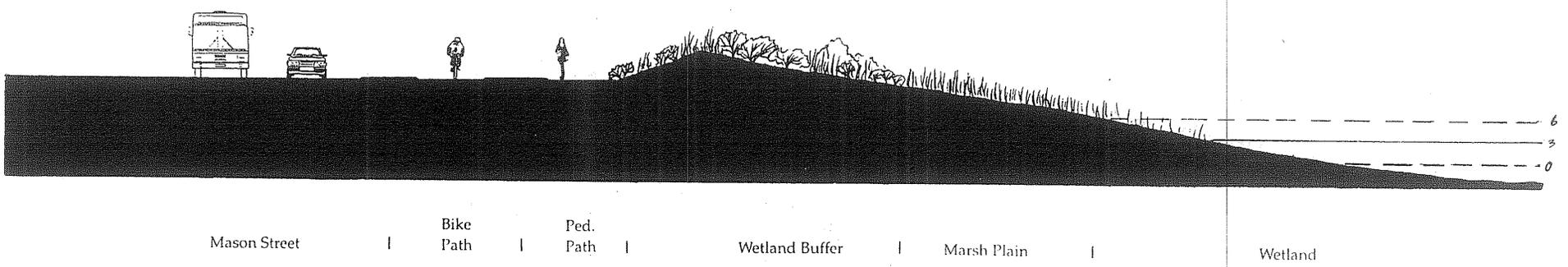
**New Seating Areas Along the Promenade and Barrier Fencing Hidden in Vegetation**

**Figure 2-4**

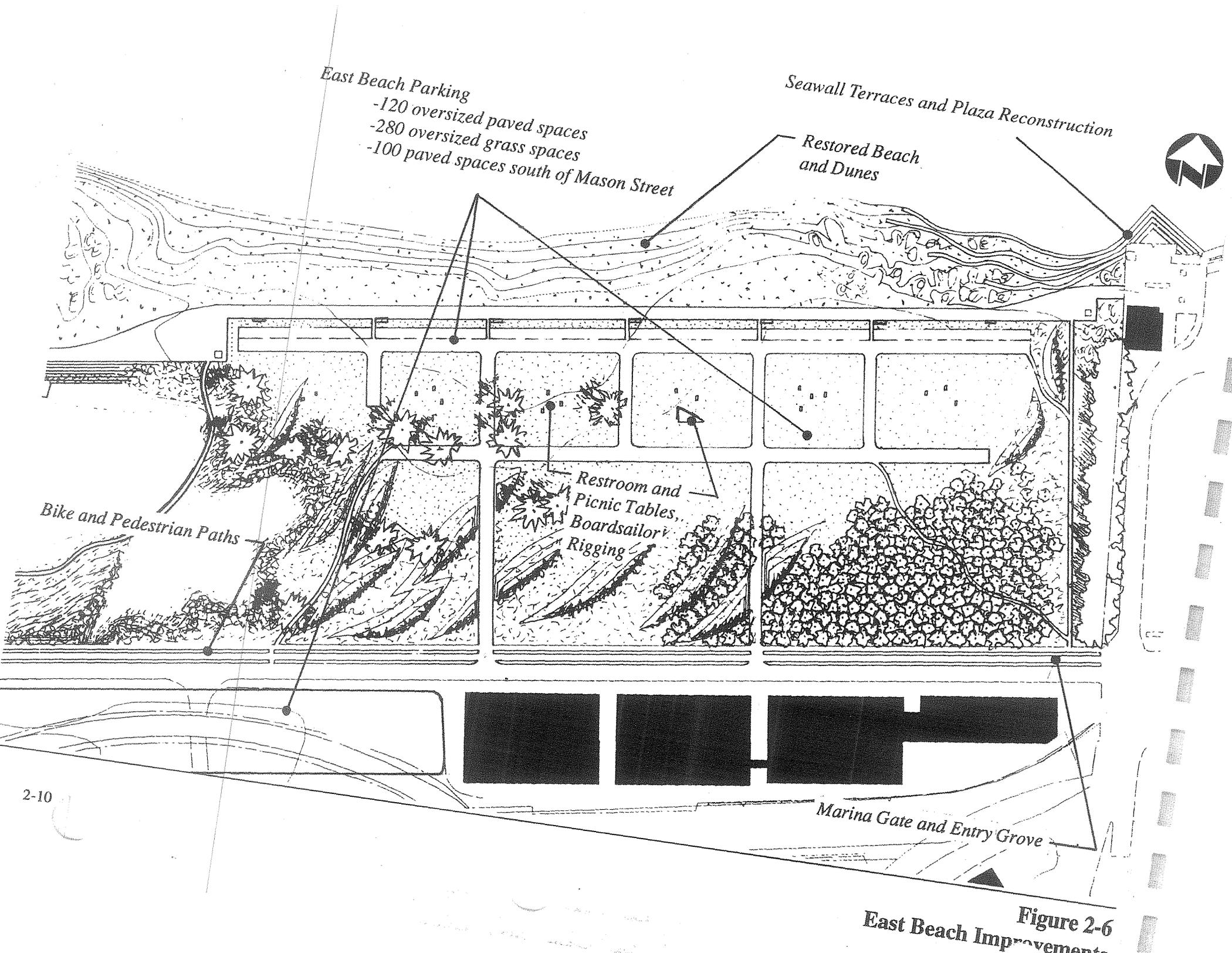


Mason Street-52'

CROSS SECTION OF MASON STREET, BICYCLE PATH, AND PEDESTRIAN PATH



SECTION THROUGH MASON STREET AT WETLAND



East Beach Parking  
 -120 oversized paved spaces  
 -280 oversized grass spaces  
 -100 paved spaces south of Mason Street

Seawall Terraces and Plaza Reconstruction

Restored Beach and Dunes

Bike and Pedestrian Paths

Restroom and Picnic Tables,  
 Boardsailor Rigging

Marina Gate and Entry Grove

Figure 2-6  
 East Beach Improvements

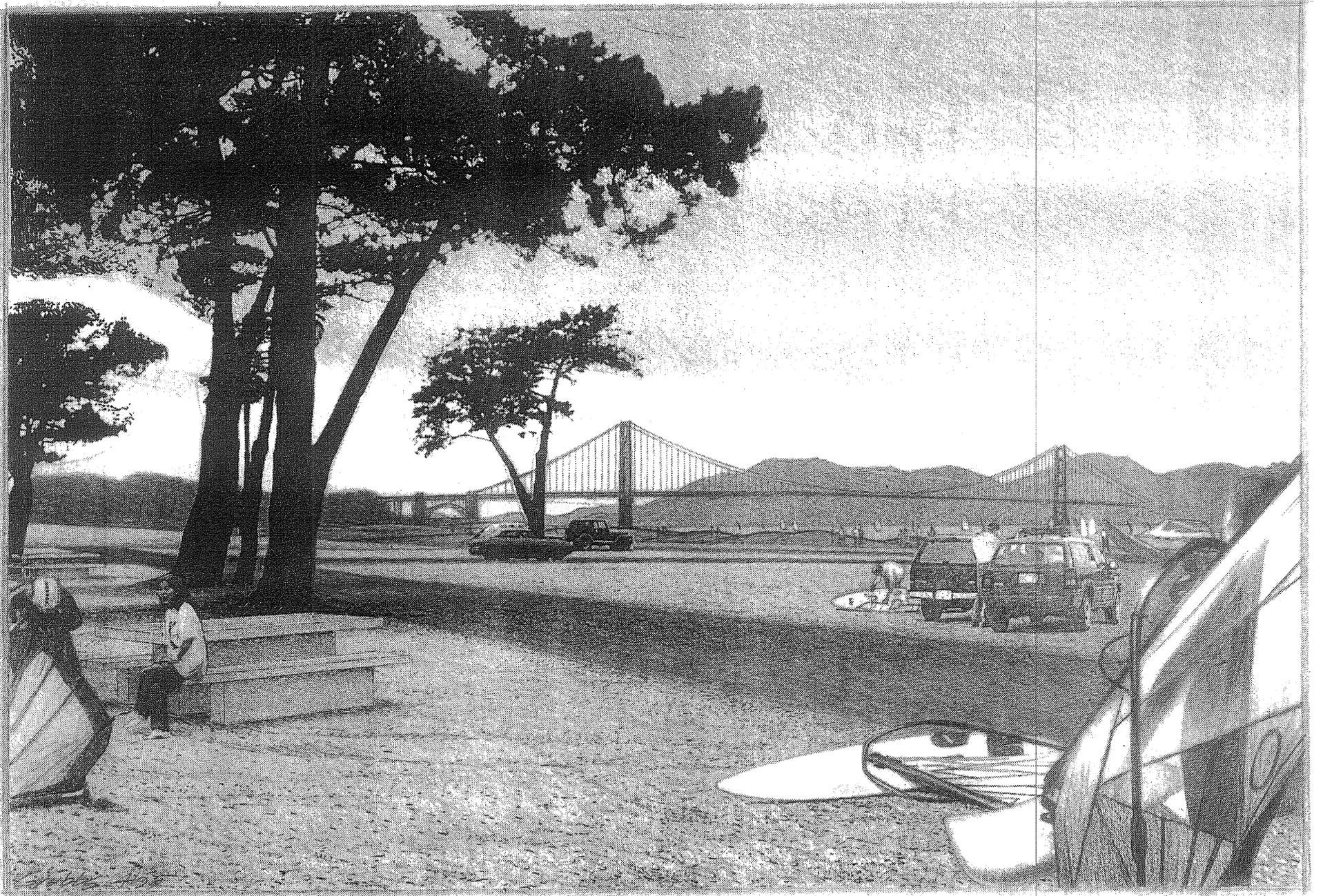


Figure 2-7  
Improved Parking and Boarding Areas

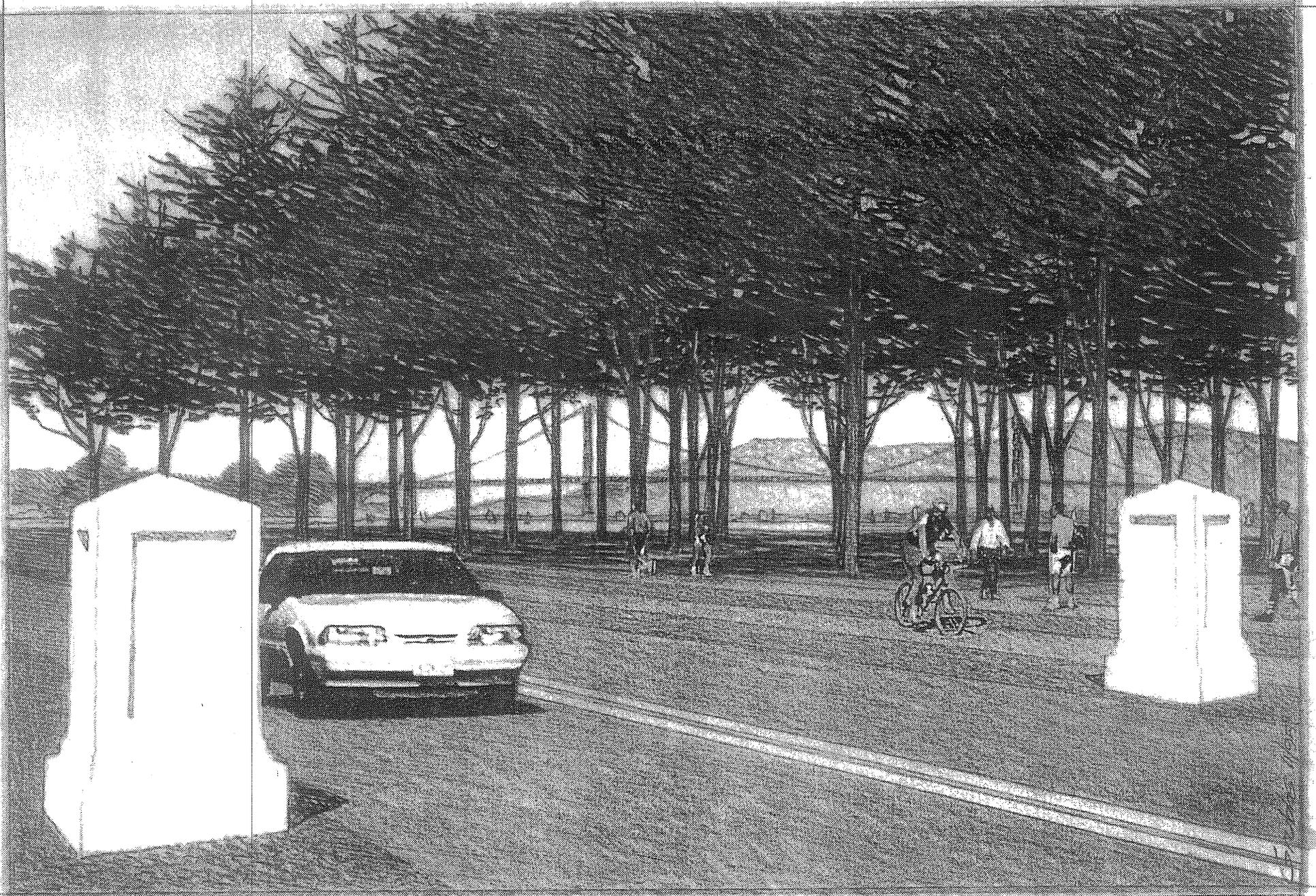


Figure 2-8  
Entrance at Old M... Street

The grass would be irrigated and mowed for sailboard rigging and a variety of active recreational uses and to enhance the contrast with surrounding dune vegetation not suitable for parking. Picnic tables would be provided throughout the area. A restroom complex with outdoor showers would be constructed near the center of the East Beach site.

A vegetated median with a number of paths connecting parking areas with the beach would be located between the parking areas and the Promenade to provide a visual buffer, seating, and an area for boardsailor setup. This buffer would also control cross traffic and minimize conflicts between users of this area. The existing Monterey pines and cypresses would remain interspersed in the parking area to provide protection from the wind and increase scenic quality.

Open space between Mason Street and East Beach parking would be recontoured to create several low dune landforms vegetated with dune scrub, creating stable separation and screening parking from views along Mason Street. A list of some of the plants that would be likely used in this area is given in Appendix A. This is designed to be a low-maintenance area with irrigation only for the plant establishment phase.

Landscape improvements at the east entry also include a grove of trees covering roughly 2 acres at the easternmost end of Crissy Field planted in Monterey cypress to create a sense of entry reminiscent of other Presidio gates. The trees, other vegetation, and low dunes in this area would improve the visual quality by screening views of cars parked at the East Beach parking area. Their location would also improve wind protection for Little Marina Green.

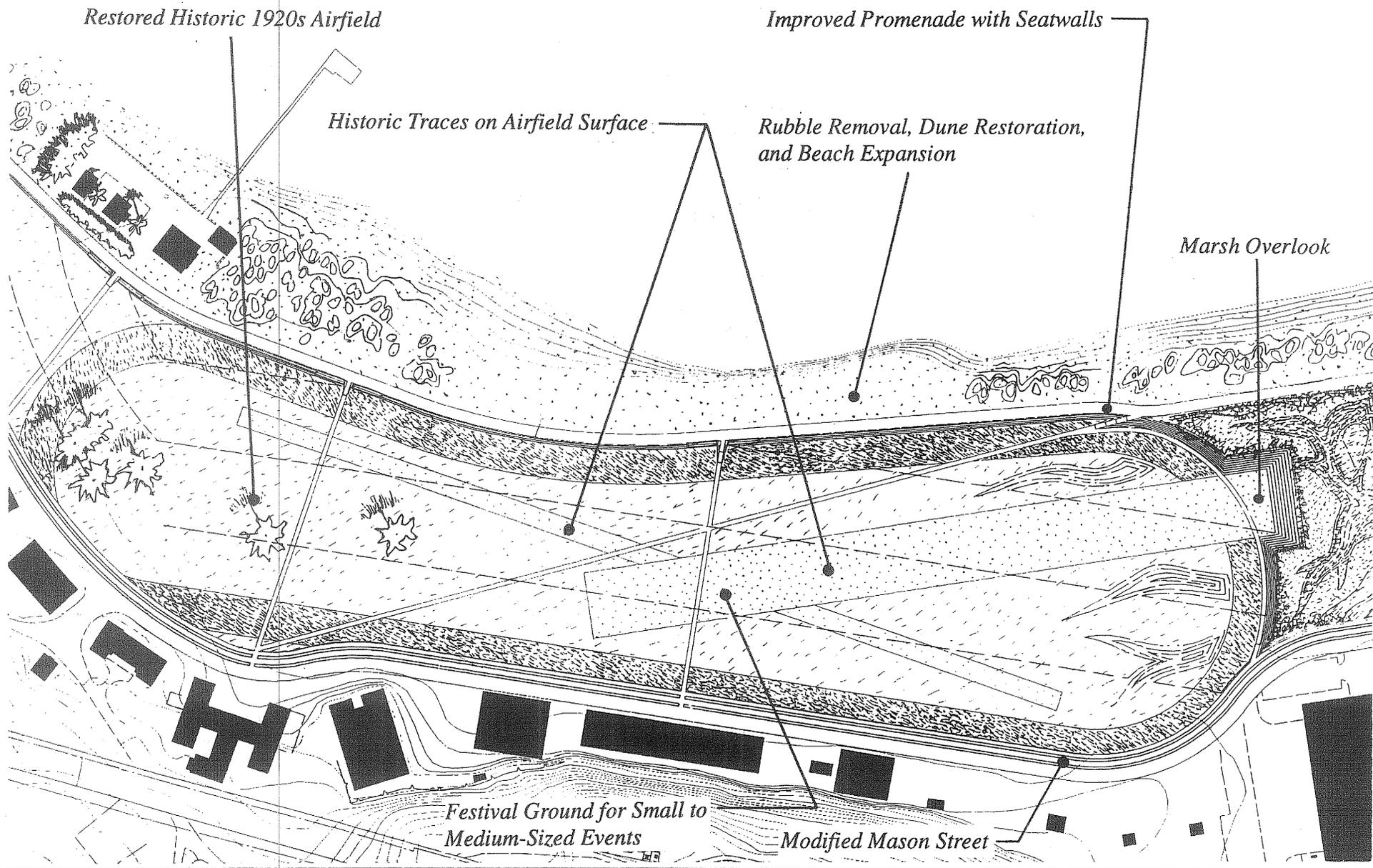
### **2.1.2.5 Airfield Restoration**

The historic grass airfield would be restored and would extend from the Promenade south to Mason Street and from the commissary west to the historic hangar buildings and seaplane ramp (Figures 2-9 and 2-10). The grass surface, configuration, and dimensions of the airfield would be restored to their appearance during the most significant historic period of the 1920s. The character, look, and feel of this historic period would be recreated.

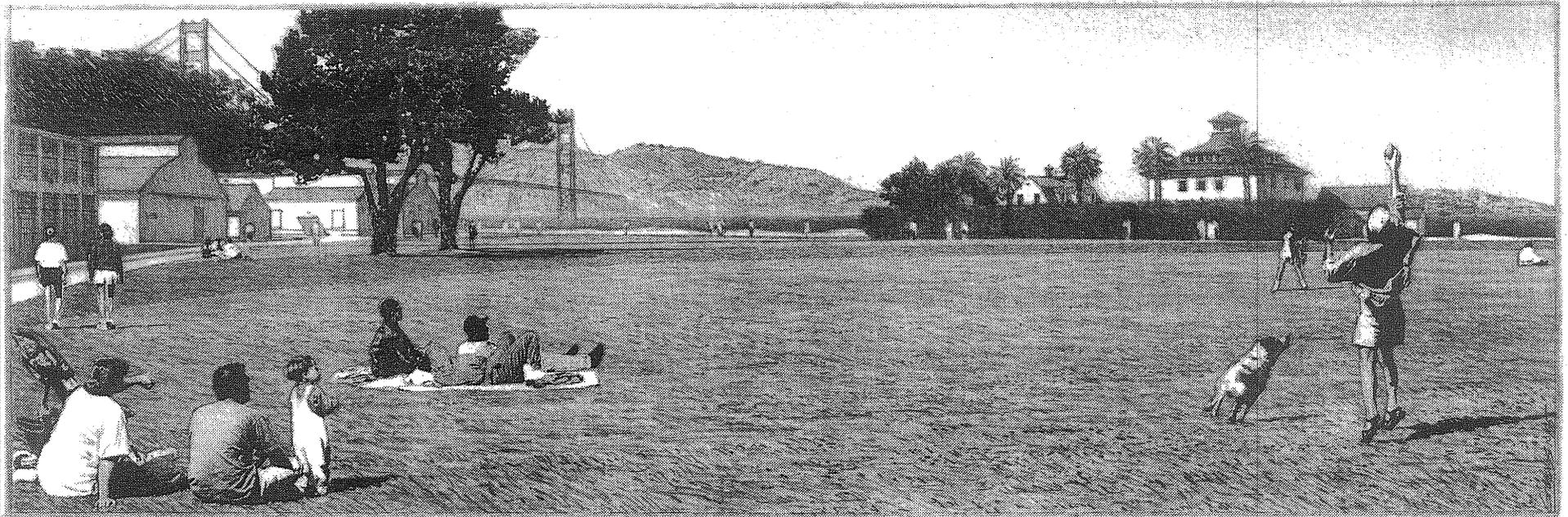
The airfield would be designed for small to medium-sized festivals and events and active daily outdoor recreational use, including off-leash dog walking. Pedestrian paths, surfaced with crushed oyster shell or stabilized aggregate, would be constructed to provide access between the Promenade and Mason Street. Power and lighting to support events would be incorporated into the surface. Fences, pavement, and obstructions would be removed and the material excavated from the central portion of the project site would be used to raise the elevation of the airfield slightly. The airfield surface would be vegetated with red molate fescue grass, a variety that poses a low potential for invasiveness to adjacent dune areas. This grass, native to the Bay Area, can tolerate drought, mowing, and active recreation. Monterey pine and cypress trees at the west end of the airfield would be retained. The remainder of the trees would be removed. A permanent irrigation system would be installed below grade that will be used for initial establishment, during drought conditions, and after periods of heavy pedestrian use. Although the elevation of this area would be raised, the airfield would be at grade with Mason Street all along its south and west edges. A maximum 3-foot elevation difference would define the north and east edges of the airfield (Figure 2-11).

The restoration would include the removal of approximately 15 acres of asphalt paving and thousands of yards of chain-link fencing that segment the project area. The concrete pad, lights, and fencing associated with the helipad would also be removed. The airfield would continue to accommodate emergency helicopter landings related to the emergency operations of the park and disaster response.

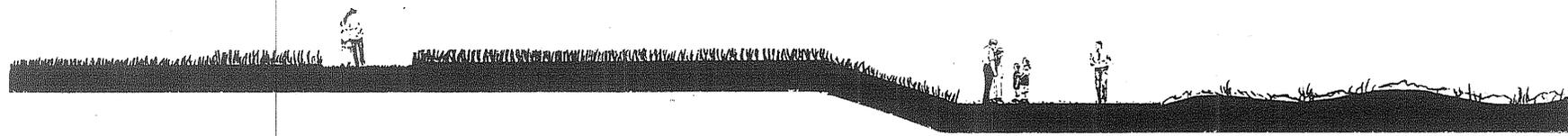
The airfield restoration incorporates interpretations of historic patterns of use, including the trace of the 1915 Exposition racetrack and early airfield use. The illustrated concept for the treatment of the airfield should be considered to reflect general examples of site restoration. Actual restoration details may differ and will be guided by the time period of the airbase's national influence. Both educational and festival uses may be facilitated by the incorporation of former historic site elements into the designs.



**Figure 2-9**  
**Airfield Restoration**



**Figure 2-10**  
**Restored Crissy Airfield**



Airfield

| Promenade |

Dunes

CRISSY FIELD

SECTION THROUGH PROMENADE AT AIRFIELD

| 10'      | 0      | 5'      | 10'                      | 30'

**Figure 2-11**  
**Airfield Cross Section**

### **2.1.2.6 West Bluff Improvements**

The West Bluff is at the wind-sheltered base of the steep bluffs at the west end of the plan area. A 2.5-acre portion of this area would be enhanced for use for picnics, small gatherings, and events (Figure 2-12). Soil and rubble from excavations elsewhere in the plan area would be used to create minor topographic features oriented to views of the bay and bridge and provide screening and separation from the parking area. The surface would be irrigated turf, and picnic tables and related visitor amenities would be provided (Figure 2-13).

### **2.1.2.7 Rubble Removal, Shore Protection, and Beach Reconfiguration**

The existing shore edge at Crissy Field contains exposed concrete, asphalt, and brick rubble that has been used for fill material and to extend and protect the shoreline. The exposed rubble is configured with a nearly vertical slope, creating a defined boundary between the sand beach and the rest of the project area. Where possible, rubble would be removed to restore a natural beach profile and allow windblown sand to sustain an active dune ecosystem. Rubble would be retained in several locations where needed to continue to provide shoreline protection. At the eastern project boundary connection with the City of San Francisco's abandoned pump station, terraced shore protection would replace rubble, providing a transition to the sandy beach (Figures 2-14 and 2-15).

In all other areas, exposed rubble would be removed and the beach graded to a gentle slope. Through extraction of this rubble, the beach would be lowered to a natural beach profile to allow blowing sand to accumulate. This accumulation of sand would expand the beach area and allow increased sand exchange with the established dunes.

### **2.1.2.8 Retention and Removal of Existing Vegetation**

A small number of introduced shrubs and trees exist at Crissy Field. Typical species include eucalyptus, palm trees, Monterey pine, and cypress. Some of these plants would be removed and others would be retained. Palm trees located along the existing asphalt airstrip would be removed and replanted

elsewhere. Various palms and shrubs in the East Beach parking area and shrubs near the World War II-era barracks would be removed. Eucalyptus trees near the west end of the site would be removed. The row of eucalyptus trees along Lyon Street would be retained as a boundary between Crissy Field and Marina Green. Monterey pine and cypress scattered on the site would be retained. Existing vegetation that defines the U.S. Coast Guard compound would also be retained.

### **2.1.2.9 Waterbird Protection Area**

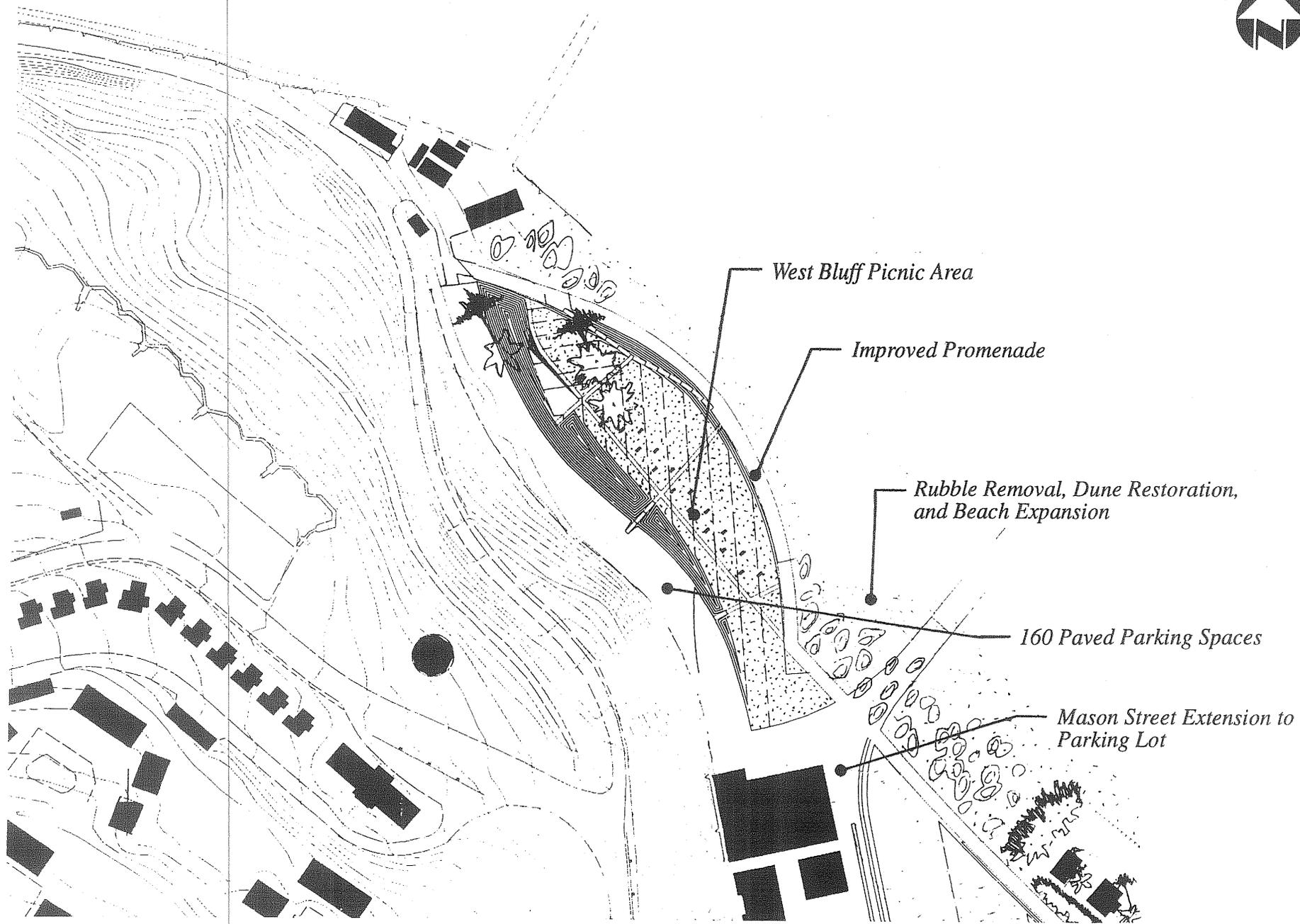
Under either alternative, a waterbird protection area would be officially established as called for in the GMPA (Figure 2-1). The area for protection would be designated and clearly marked with signage for waters between the pier at Torpedo Wharf (Fort Point) and 500 feet east of the former U.S. Coast Guard station. Watercraft would not be permitted to launch from the shore along the protected area. Dogs would also be excluded from the beach in this area.

### **2.1.2.10 Dog Use Areas**

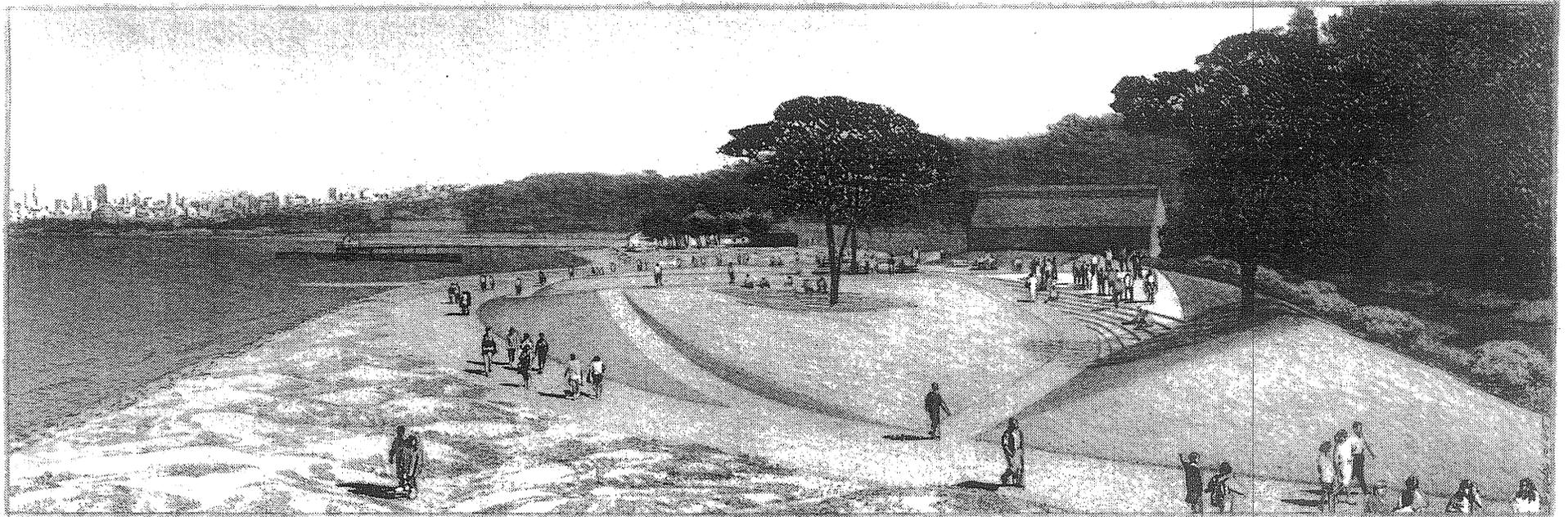
Dog walking is a popular activity at Crissy Field, and both alternatives provide for the continued enjoyment of that activity. An approximately 70-acre area would be available for dog activities. Walking dogs off leash under voice control would be permitted on the Promenade and beach east of the U.S. Coast Guard station, on the restored airfield, and in the East Beach area. Dogs would not be permitted, even on leash, on the overlooks on the boardwalk crossing the tidal marsh or in portions of the dune field that would be enclosed by barrier fencing hidden by vegetation.

### **2.1.2.11 Implementation**

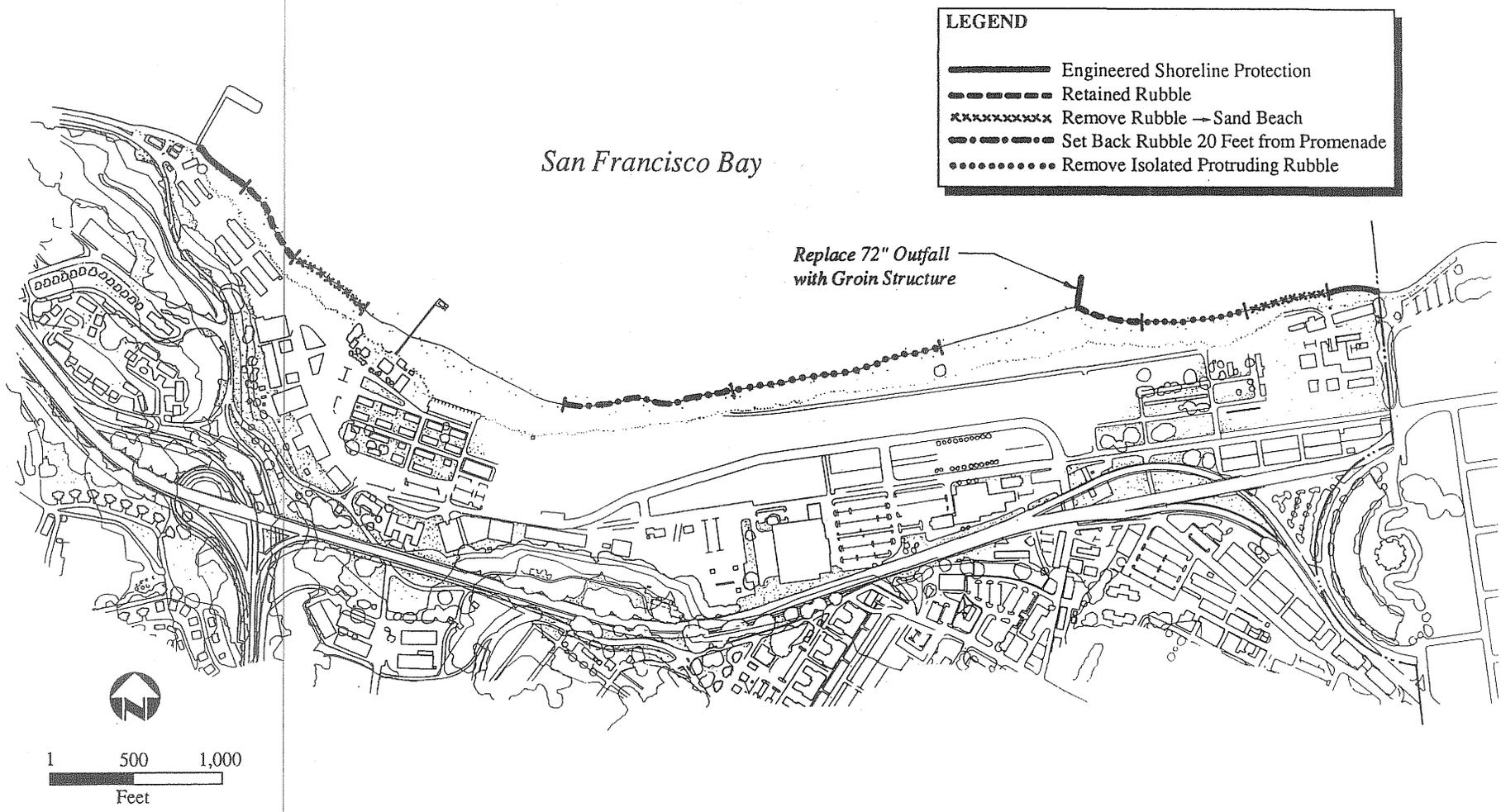
Although it is desirable to implement all of the Crissy Field plan at once, it might become necessary, because of funding limitations, schedule of the Army-funded environmental remediation, or other delays, to phase implementation. It may also become important to complete portions of the project more quickly to take advantage of special funding and other



**Figure 2-12**  
**West Bluff Im** **vements**



**Figure 2-13**  
**West Bluff Group Picnic Area**



**Figure 2-14**  
**Rubble Removal, Shore Protection, and Beach Restoration**



**Figure 2-15**  
**Entry Plaza Shore Protection and Expanded Beach**  
**Created by Rubble Removal at Eastern Entrance**

## ALTERNATIVES, INCLUDING THE PROPOSEDACTION

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opportunities. This phasing will not be implemented in such a way that it forecloses future implementation of the remaining portions of the project or other features outlined in the GMPA. It is anticipated that the final design and funding acquisition activities would take 2 years, and construction could begin no earlier than summer 1999.

## 2.2 Project Alternatives

In addition to the above elements, the two site plan alternatives each have elements that are unique. The following sections describe the specific elements of the Proposal and the Dune Alternative, as well as the No-Action Alternative. The primary difference between the two site plan alternatives is the treatment of the central portion of the project area extending from the edge of the historic airfield to the East Beach area.

### 2.2.1 The Proposal

In addition to the features described above in Section 2.1 (Figure 2-1), the Proposal includes a 20-acre tidal marsh to be created near the center of the site plan area (Figure 2-16), restoring a remnant of the natural tidal marsh that historically existed on the northern waterfront. This habitat type is commonly referred to as northern coastal salt marsh (Holland 1986).

The marsh would be created by excavation of soil from the central portion of the site, which would be used for airfield restoration and to create other topographic features. The restoration approach is to provide a template that allows for the natural processes of scouring and sedimentation that will encourage the evolution of the marsh ecosystem. The marsh would be created in an immature state and would evolve to maturity with minimal intervention. This means that initially much of the marsh would be open water and intertidal sand and mud flats surrounded by a perimeter of marsh vegetation. The vegetation, primarily pickleweed (*Salicornia* sp.), would later expand to cover a large portion of the site. An open-water lagoon would connect to the bay via a channel across the beach.

Development of the tidal marsh would emphasize provision of ecological values, balanced with educational, aesthetic, and historical values. Except where the features and structures described below are located, the entire tidal marsh would have a vegetated buffer zone ranging from 30-50 feet in width along the north side to 50-200 feet in width along the south, east, and west shoreline. This buffer would consist of dune scrub species such as coyote brush (*Baccharis pilularis*), mock heather (*Ericameria ericoides*), salmon monkeyflower (*Mimulus aurantiacus*), yellow bush lupine (*Lupinus*

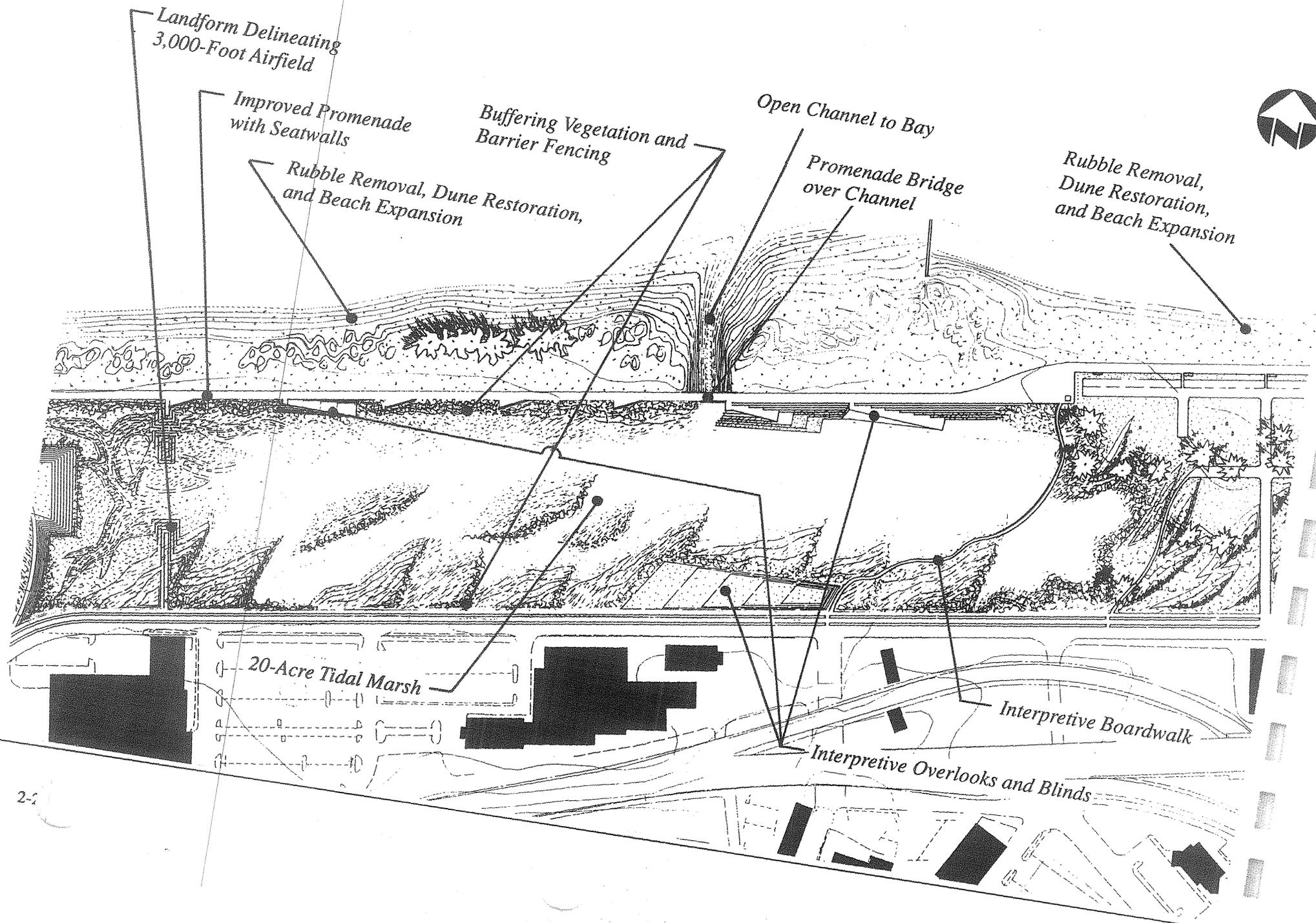
*arboreus*), and seaside woolly sunflower (*Eriophyllum staechadifolium*) to create a dense buffer between humans and wildlife, as well as provide upland habitat associated with the tidal marsh. Barrier fencing set within the vegetation would deter dogs, cats, and visitors from getting into the marsh and disturbing wildlife (Figures 2-4 and 2-18). Three islands would provide a refuge for birds.

A bridge would be constructed across the channel to maintain a continuous pathway for the Promenade. Perimeter access to the tidal marsh would be provided from the Promenade and from the Mason Street corridor. The northern edge of the tidal marsh would be configured similar to the stabilized dunes proposed under the Dune Alternative.

Three overlooks along the Promenade meeting ADA access requirements would provide perimeter access for pedestrians to stop and view the marsh from the north edge. The westernmost overlook is designed to allow interpretation of the marsh plain and is detailed like a large blind, so that visitors can observe wildlife. The other pair of overlooks would be at the east end of the tidal marsh, near the north terminus of the boardwalk. The eastern one would be a ramp descending from the Promenade into the water, providing access at all points in the tidal cycle. Terraced steps along the Promenade would provide space for groups to gather for education programs. Vegetation between these steps and the water's edge would provide some buffer between wildlife and visitors. The two eastern overlooks would be separated from the Promenade by fencing, barrier walls, and a self-closing gate to increase public safety and to ensure that off-leash dogs do not have access to these areas.

The tidal marsh would also have one overlook located at the east end of the airfield (west end of the marsh) (Figure 2-17). This overlook would be buffered by vegetation and barrier fencing so that wildlife would not be disturbed.

A boardwalk would cross the marsh, connecting Halleck Street (future site of the shuttle stop and primary pedestrian connection to the Main Post) with the Promenade and East Beach parking (Figure 2-18). The boardwalk is



Landform Delineating  
3,000-Foot Airfield

Improved Promenade  
with Seatwalls

Buffering Vegetation and  
Barrier Fencing

Open Channel to Bay

Rubble Removal, Dune Restoration,  
and Beach Expansion

Promenade Bridge  
over Channel

Rubble Removal,  
Dune Restoration,  
and Beach Expansion

20-Acre Tidal Marsh

Interpretive Boardwalk

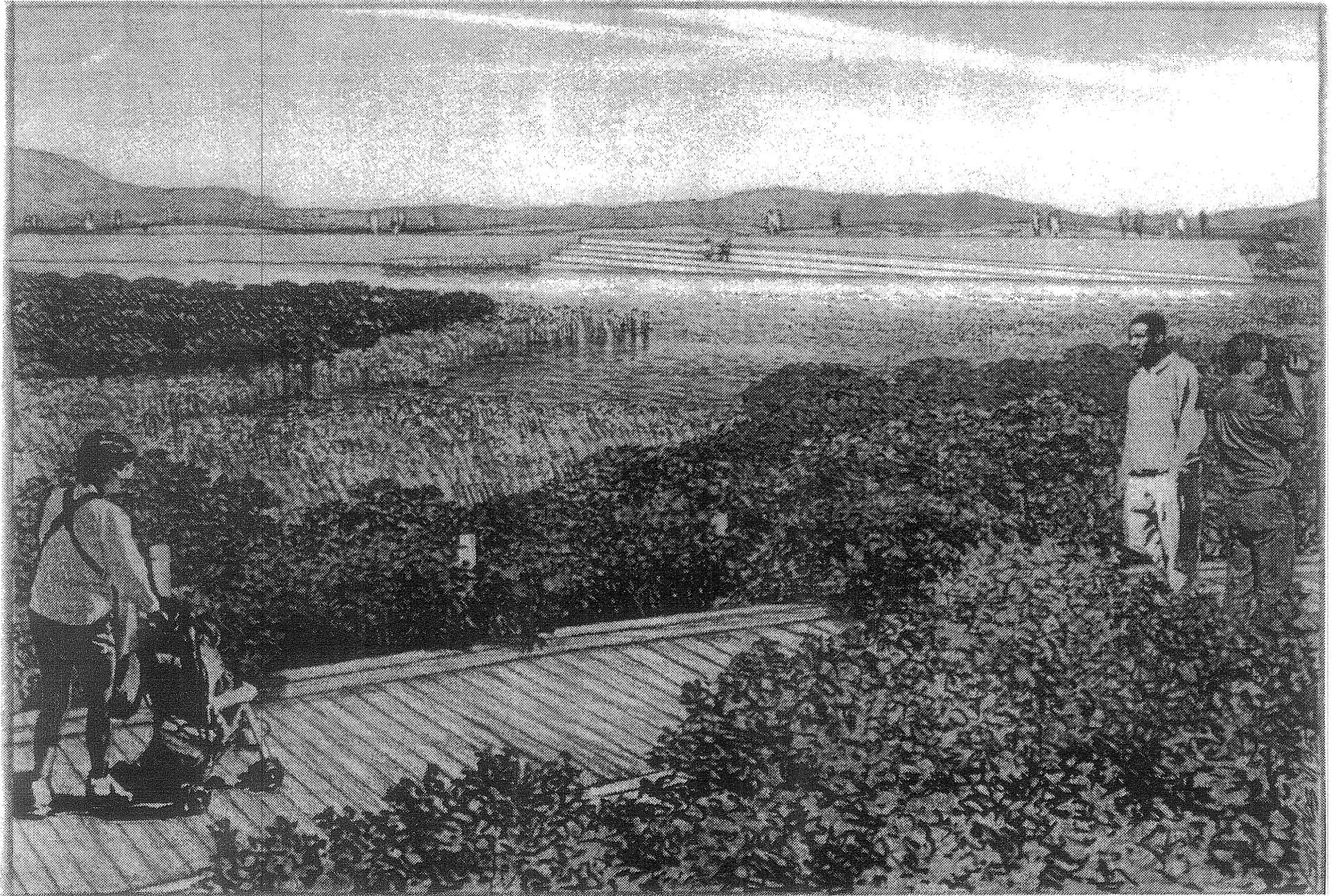
Interpretive Overlooks and Blinds

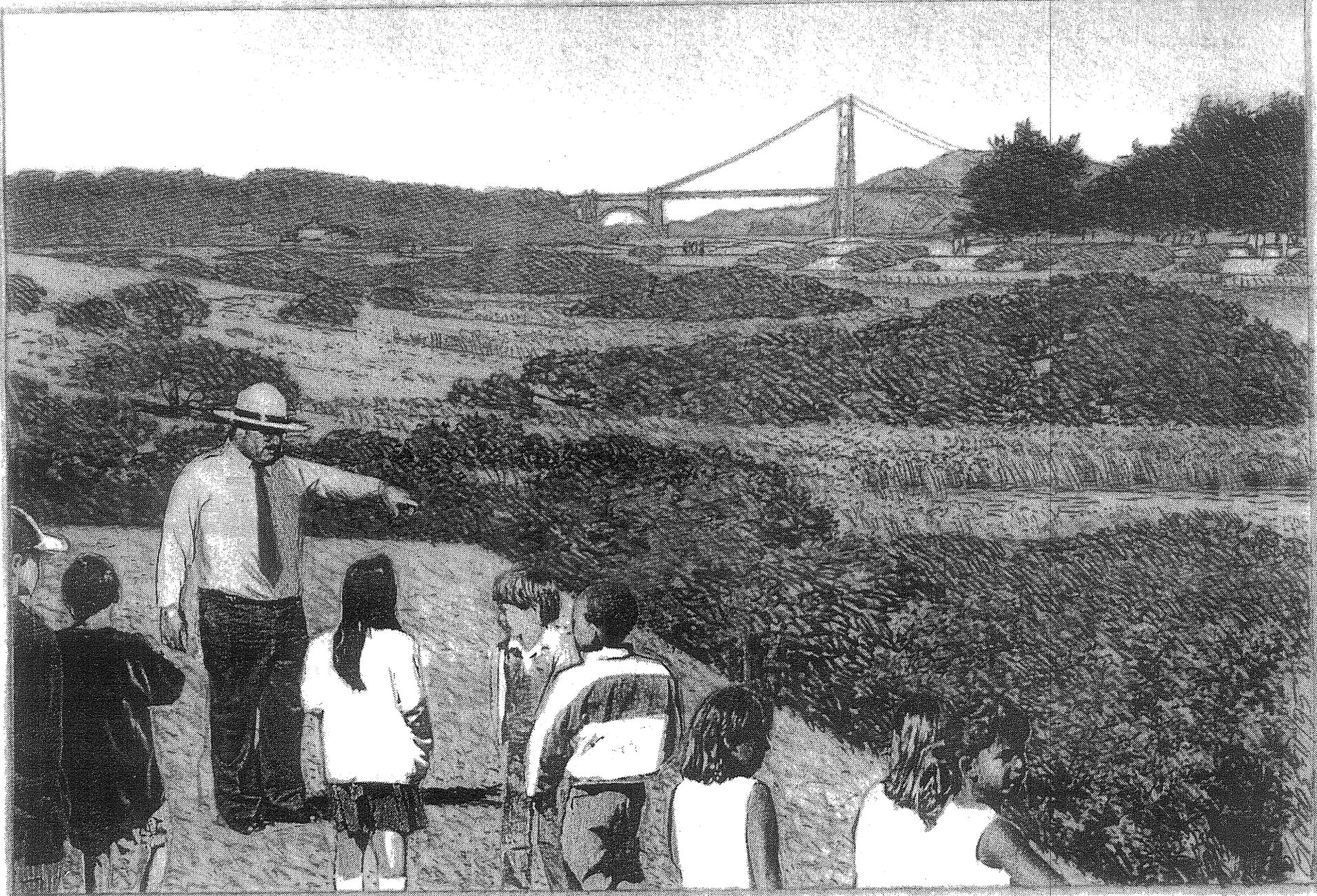
2-2

Figure 2-16



**Figure 2-17**  
**View of the Marsh and San Francisco Skyline**  
**from the East End of the Historic Airfield**





**Figure 2-19**  
**Interpretive Overlook at South Edg Marsh**

## ALTERNATIVES, INCLUDING THE PROPOSED ACTION

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designed to be 3-4 feet above the water to allow sunlight for vegetation below. At the south end of the boardwalk near Halleck Street would be a grassy knoll/overlook and gathering area meeting ADA access requirements offering views of the tidal marsh and the bay, as well as providing a place for groups to conduct education activities prior to stepping onto the boardwalk (Figure 2-19). A vegetative buffer and hidden barrier fencing around the overlook would limit potential impacts on wildlife.

Prior to excavation for the tidal marsh, utilities would be capped and covered or removed. A stormwater culvert that conveys runoff from Tennessee Hollow (an area proposed for future stream restoration) to the bay would be intercepted so that the outflow is directed into the wetland. The 72-inch outfall would be replaced with a groin structure to protect the beach. Eventually, following implementation of future stormwater management plan improvements, up to seven stormwater culverts from the adjacent watersheds could connect to the marsh dependent on meeting water quality criteria, allowing elimination of offshore outfalls.

The tidal marsh would be connected to the bay by a natural inlet channel. An approximately 15-foot-wide channel mouth would be excavated to create the connection to the bay. The channel would be shallow enough for wading at lower tide stages but would swell in width to approximately 20-80 feet at high tide. Wading would likely be precluded during these periods. It is estimated that the tidal flux is substantial enough to keep the mouth of the natural inlet open for 20-30 years. After 20-30 years, if the wetland has not been expanded, accumulated sediment may cause the mouth to close intermittently, in which case the channel may need to be cleared mechanically with a backhoe.

Landforms vegetated with dune scrub would separate the marsh from parking in the East Beach area and Mason Street to create a buffer between the tidal marsh and human activity, improve scenic quality, provide a wind buffer, and increase security in the East Beach parking area.

The created tidal marsh itself would be vegetated with annual pickleweed (*Salicornia europa*), perennial pickleweed (*Salicornia* spp.), and cord grass (*Spartina foliosa*) to create a northern coastal salt marsh habitat. It would eventually evolve to be predominantly a vegetated marsh plain drained by

meandering tidal slough channels. Willows (*Salix* sp.) and alkali bulrush (*Scirpus robustus*) would be planted near the discharge from the Tennessee Hollow freshwater stream entering the tidal marsh, creating a central coast riparian shrub community. Plants above the tidal zone would be progressively more upland in character to maximize buffering between the wetland and Mason Street and pedestrian access along the north, east, and west sides. Common northern dune scrub plant species would include beach sagewort (*Artemisia pycnocephala*), coyote brush, chamisso bush lupine (*Lupinus chamissonis*), coast buckwheat (*Eriogonum latifolium*), creeping wild rye (*Leymus triticoides*), seaside brome (*Bromus carinatus* var. *maritimus*), California poppy (*Eschscholzia californica*), and California figwort (*Scrophularia californica*). A list of plants by community type that would be used in these areas is given in Appendix A.

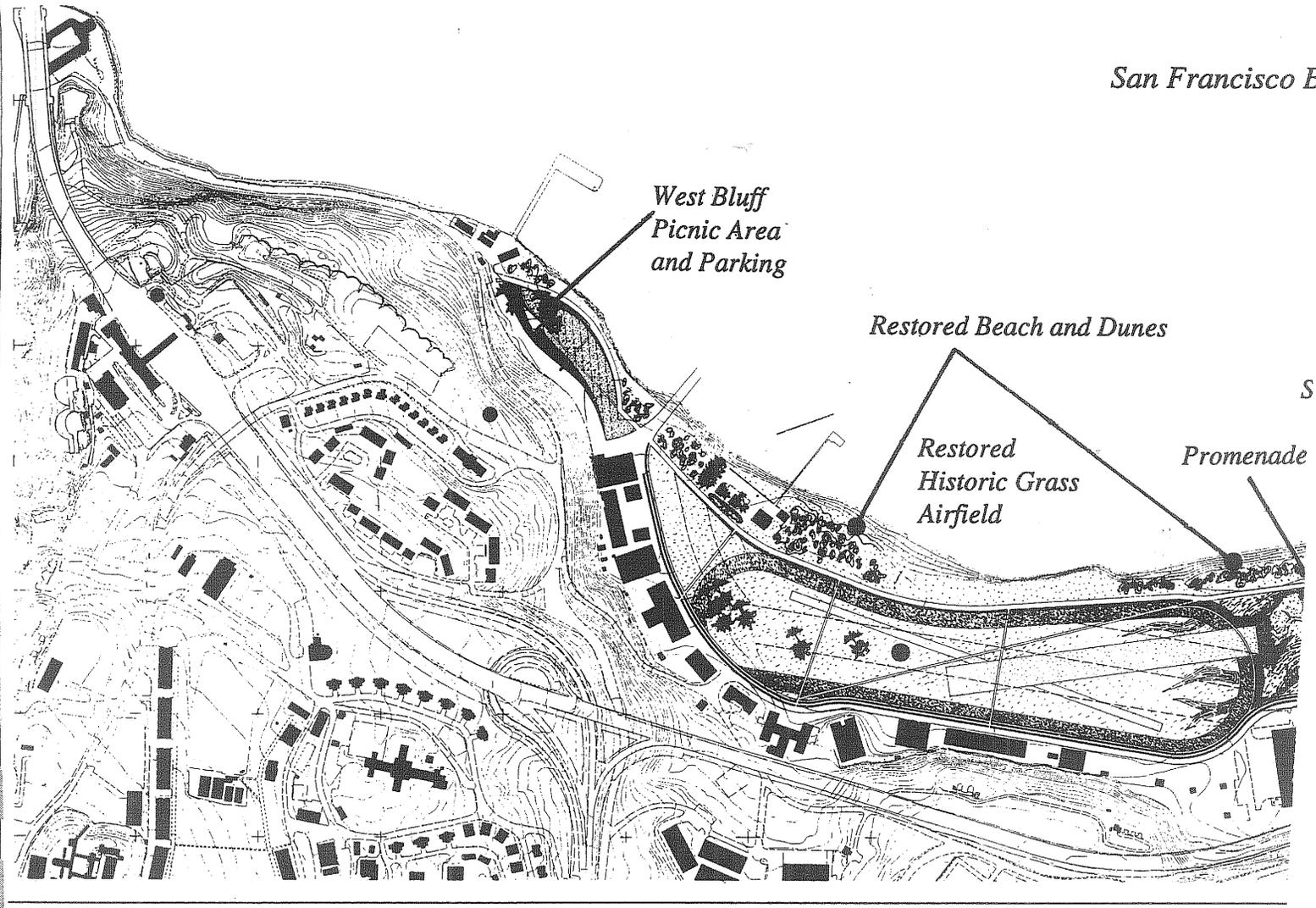
The Proposal is designed to accommodate possible future expansion to the area south of Mason Street. A channel would be created that could direct water to parcels south of Mason Street, if desired, during future development projects. A larger marsh of 30 acres would always have sufficient volume to maintain a natural opening to the bay.

An earthwork structure would define the western edge of the tidal marsh and the former edge of the 3,000-foot airfield. It would have enough gaps to allow the free movement of tidal flow up into the area beyond the structure.

### 2.2.2 Dune Alternative

Under the Dune Alternative (Figure 2-20), the central portion of the site plan area would contain a stabilized dune field (Figure 2-21). This habitat type is classified as central dune scrub by Holland (1986). The topography would be converted from the relatively flat grade that currently exists to an undulating terrain containing an average 6-foot vertical change in grade. Material excavated from this area would be used in airfield restoration. The dunes would progressively increase in slope and density from west to east. Construction of the dunes would be completed in such a way that buried infrastructure would be avoided.

*San Francisco B.*



*West Bluff  
Picnic Area  
and Parking*

*Restored Beach and Dunes*

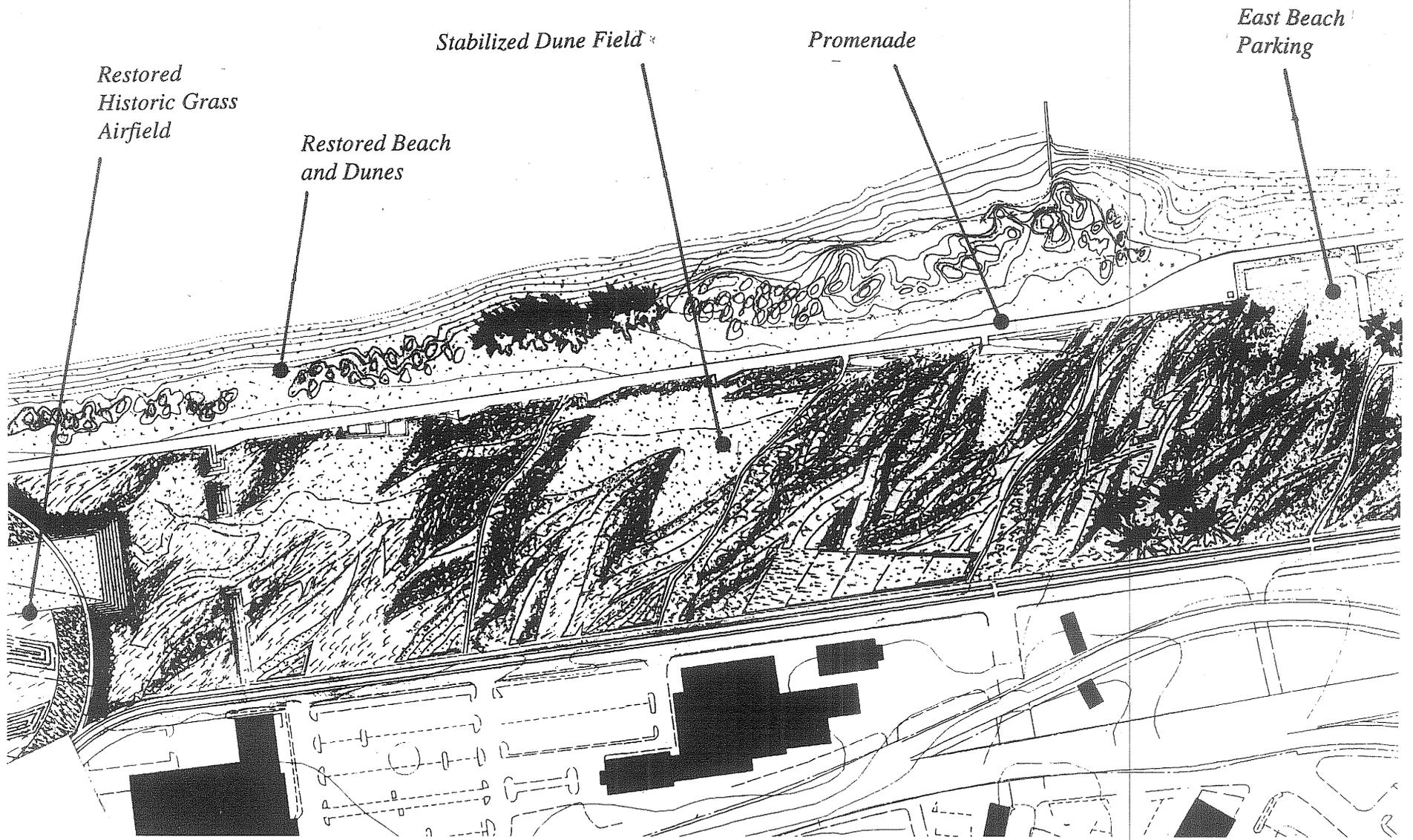
*Restored  
Historic Grass  
Airfield*

*Promenade*

*S*







**Figure 2-21**  
**Central Dune Field**

## ALTERNATIVES, INCLUDING THE PROPOSEDACTION

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Perimeter access to the dune field would be provided from the Promenade and from the Mason Street corridor. Three overlooks with interpretive stations would be constructed along the north edge of the dune field and would be directly accessible from the Promenade, providing areas for pedestrians to stop and view the dune field. The overlooks would have paved surfaces approximately 5 feet below the level of the Promenade and would be connected to the Promenade by sloping and stepped stone terraces.

With an average length of 220 feet, the overlooks would meet the minimum accessibility standards of the ADA. Three or four pedestrian paths would cross the dunes, linking the Promenade with Mason Street. The paths would consist of either a raised wood-plank boardwalk or a 6- to 8-foot-wide surface made of stabilized aggregate or crushed oyster shell, with trailside seating and picnicking areas.

Dune scrub vegetation would be used for this site. Overlapping communities would transition from the existing foredune community to an extensive dune scrub community. Typical plant species in the existing foredunes include coastal sand verbena, beach bur, and beach primrose. The restored community would consist of a diverse mix of native shrubs and perennial and annual forbs and grasses. Common plant species would include beach sagewort, coyote brush, chamisso bush lupine, coast buckwheat, creeping wildrye, seaside brome, California poppy, and California figwort. A complete list of plants that would be used during the restoration is provided in Appendix A. No irrigation would be installed in the dune field, except during the initial plant establishment phase.

### *2.2.3 No-Action Alternative*

The No-Action Alternative is a continuation of existing conditions at Crissy Field, as described in Section 3.0, "Affected Environment". This alternative is the environmental baseline that is used to determine the environmental effects of the two proposed site plan alternatives. Under the No-Action Alternative, none of the site modifications and enhancements described above would be constructed. Actions would be limited to stabilizing portions of the site where buildings are removed and continuing maintenance and management of existing resources and facilities.

### *2.2.4 Dog Management Options*

Because public input related to dog use at Crissy Field was mixed, other dog use management options have been and are still being evaluated. Opinions were voiced for maintaining, enhancing, or eliminating off-leash dog use at Crissy Field. Because it is a current popular and valued activity at Crissy Field, NPS evaluated three options for reducing, maintaining, or enhancing space for this activity. Other dog use options evaluated include off-leash dog walking:

- on the airfield, Promenade, and the beach east of the U.S. Coast Guard station only;
- on the airfield, adjacent beach, and Promenade only; and
- on the Promenade and beach only.

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## 2.3 Related Projects

There are a number of related projects currently underway at the Presidio that involve some or all of the Crissy Field site. These projects are related to the Proposed Action but are being analyzed in separate environmental documentation. The projects are described below.

### *2.3.1 General Management Plan Amendment for the Presidio of San Francisco*

The GMPA for the Presidio of San Francisco amended the 1980 General Management Plan for the GGNRA to include the Presidio. The GMPA is a planning guide that sets forth the basic management philosophy for the Presidio and identifies strategies for addressing issues and achieving management objectives. Crissy Field is one of 13 designated planning areas addressed in the GMPA. The GMPA was subjected to environmental review and documentation as required under NEPA, and a final programmatic EIS was issued in 1994.

The 13 planning areas at the Presidio are:

- Main Post,
- Golden Gate/Fort Point,
- Fort Scott,
- Letterman Complex,
- Cavalry Stables,
- Public Health Service Hospital,
- East Housing Area,
- Crissy Field,
- Presidio Hill,
- National Cemetery,
- Presidio Forest,
- Lobos Creek Valley, and
- Coastal Bluffs.

NPS is currently working on a number of other projects related to implementation of the GMPA concepts and actions for these planning areas.

**Presidio Forest Management Plan and Other Vegetation Programs.** A management plan for the Presidio forest is being prepared to develop a strategy for revitalizing and maintaining the aging woodland as a key component of the cultural landscape at the Presidio.

**Habitat Restoration Program.** At various locations at the Presidio, NPS is engaged in habitat restoration and enhancement. This type of work is underway at locations such as the Lobos Creek Valley and the Crissy Field coastal dunes.

**Building Rehabilitation and Demolition Programs.** Additional NPS work ongoing at the Presidio includes site and building rehabilitation on the Main Post and at Fort Point. A new clubhouse and maintenance facilities are being planned for the Presidio golf course.

A five-phase demolition program is currently in progress at the Presidio. Demolition of structures at Crissy Field is in the final stages. Fifty-three structures at Crissy Field were removed, along with building foundations. Some chain-link fencing is also being removed. Approximately 37,300 square feet of concrete and asphalt will also be removed from the areas adjacent to the structures. The tarmac, paved airfield, and other paved surfaces will be left in place. Project completion is scheduled for fall 1996.

**Transportation Programs.** The Transportation Demand Management Plan was prepared to address traffic and parking issues at the Presidio. A water shuttle service was also recommended in the GMPA, and its feasibility will be investigated as a separate project. If this project is implemented, visitors would also be able to enter Crissy Field via the water shuttle. It would transport visitors between Fort Mason, Crissy Field, and Fisherman's Wharf. It could possibly have a station near the former U.S. Coast Guard station.

**Stormwater Management Plan.** A Stormwater Management Plan (Dames & Moore 1994) was developed for the Presidio to assist stormwater planning and management efforts and to ensure that any new stormwater conveyance and water quality improvement facilities complied with current laws and regulations. A component of the water quality improvement plan is the

routing of runoff through the proposed wetland restoration area at Crissy Field.

The plan assesses existing drainage conditions at the Presidio. The goal of the plan is to reduce stormwater discharge and any pollution in stormwater that is discharged from the Presidio through structural improvements and best management (operational) practices. The study contains recommendations for elimination of runoff and guidelines for reducing the contamination of stormwater from oil, chemicals, and other pollutants.

**Tennessee Hollow Riparian Corridor.** A study conducted by Dames & Moore for NPS (Dames & Moore 1995) evaluated the feasibility of restoration of the Tennessee Hollow riparian corridor consistent with the GMPA. The Tennessee Hollow area currently drains to Crissy Field primarily through stormwater pipelines and open culverts that discharge to the bay. The study concluded that the removal of stormwater pipelines and restoration of surface drainage channels and associated riparian ecosystems was feasible and identified actions to accomplish this restoration. The Proposed Action includes the connection of the Tennessee Hollow flow to the tidal marsh and is consistent with and would benefit from future riparian corridor restoration. Additional planning, design, environmental analysis, and implementation of the riparian restoration would be conducted as a separate project.

### ***2.3.2 Hazardous Materials Remediation***

The U.S. Army is conducting an ongoing investigation and cleanup of areas at the Presidio that were contaminated as a result of military operations. The California Department of Toxic Substances Control is the regulatory agency overseeing the Army's cleanup. The Army is presently engaged in activities related to hazardous materials investigation and cleanup throughout the Presidio, including Crissy Field. These activities are separate actions that are not evaluated in this EA. Investigation and cleanup activities are described in this document to provide a complete description of existing conditions in the project area.

### ***2.3.3 Doyle Drive Reconstruction***

Doyle Drive (U.S. 101) extends through the entire length of the Presidio, visually and physically separating Crissy Field from the remainder of the Presidio. Its elevated and at-grade sections are deteriorated, do not meet current design or seismic standards, and are scheduled for replacement. The California Department of Transportation (Caltrans) is beginning the design and environmental documentation process for reconstruction of the roadway as a parkway-style road corridor that complements the nature of the Presidio's new status as a national park. This process to begin reconstruction is expected to take 4 years and will include the entire roadway through the Presidio, Marina Boulevard, and Richardson Avenue approaches and provision for direct Presidio access to the Main Post and Crissy Field. Construction is scheduled for completion in 2004.

NPS staff have actively participated in all planning for Doyle Drive reconstruction to ensure that the two planning efforts are properly coordinated. The future redesign and reconstruction of Doyle Drive will be analyzed in a separate environmental documentation for which Caltrans will be the state lead agency.

### ***2.3.4 Golden Gate Bridge Seismic Retrofit Project***

The Golden Gate Highway Transportation District is in the process of finalizing the plan specifications and acquiring permits for the first phase of the Golden Gate Bridge Retrofit Project. The 2-year first phase is scheduled to begin in January 1997 and includes retrofit of the north viaduct, lead cleanup of the north and south approaches, and renovation of Presidio Building 989.

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## 2.4 Alternatives Considered but Rejected

Through an extensive public involvement process, NPS worked with the public and affected user groups to narrow the range of reasonable alternatives by early resolution of issues. Also, the GMPA EIS evaluated a broader range of alternatives. Because only alternatives within the bounds of the program stipulated for Crissy Field in the GMPA were considered, the range of alternatives that could be considered was somewhat narrow. The following alternatives were considered for Crissy Field but were rejected because they were infeasible or would not meet the project purpose and objectives.

### *2.4.1 Alternative Concept Plans for the Greater Crissy Field Planning Area*

During the January 1995 public workshop, several concept alternatives were presented that proposed concept designs for the entire 145-acre Crissy Field planning area, including the area south of Mason Street. The boundaries of this planning area generally extend from the waterfront southward to Doyle Drive (minus the commissary and post exchange area) and from Marine Drive/Torpedo Wharf eastward to Marina Green.

A number of issues were identified that were problematic. The Army still uses the commissary and post exchange at Crissy Field with no set date for closing the facilities. Another issue involves the redesign and reconstruction of Doyle Drive/U.S. 101. The design and timetable for completion of this Caltrans project have not been defined thus far to the degree of detail needed to effectively plan for inclusion in the concept plan. One other issue that was identified at the time the alternatives were presented was the availability of funding for a larger scale concept plan. For these reasons, detailed plans for including the portion of Crissy Field south of Mason Street were deferred to a future date. Both action alternatives consider and are compatible with the GMPA concept for the area south of Mason Street.

### *2.4.2 Alternatives Containing Specific Concept Plan Elements*

Four preliminary alternatives were presented at a public workshop on June 13, 1995, for the portion of Crissy Field north of Mason Street. Certain components of these alternatives were subsequently rejected. Various sizes, configurations, and locations for a wetland component to the plan were considered early in the alternative concept development process. Two of the alternatives included a tidal marsh on the central portion of the site. One of the alternatives included a Proposal to create a 6-acre urban wetland that would have a hard, urban edge on one side and a natural edge on the opposite side. This alternative was rejected because the urban edge would limit the ecological value of the created tidal marsh. Two of the alternatives included a 17-acre central meadow that would be designed for use as a picnic area with small topographic features that would allow refuge from the elements. The central meadow component was also rejected in favor of an alternative containing a central dune field that could provide increased ecological values.

A feasibility study conducted for NPS by Dames & Moore (Dames & Moore 1995a) evaluated the feasibility of three alternatives for wetlands restoration: a freshwater backdune marsh, a 30-acre tidal marsh, and a 60-acre tidal marsh. This report concluded that restoration of a freshwater marsh having no tidal influence or connection to the bay was less feasible than restoration of a tidal marsh. This was because of the limited freshwater source, potential for significant seasonal fluctuations in water levels, and limited water circulation. This alternative was rejected from further consideration for these reasons.

The report concluded that tidal marsh restoration was feasible and that restoration of a larger marsh would lower the risk of closure of the entrance channel. However, restoration of a 60-acre marsh would require use of significant portions of the site required for airfield restoration, would not have been consistent with the GMPA, and would have had an adverse effect on the Presidio National Historic Landmark. Both the 60- and 30-acre tidal marsh would require use of portions of the site south of Mason Street, which is currently unavailable and is outside the current planning area boundary. For these reasons, these alternatives were also eliminated from further consideration.

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## ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Various sizes and locations for configuring the east end parking area were also considered, including elimination of parking north of Mason Street. Elimination of an east end parking facility was rejected because that location is necessary to serve the parking needs generated by visitors to the site.

### *2.4.3 Severing of Mason Street*

One alternative considered for Crissy Field proposed the severing of Mason Street to limit cut-through traffic. This alternative was rejected after the results of traffic modeling were evaluated. The modeling indicated that substantial undesirable changes in local traffic circulation would result from this Proposal.

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## 2.5 Permits and Approvals Required to Implement the Proposal

Documentation of the status of NPS compliance with federal and state laws and regulations is included in Section 5.0, "Consultation and Coordination". The following environmental permits and other approvals would be required to implement the Proposed Action:

**NEPA Compliance.** After circulation and public review of the draft EA, NPS will prepare a final EA and make a determination about the appropriate environmental clearance document. NPS will prepare a finding of no significant impact (FONSI) statement or, if the Proposed Action would result in substantial adverse environmental effects, NPS will prepare an EIS.

**National Historic Preservation Act Compliance.** The Proposed Action requires compliance with Section 106 of the National Historic Preservation Act to address potential effects on elements contributing to the Presidio National Historic Landmark.

**Clean Water Act Compliance.** Some aspects of the Proposed Action would require a permit from the Corps to address modification of the shoreline to comply with Section 404 of the Clean Water Act. Any activities involving excavation or fill below the high tide line, such as construction of the tidal marsh channel inlet, installation of engineered shore protection, and removal of rubble and subsequent maintenance activities, would be subject to Section 404 permit requirements.

**Rivers and Harbors Act Compliance.** The Proposed Action would also require a permit from the Corps to comply with Section 10 of the Rivers and Harbors Act for work performed that would affect areas subject to ebb and flow of the tide.

**State Porter-Cologne Water Quality Control Act Compliance.** A National Pollutant Discharge Elimination System (NPDES) permit from the San Francisco Regional Water Quality Control Board (RWQCB) and

compliance with Section 401 of the federal Clean Water Act is required to address potential sources of surface water discharges during construction.

**Coastal Zone Management Act Compliance.** The Proposed Action requires concurrence by the San Francisco BCDC of a determination of consistency with the San Francisco Bay Plan's designation of Crissy Field as a waterfront park.

**McAteer-Petris Act State Compliance.** The Proposed Action requires approval from the San Francisco Bay BCDC to comply with the McAteer-Petris Act for placement of material, pilings, or structures; extraction of material; or any substantial change made in use of the bay or within 100 feet of the shoreline.

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## 2.6. Environmental Commitments Included as Part of the Project Design

As part of the Proposal, NPS will implement the following environmental commitments to avoid significant impacts. These commitments are described in more detail in Section 4.2, "Environmental Consequences of the Proposed Action".

### 2.6.1 Cultural Resources

To avoid disturbing unknown cultural resource sites in areas with potential to contain resources, NPS will implement the archeological monitoring program designed in accordance with the 1994 programmatic agreement (PA). The program establishes procedures that will be used to evaluate and record historic features (as noted in Section 3.3) that may be discovered during project construction.

In the event of discovery of either prehistoric sites or burials, consultation would be initiated immediately with appropriate Native American groups.

### 2.6.2 Geomorphology and Soils

To avoid siltation and closure of the tidal marsh inlet channel, NPS will monitor conditions and periodically mechanically excavate accumulated sand, if necessary, or construct a culvert to prevent extended periods of channel closure.

### 2.6.3 Water Resources

To avoid violation of water quality standards and reduce short-term effects on water quality during construction, NPS will comply with conditions of the NPDES general construction activity stormwater permits, including use of

best management practices (BMPs) to minimize soil erosion and other discharges into the bay or natural drainages.

To avoid exposing aquatic organisms in the tidal marsh to hazardous substances that could intercept shallow groundwater, the Army will monitor contaminant levels in the project area. Cleanup of contaminated areas at Crissy Field is the obligation of the Army. The implementation of the Proposed Alternative improvements will be coordinated such that it does not take place before remediation in areas where contamination occurs. The Army's cleanup plans are being developed to be consistent with implementation of the GMPA for the Presidio, including areas at Crissy Field. If levels are found to exceed risk criteria, the Army will identify and implement appropriate corrective measures, such as constructing subsurface barriers, impermeable soil caps, or interceptor drains.

### 2.6.4 Air Quality

To avoid violation of air quality standards during project construction, NPS will require construction contractors to use equipment that adheres to strict emission standards for nitrogen oxides (NO<sub>x</sub>), and to use water or another effective dust palliative to control particulate matter.

An alternative strategy to requiring contractors to use modern low-emission equipment would be to reduce the number of pieces of equipment being operated each day.

### 2.6.5 Public Health and Safety

To avoid potential exposure of humans or tidal marsh aquatic life to hazardous substances, NPS will coordinate timing of implementation of the Proposal with Army remediation efforts. NPS construction activities would follow Army remediation activities.

# Section 3.0

## Affected Environment

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## 3.1 Land Use

### 3.1.1 Regional Context

Crissy Field is the northernmost portion of the Presidio of San Francisco (Figure 1-2). Crissy Field is bordered by San Francisco Bay to the north, Lyon Street to the east, and U.S. Highway 101 (U.S. 101) to the south and west. The 1,480-acre Presidio is at the northern tip of the San Francisco peninsula, on the south side of the Golden Gate Bridge. The entire Presidio is generally characterized by open space with moderately dense pockets of military-related development (e.g., administration offices, housing, warehouses, and barracks). The Presidio was included within the legislative boundary of the GGNRA when the GGNRA was created in 1972. The Presidio was transferred to NPS from the Army in 1994 and is managed by NPS today.

The overall Crissy Field planning area, as designated in the GMPA, covers 145 acres of the 1,480 acres of the entire Presidio (Figures 1-2 and 1-3). The Presidio (including Crissy Field) is surrounded by residential neighborhoods and commercial development of the city/county of San Francisco to the south, San Francisco Bay to the north and east, and the Pacific Ocean to the west. The Crissy Field site plan area for this Proposed Action, generally the portions of the site north of Old Mason Street, represents 100 acres of the 145-acre overall Crissy Field planning area.

### 3.1.2 Current Land Uses

#### 3.1.2.1 Land Uses Adjacent to Crissy Field

Most of the land south of Crissy Field is associated with the traditional military use of the Presidio. The Presidio today has well-established land uses related to its former military role. In addition to uses for administrative and operational support, there is a substantial amount of residential use. Over time, several thousand people have lived and worked at the Presidio and created a small community in which to live. The Presidio today is in

transition from its former military role to its new status as a national park. It contains the full range of land uses one would find in a small town, including housing, offices, warehouse storage areas, recreation facilities, and shopping areas, in addition to the former military-related facilities such as aircraft hangars and defense batteries. Currently, the land use of almost half the land at the Presidio is open space/recreation, with residential, commercial/office, industrial, institutional, and special use (cemetery and roads) being the next most common land uses. Land uses adjacent to Crissy Field, within the Presidio, include residential, special use (cemetery and roads), commercial/office, industrial, and open space/recreation. U.S. 101 (Doyle Drive) bisects the Presidio and lies directly south of the overall Crissy Field planning area.

The 45 acres of land that are outside the site plan area for the Proposed Action but are a part of the overall Crissy Field planning area lie south of Mason Street and north of U.S. 101. NPS uses buildings at Crissy Field for museum displays, educational classes, offices, maintenance functions, and storage, with some buildings currently vacant. Buildings at Crissy Field operated by other agencies include the post exchange, operated by the Army and Air Force Exchange System, and the post commissary, operated by the Defense Commissary Agency. The post commissary and post exchange are contracted to remain at Crissy Field until September 30, 2006 (Rossi pers. comm.).

Other land uses surrounding Crissy Field and the rest of the Presidio include San Francisco Recreation and Park's "little" Marina Green, the Palace of Fine Arts Theatre, the Exploratorium, Saint Francis Yacht Club and marina, and the Marina District neighborhood, which all lie to the east of Crissy Field. San Francisco Bay and the Pacific Ocean are north and west, respectively, of Crissy Field.

#### 3.1.2.2 Land Uses within the Crissy Field Site Plan Area

The description of land uses in this section focuses on the Crissy Field site plan area (Figure 1-2). Mason Street is the southern boundary of the area, except at the west end, where the proposed airfield restoration would extend slightly south of the existing Mason Street. The eastern boundary of the site plan area is Lyon Street, and the western boundary is the Torpedo Wharf area of Fort Point.

Current land uses at Crissy Field are primarily residential, office, and open space/recreation (Figure 3-1). The majority of the buildings at Crissy Field (i.e., storage sheds, hangars, barracks, and warehouses) were recently removed as part of the building demolition project. The four remaining buildings are part of the historic former U.S. Coast Guard station, located on the western portion of Crissy Field, east of Torpedo Wharf. This cluster of four buildings will be reused by NPS as a water-oriented public facility. Current uses of the buildings include the Gorbachev Foundation, National Oceanic and Atmospheric Administration's Gulf of the Farallones National Marine Fisheries Service headquarters, and NPS dormitories. The west half of Crissy Field includes Fort Point Wharf (the westernmost point of Crissy Field), the historic U.S. Coast Guard station, and an active helipad. The east half of Crissy Field contains parking facilities and unstructured open space, as well as several acres currently fenced and included in the building demolition project, which are being returned to open space. Crissy Field's paved parking lots and large undeveloped space are occasionally used as overflow parking for special events and also as a shuttle staging area.

Extending along the length of the Crissy Field shoreline is the Golden Gate Promenade, a popular recreation path for runners, pedestrians, dog walkers, skaters, and cyclists. Remnants of the military airfield exist south of the Promenade and north of Mason Street. Crissy Field is also the location of sand dune restoration projects and associated dune wildlife along the waterfront. NPS has designated an area between the U.S. Coast Guard station and Fort Point as a waterbird protection area (National Park Service 1994b). The offshore waters provide a world-class boardsailing (windsurfing) area. The parking area at the eastern portion of Crissy Field provides parking for a variety of recreationists and is often used as a staging area by boardsailors. More information on recreation activities at Crissy Field is presented in Section 3.2, "Recreation".

Infrastructure for several utility systems is in place at Crissy Field. Electrical, natural gas, water, sanitary sewer, stormwater, and telecommunications utility systems serviced much of the project area. All utilities, except stormwater systems, are being removed, or capped and abandoned in place, as part of the building demolition project (Swanson pers. comm.).

### 3.1.3 Relevant Plans and Policies

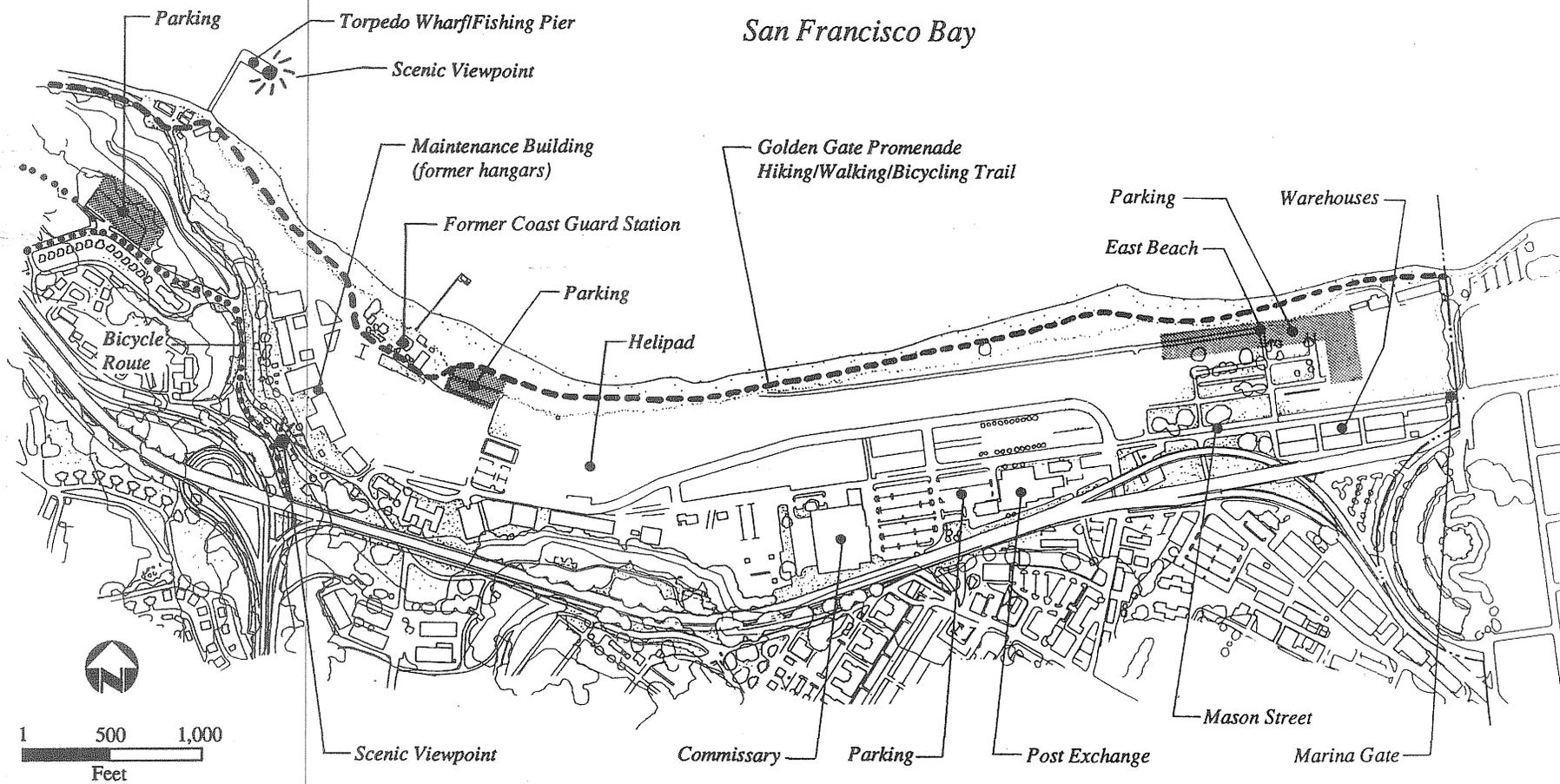
The following land use plans and policies were analyzed for consistency with the proposed concept plan:

- the National Park Service Management Policies,
- the GMPA,
- the San Francisco Master Plan, and
- the San Francisco Bay Plan.

#### 3.1.3.1 National Park Service Management Policies

The Management Policies (National Park Service 1988) is the basic servicewide policy document for NPS. It provides guidelines for park policy regarding planning, land protection, natural resource management, cultural resource management, wilderness preservation and management, interpretation and education, use of the parks, park facilities, and concessions management. The following general NPS management policies related to natural and cultural resources, visitor use, and facilities are particularly relevant to the Proposed Action:

- The NPS will manage the natural resources of the national park system to maintain, rehabilitate, and perpetuate their inherent integrity.
- Natural resources will be managed with a concern for fundamental ecological processes as well as for individual species and features.
- The NPS will seek to perpetuate native plant life as part of natural ecosystems.
- The NPS will preserve and foster appreciation of the cultural resources in its custody through appropriate programs of research, treatment, protection, and interpretation.



**Figure 3-1**  
**Existing Land Uses at Crissy Field**

- The NPS will conduct interpretive programs in all parks to instill an understanding and appreciation of the value of parks and their resources; to develop public support for preserving park resources; to provide the information necessary to ensure the successful adaptation of visitors to park environments; and to encourage and facilitate appropriate, safe, minimum-impact use of park resources.
- Trail design will vary to accommodate a range of users and will be appropriate to user patterns and site conditions.
- Facilities will be provided to assist park visitors in appreciating and enjoying the park and understanding its significance.

### 3.1.3.2 General Management Plan Amendment for the Presidio of San Francisco

The general direction for land use at Crissy Field comes from the GMPA. The GMPA emphasizes Crissy Field's opportunity for bayfront recreation and resource preservation and states the following:

Crissy Field, currently the most public of Presidio open spaces and a landscape imprinted by the technology of various historic periods, will become a "front yard" for the Presidio. The bay, the long stretch of shoreline ideal for all forms of movement and recreation, and the impressive views all contribute to experiences that draw visitors from throughout the world. Crissy Field will be managed to enhance the setting for those experiences while rehabilitating and preserving important historic resources and natural systems. (National Park Service 1994b.)

### 3.1.3.3 San Francisco Master Plan

The Presidio is under federal jurisdiction and is not subject to state and local land use plans and policies. However, NPS does seek to reduce possible conflicts between NPS mandates and the City of San Francisco's policies and consults with the city to achieve consistency whenever possible (National Park Service 1994b).

The City and County of San Francisco has included some policies concerning the Presidio in the recreation and open space portion of the San Francisco Master Plan. The following are relevant policies included in the San Francisco Master Plan:

- Preserve the open space and natural historic, scenic, and recreational features of the Presidio.
- Provide new public open spaces along the shoreline.
- Develop the Crissy Field area to permit more intensive recreational uses without significantly altering the character of its open landscape. Enhance existing beach and lawn areas to accommodate varied active and passive recreational uses, and enhance views of the Golden Gate. Integrate the landscaping, design, development, and use of the portion of Crissy Field under jurisdiction of the US Army with the portion managed by the National Park Service. Reduce the profile of any development near the National Recreation Area so that it may be screened from view of the shoreline. (City and County of San Francisco Department of City Planning 1988.)

### 3.1.3.4 San Francisco Bay Plan

The Bay Conservation and Development Commission (BCDC) is the California state agency charged with planning, regulating, and managing the San Francisco Bay segment of the California coastal zone, which consists of San Francisco Bay and its shoreline. BCDC's area of jurisdiction extends 100 feet inland from the mean high-water line (Michaels pers. comm.). BCDC objectives include increased public access to San Francisco Bay and the restriction of unnecessary development or development that would have adverse impacts on the bay. In the San Francisco Bay Plan, BCDC designates Crissy Field as "Waterfront Park, Beach" (San Francisco Bay Conservation and Development Commission 1987).

## 3.2 Recreation

The Presidio is a popular location for recreationists. More than 2 million people per year visit the coastal attractions of the Presidio, many of which are on Crissy Field (National Park Service 1994a). Crissy Field offers many hiking/walking trails, bicycle trails, picnicking areas, scenic viewing areas, and educational areas. NPS also offers interpretive tours of and programs about the Presidio. Users of Crissy Field include local neighborhood residents, San Francisco Bay Area residents, and visitors from all over the United States and the world. Overall peak recreational use of Crissy Field generally occurs in the fall and summer months (Ozanich pers. comm.).

The 100-acre site plan area of Crissy Field offers numerous opportunities for people to walk, jog, ride bicycles, boardsail, participate in educational and interpretive programs and restoration activities, and enjoy views (Figure 3-1). Table 3-1 provides the size of the physical areas at Crissy Field available for recreation opportunities.

**Table 3-1. Land Available for Existing Recreation Opportunities**

Existing Recreational Opportunities	Area
Accessible areas (multirecreation activities)	66 acres
Golden Gate Promenade (walking, hiking, bicycling)	1.5 miles
Area currently used for off-leash dog walking	38 acres
East Beach parking area <sup>a</sup>	up to 490 cars
Area fenced off or occupied by structures	14.7 acres

<sup>a</sup> Marked and unmarked paved parking.

Source: Hargreaves Associates 1995.

### 3.2.1 Pedestrian Uses

Most recreationists at Crissy Field are involved in pedestrian-oriented activities such as walking, hiking, and dog walking. A field survey of trail use at Crissy Field, performed in August 1995, showed that the majority of recreationists are pedestrians, joggers, and bicyclists, respectively (Clemons pers. comm.). Hiking and walking trails are provided throughout Crissy Field. The most popular trail is the Golden Gate Promenade, along the Crissy Field shoreline, which provides visitors with a breath-taking view of the bay and the Golden Gate Bridge. The existing Promenade, approximately 1.5 miles long, has a width that varies between 6 feet and 30 feet and has stretches that are surfaced with asphalt, asphalt gravel, and crushed stone. Despite the various widths, surfaces, and conditions, the Promenade accommodates several recreational activities, such as walking, jogging, bicycling, and dog walking. Pedestrian connections from the site to the Main Post are along Halleck Street and the former Bank Street, which was recently converted to a pedestrian path.

### 3.2.2 Bicycling and Skating

Cycling and skating are also popular activities at Crissy Field. Cyclists and skaters (i.e., in-line skaters, skateboarders, rollerskaters) use various paved/hard-surface portions of the Promenade and bicycle routes located just west of the Crissy Field site plan area. The westernmost portion of the Promenade connects to other bicycle routes that extend throughout the rest of the Presidio.

### 3.2.3 Dog Walking

Crissy Field is a very popular place for dog walking. The beach, Promenade, and fenced area north of New Mason Street are a mix of paved areas and grassy, open space that is often used for voice-command, off-leash dog walking.

### *3.2.4 Water-Related Recreation*

Crissy Field's 1.3-mile-long shoreline on the bay provides excellent opportunities for water-related recreation activities. Although the water is generally too cold for people to swim in, other recreationists such as beach-walkers/runners and dog-walkers take advantage of Crissy Field's long shoreline. High winds, tide conditions, and access to the bay waters create world-class boardsailing (windsurfing) conditions. Peak boardsailing use generally occurs between mid-March and mid-September (National Park Service 1994b, Robberson pers. comm.). Prime boardsailing launching is along the sandy portions of the East Beach from just west of the large outfall, extending east to the rubble. Catamarans and kayaks are also occasionally launched from the Crissy Field shoreline from both the east and west end parking areas.

### *3.2.5 Special Events*

The primarily flat, open spaces of Crissy Field have been a popular location for organized special events, in addition to other daily recreational activities. Special events are scheduled at Crissy Field almost monthly; these include fun runs and benefit walks (along the Promenade) and cultural events/celebrations. Fleet Week, while not an NPS Crissy Field event, does result in the largest event-related use of Crissy Field. It is an annual fall event in the Bay Area that draws thousands of spectators along Crissy Field's shoreline to view airplanes performing in the sky. (Ozanich pers. comm.) Crissy Field's shoreline area was also formerly the home of the Fourth of July fireworks display, which drew approximately 75,000 people annually (Haller 1994). However, since 1993, all Fourth of July event venues have moved to Aquatic Park and the city's northeast waterfront, resulting in greatly reduced use of Crissy Field. Crissy Field's paved parking lots and large undeveloped space are used as overflow parking for special events and also as a shuttle staging area to other GGNRA special events in the local area.

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## 3.3 Cultural Resources

Information for the following sections was obtained primarily from the redocumentation of the Presidio of San Francisco National Historic Landmark District (National Park Service 1993), the draft Presidio of San Francisco Archaeological Management Plan (Adams 1995), and *The Last Word in Airfields: A Special History Study of Crissy Field, Presidio of San Francisco* (Haller 1994).

### 3.3.1 *History of the Presidio*

The Ohlone Indians were the earliest inhabitants of the area now occupied by the Presidio. Ohlone settlements populated the coastal areas between Big Sur and the San Francisco peninsula. The Ohlone were hunter-gatherers, living in extended family units and depending on the abundant plant and animal resources of the area for subsistence. (National Park Service 1993.)

The Presidio was established as a military post in 1776 during Spain's colonial expansion (Haller 1994, Thompson and Woodbridge 1992). When Spain's colonial efforts in Mexico collapsed, the Presidio passed quietly into the hands of the new Mexican government in 1821. In 1846, the United States declared war on Mexico, and California soon passed into American hands, with the Presidio subsequently becoming a U.S. Army post. The post played an important role in guarding San Francisco Bay and also helped facilitate the settlement of the American West. It is the oldest Army installation operating in the American West and one of the longest garrisoned posts in the country. (Haller 1994.)

### 3.3.2 *History of Crissy Field*

Crissy Field is in the northern portion of the Presidio, where the Presidio meets San Francisco Bay. Prior to its settlement, the area was a tidal marsh with sand dunes on the northeast side. Native Americans probably gathered clams and mussels in the marsh area. Midden sites and a Native American burial site have been located in the area (Haller 1994).

After acquiring the Presidio, the U.S. Army began constructing roads and buildings on portions of Crissy Field. Between 1863 and 1865, a road along the Presidio coastline was completed. By 1870, the U.S. Army had built the first of a series of quartermaster wharves and roadways crossing the area on a north-south axis "to connect the wharf to the main post" (Haller 1994). In following years, the Quartermaster Corps constructed a number of warehouses on portions of Crissy Field.

In preparation for the Panama-Pacific International Exposition, Crissy Field was filled with material dredged from the bay, obliterating most of the natural and cultural landscape features, with only a "footprint of the old toll road, now called Marine Drive, and the sand dunes to the north" surviving (Haller 1994). During the exposition, the western portion of the landfill area contained a 1-mile automobile race track that was also used as a drill ground and aviation field. After the end of the exposition, the Army continued using the level field for its early air operations until 1919. In 1919, it was determined that Crissy Field met all the requirements of both the Coast Artillery Corps and the Air Service for an Air Coast Defense Station. Crissy Field's mission was to be an airfield to "cooperate with the artillery defenses of San Francisco Bay by scouting for the approach of an enemy, observing and correcting the fire of our guns, and facilitating cooperation with troops in the field" (Haller 1994). The permanent airfield was built in 1921 (Figure 3-2). The airfield was named after Major Dana H. Crissy, who died in a crash after taking off from the airfield during the Army's Transcontinental Reliability and Endurance Test, testing the "practical limits of long-range air power" in 1919 (Haller 1994).

Crissy Field was the site of many developments in military aviation history during the same era in which Charles Lindbergh and Amelia Earhart made their famous flights. Famous aviators, such as Major Henry "Hap" Arnold, George H. Brett, Delos C. Emmons, Lowell Smith, and Russell Maughan, were stationed at Crissy Field, and it was a place where history-making long-distance flights began and ended. In 1924, the first dawn-to-dusk transcontinental flight ended in triumph at Crissy Field and later that same year Crissy Field was a part of the Army's Round-the-World Race. The Round-the-World Race is considered the most important pioneering flight of its day. In 1925, Crissy Field was used to prepare the two U.S. Navy seaplanes that made the first attempt to fly from the mainland to Hawaii.

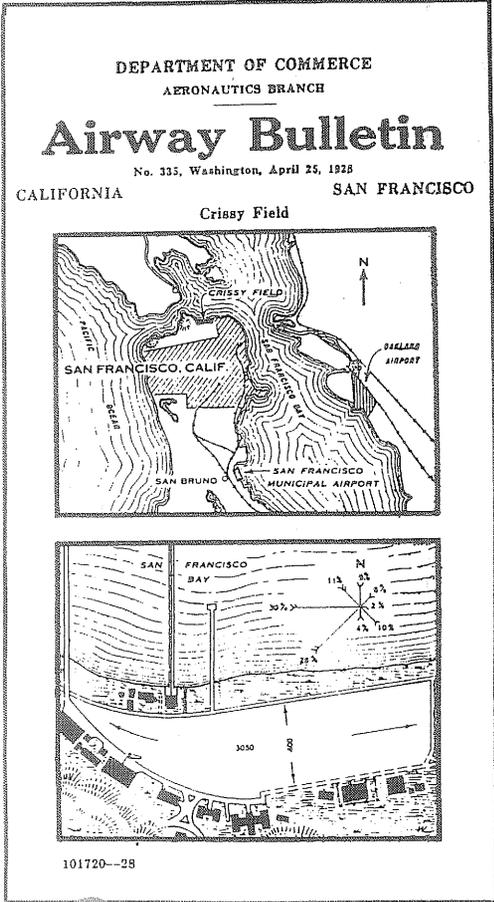
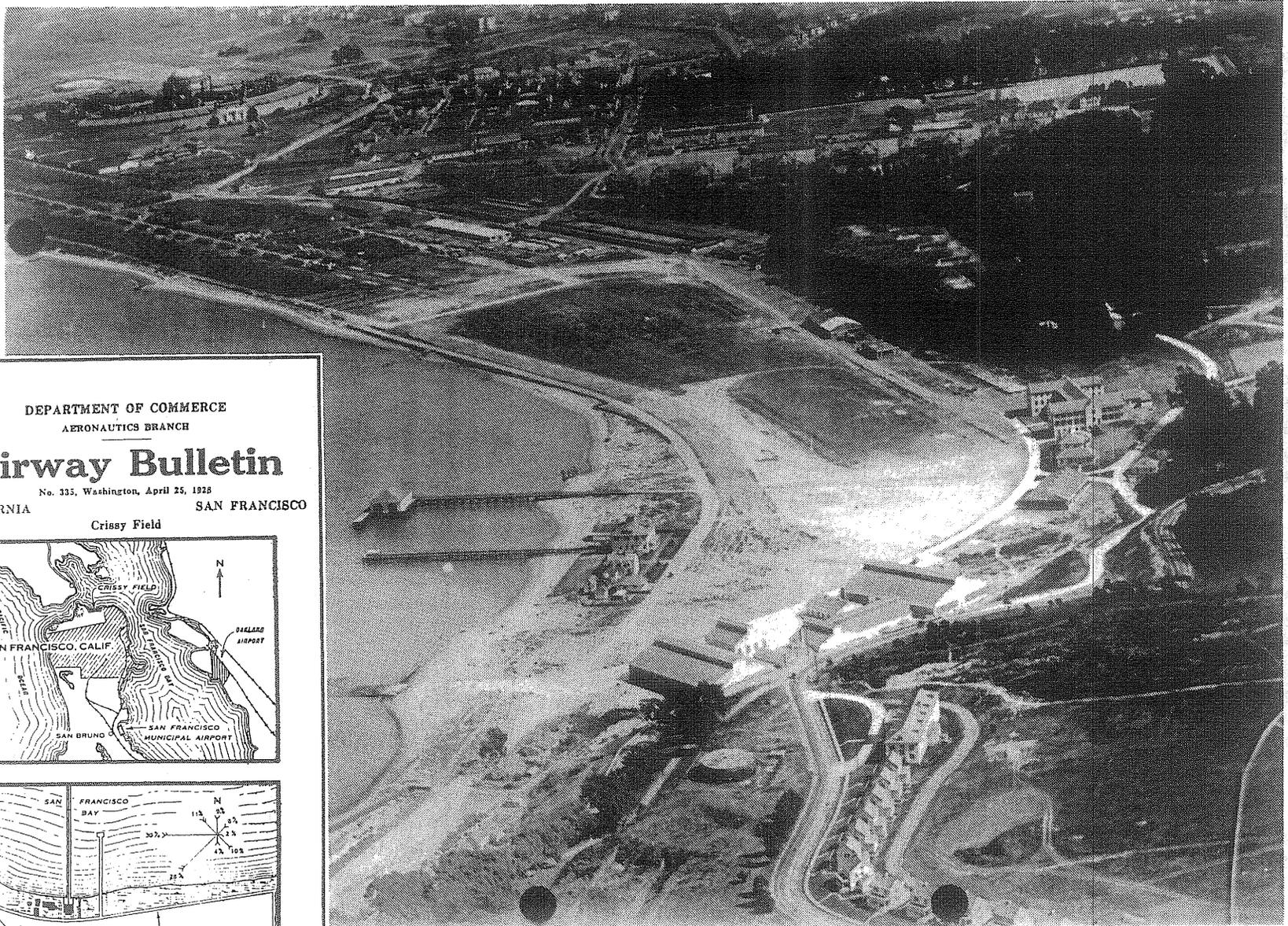


Figure 3-2  
Crissy Field Looking East, circa 1921

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However, the first attempt was unsuccessful; the second try, made two years later by land planes staged out of Crissy Field, was a success. (Haller 1994.)

In 1936, Crissy Field closed as a first-line air base because of the continual windy, foggy weather; the construction of the Golden Gate Bridge (which made flying even more difficult); and Crissy Field's location near the ocean (which made Crissy Field susceptible to enemy attacks by sea). The recently activated Hamilton Field in Marin County became the new location for the Air Corps. During World War II, after Crissy Field was closed as a first-line air base, only light aircraft used the field, and the landing field increasingly became an assembly area for the mobilization of troops. With the coming of World War II, temporary mobilization-type barracks were built at both ends of the airfield, and more of the landing strip was paved. The former air mail hangar at Crissy Field (building 640) was used as barracks and classrooms for training Japanese-American soldiers in the Army's highly secret Military Intelligence Service Language School, the predecessor of the Defense Language Institute. (Haller 1994.)

After World War II, the Sixth Army Flight Detachment operated light airplanes and helicopters from the paved strip, now called Crissy Army Airfield. Major improvements were made in 1959, resulting in the repaving of the landing mat to its present-day configuration and the placement of rubble along the shoreline. Also in 1959, the engineer field maintenance building (924) was constructed next to the old landplane hangar. Light planes used the field until 1974, when the field was finally closed to fixed-wing aircraft and then was used solely as a heliport. The former transportation areas to the south of Mason Street and west of Halleck Street were replaced by the commissary building in 1989. Today, the west end of the field continues in use as a helipad for emergency use. (Haller 1994.)

In October 1972, the GGNRA was established. The first portion of the Presidio to pass from day-to-day Army control to the GGNRA was the northern portion of Crissy Field, including the sand dunes and beach area. By September 1994, the entire Presidio had passed into the care of NPS.

### *3.3.3 Status of the National Historic Landmark*

The Presidio of San Francisco was designated a National Historic Landmark on June 13, 1962. This nomination was extensively updated in 1992 and specific features were listed as contributing or noncontributing to the landmark at this time. The landmark included the entire military reservation, more than 1,400 acres. The Presidio of San Francisco Landmark district, updated in 1992, contains 870 buildings that represent a variety of military architectural styles dating from the Civil War to the present. Of the 870 buildings, 510 have been identified as contributing to the National Historic Landmark district (National Park Service 1992). The landmark also includes designed landscape features, such as the historic forest, and infrastructure features, such as roads. Archaeological sites and features, both predicted and known, are also included in the landmark. The Presidio is counted as one historic archaeological site consisting of 50 major areas or features. Combined with the buildings, these sites, structures, and objects total 662 resources that contribute to the landmark, representing the full range of military history (Spanish, Mexican, and American) at the Presidio. The landmark's themes of significance include military, exploration and settlement, Spanish settlement, and historic archaeology. The period of historical significance extends from 1776 to 1945. Prehistoric sites do not contribute to the landmark but could be eligible for listing in the National Register of Historic Places.

Within the National Historic Landmark is Crissy Field. Crissy Field is nationally significant for the following reasons: it was the first air coast defense station on the Pacific coast and is the only military airfield in California that retains historic features of the 1920s; it is the only Army air base in the western United States active on a continuous basis from 1919 to 1936; it is associated with individuals who were important because of their role in developing American air power; it was the site of many aviation "firsts" during its heyday; and it was the location of the Military Intelligence Service Language School. Crissy Field is regionally significant because of the role it played in assisting other agencies such as the U.S. Forest Service, the U. S. Geological Survey, and the Smithsonian Institution in the management, mapping, and aerial exploration of the western United States.

It is the only Army airfield in the western United States that was active on a continuous basis from 1919 to 1936. Crissy Field is locally significant because it is the oldest extant airfield in the Bay Area. (Haller 1994.)

### *3.3.4 Cultural Resources Present in the Crissy Field Area*

Crissy Field is one of the many discrete areas of the Presidio that contribute to the National Historic Landmark. Elements associated with Crissy Field that contribute to the landmark are the 62 buildings and the historic designed landscape that make up the airfield and related features. The Crissy Field area also consists of resources that are not related to the airfield but contribute to the National Historic Landmark and are considered significant in accordance with the National Landmark criteria. These resources primarily consist of historic archaeological sites and features, including the wreckage of the 18th-century packet San Carlos (El Filipino); the remains of sites and structures related to the anchorage; wharf structure remains and building remains of the 19th-century and 20th-century Quartermaster depots; archaeological features associated with the Fort Point Life Saving Station; and "Herman's House", a domestic/recreational archaeological site.

Historic archaeological resources also include the predicted remains of transportation corridors along the bay shore and Fort Point Road, remnants of the Belt Line Railroad along old Mason Street, and elements of the causeway from Lower Halleck Street to the Quartermaster wharves. Finally, it is believed that the Crissy Field area was also the site of generalized refuse disposal during the Presidio's long tenure, and is also likely to contain resources associated with refuse deposited following the 1906 earthquake.

Prehistoric resources are also known to exist in the vicinity of Crissy Field and are considered potentially eligible for listing in the National Register of Historic Places. Two prehistoric sites, CA-SFR-6 and CA-SFR-26, also have been identified in the vicinity of proposed ground disturbance. The exact location and boundaries of these sites are not known because reference points used to plot their location are no longer present. CA-SFR-6 was identified in 1912 during the Army's filling of the wetland to prepare for the Panama-Pacific International Exposition. At that time, the site was characterized as a

mound containing faunal material, shell, and human remains. Researchers have hypothesized that the mound was located at the edge of the former marsh. The site was reportedly covered by the Panama-Pacific International Exposition.

CA-SFR-26 was discovered in 1972 by the Army, working in the area adjacent to the location of CA-SFR-6. The site consisted of a single, incomplete human interment of Native American origin accompanied by a cut mammal-bone tube. The skeletal material was given to the California Native American Heritage Commission for reburial.

It has been speculated that additional prehistoric sites could be present at Crissy Field in the area around the former location of wetlands. These sites, should they exist, are likely to be buried under several feet of fill.

### *3.3.5 Status of Compliance with the National Historic Preservation Act*

On October 1, 1994, a Programmatic Agreement (PA) on the actions described in the GMPA was signed by the State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation (ACHP), and NPS. The PA states that all actions described in the GMPA as well as most operating and maintenance activities undertaken at the Presidio can be approved by GGNRA historic preservation staff. The PA requires that the GGNRA staff produce an annual report outlining the actions certified in the previous year through the PA and provide copies to the SHPO and the ACHP.

The GMPA also described several actions that are to occur as part of implementation of the Crissy Field site plan, including building demolition, wetland restoration, restoration of the historic airfield, and rehabilitation of remaining historic structures. The effects of these actions on the historic qualities of the Presidio of San Francisco National Historic Landmark were addressed in the GMPA PA.

The GMPA PA also outlines procedures for determining which projects may have greater effects on historic properties than those covered by the PA and

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includes a requirement for review by the SHPO and procedures for guiding repair and stabilization projects in emergency situations. The 1995 NPS servicewide PA removed the requirement for the Western Regional Office to review actions that occur in the GGNRA.

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## 3.4 Geomorphology and Soils

### 3.4.1 *Pre-Settlement Natural Coastal Environment and Historical Changes*

At the time of the first European settlement at the Presidio, the area now known as Crissy Field consisted of a sand spit, with beach sand and sand dunes enclosing a backdune tidal marsh, mudflats, and slough, and a backdune freshwater lagoon and marsh. The backdune marsh was the only one known to exist within San Francisco Bay. Figure 3-3 shows the outline of a 1851 U.S. Coast Survey map of the Presidio shoreline with dune and marsh features superimposed on a present-day map of Crissy Field (Dames & Moore 1995a).

The sand spit extended about 1.2 miles east from Fort Point along the Presidio shoreline and made a bend to the southeast just past the eastern boundary of the present project area, where the present Marina District of San Francisco lies on bay fill. The sand spit widened from west to east, with an area of sand dunes forming behind the central and eastern Presidio beach. A narrow, multibranching estuarine slough coursed through the tidal marsh, with a 150-foot-wide channel entrance at the southernmost point of Marina Beach. The backdune freshwater marsh southeast of the present U.S. Coast Guard station was cut off from direct tidal influence by the sand dunes and was fed by runoff from the Fort Scott area of the Presidio. In 1851, the Presidio coastal area consisted of about 97 acres of tidal marsh, 10 acres of mudflats and sandflats, and 20 acres of subtidal channels (Dames & Moore 1995a). This type of natural environment is inherently dynamic, but a degree of temporary equilibrium in the landscape system may have developed by the time of the founding of the Spanish Presidio.

By 1870, the first of several roads had been built across the estuary, and disturbance of the natural functioning of the marsh by human activity had begun. The roads were built to reach wharves constructed on the beach, and the road embankments severely constricted tidal flow. The filling of the tidal marsh also began at this time. By 1894, the wetland area had diminished to about 80 acres and the mouth of the estuary had been relocated to the west. Between 1912 and 1915, the marsh was completely filled with 360,000 cubic

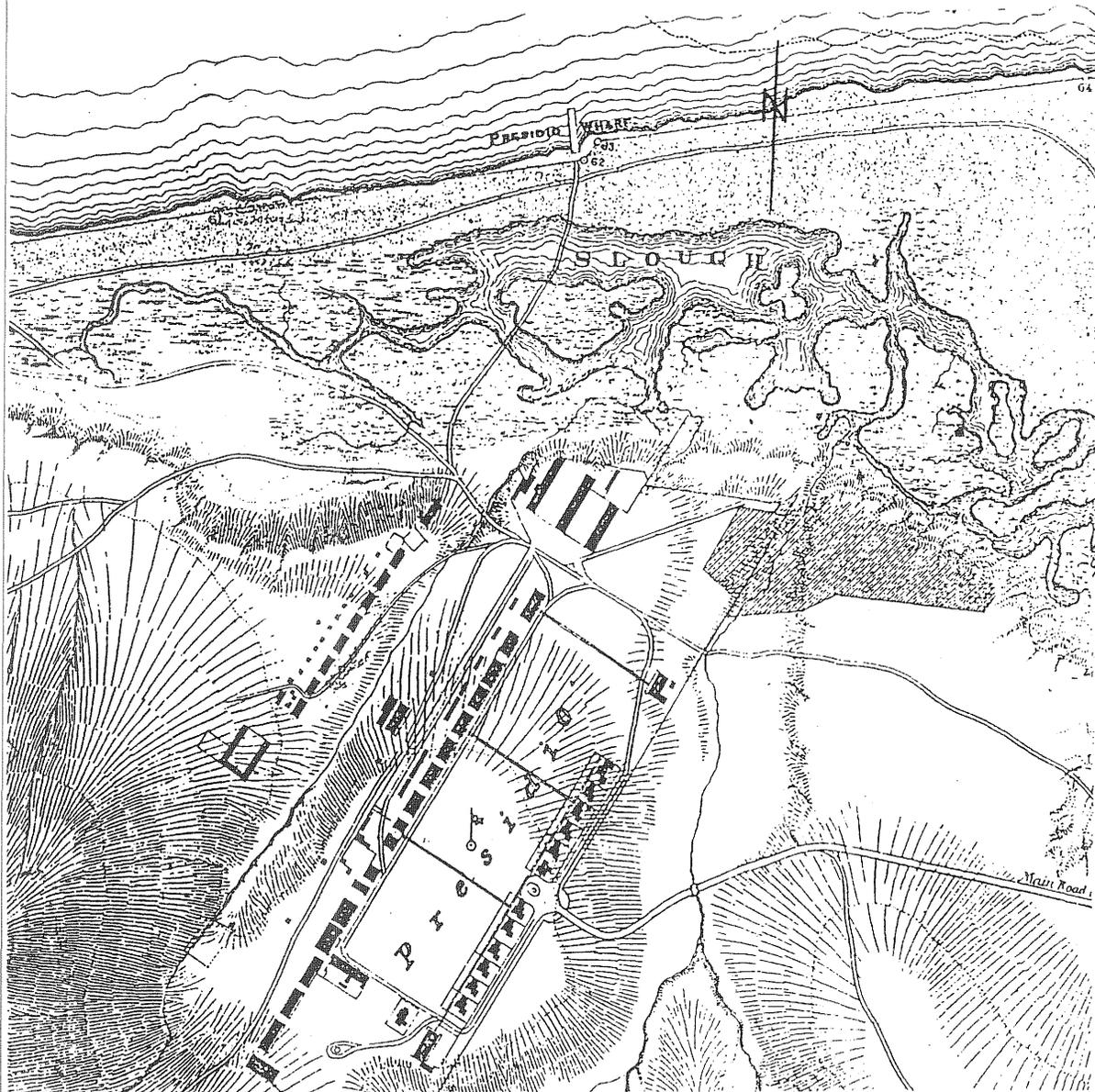
yards of sand dredged from the bay (Dames & Moore 1995a) to create grounds for the 1915 Panama-Pacific International Exposition (Philip Williams & Associates 1986), and the area subsequently was used as an airfield.

### 3.4.2 *Existing Coastal Geomorphology*

The beach and sand-spit shoreline of Crissy Field was formed and is controlled by the action of opposing northwesterly and northeasterly waves (Philip Williams & Associates 1986, Dames & Moore 1995a). The northwesterly waves are wind and ocean waves known as swells that enter through the Golden Gate. The ocean swells are large waves generated by storms in the north Pacific. These swells break up into refraction and diffraction patterns as they enter the Golden Gate. The energy of the swells is attenuated to the extent that when ocean swells reached a record 23 feet in 1983, waves along the north shore of San Francisco were less than 1 foot high. The predominant wave energy is contributed by wind waves from the northwest; however, the highest waves are caused by northeasterly winds. The northeasterly waves result from winds blowing across the long stretches of open bay water, known as fetches. The waves generated by these winds, called seas, are estimated to have a height of 1.7 feet along the north shore of San Francisco.

Crissy Field beach sands are naturally in a state of constant flux in response to the action of wind and waves, a state referred to as gross littoral transport. The net littoral transport, or overall result of wind and wave action on the Crissy Field beach, is movement of sand from west to east along the shoreline. The amount and rate of transported sand may be inferred from the dredging required to maintain the St. Francis Yacht Harbor, which is just east of the east end of Crissy Field beach. The average dredging of the sand shoal at the harbor entrance has been 9,000 cubic yards per year since 1988 (Dames & Moore 1995a). Under the historical natural conditions of the former Crissy Field tidal marsh and slough, the tendency for the littoral transport of sand to close the slough entrance would have been offset by the scouring action of tidal flux. An offshore sand bar formed as sand bypassed the slough entrance and continued moving east.

A survey of existing shoreline conditions was conducted, and the results are presented in Figure 3-4. The shoreline consists of alternating areas of beach



Source: Thompson and Woodbridge 1992.

Figure 3-3  
Historical Wetlands 1870

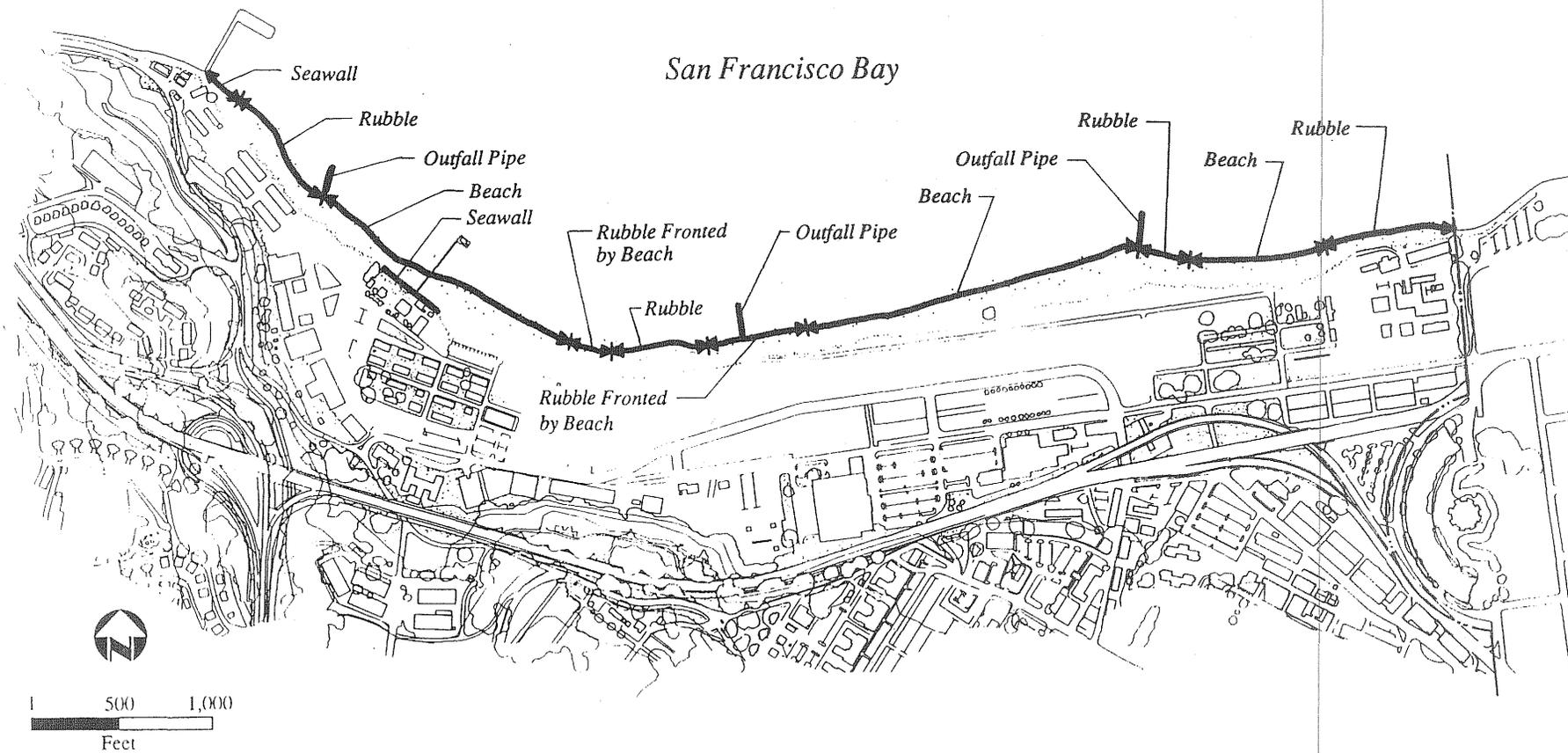


Figure 3-4  
Existing Crissy Field Shoreline

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sand and concrete and other rubble. Currently about 3,100 feet of shoreline is rubble. Two beach stretches are backed by strips of rubble. This condition implies that the present sand beaches accumulated since the placement of the rubble. A comparison of historical and present-day maps (Philip Williams & Associates 1986) indicated the possibility of beach extension within the twentieth century, but this could not be determined conclusively. The report's overall assessment is that the shoreline seems stable (Philip Williams & Associates 1986), with the exception of the 1983 storm described below.

During the severe Pacific storm of 1983, high-energy waves caused severe damage along the California coastline. At Crissy Field, shoreline damage was limited to the far west end around the fishing pier; the rubble wall west of the pier and the seawall east of the pier were damaged. In fact, sand accretion occurred along much of the Crissy Field shoreline during the 1983 storm (Philip Williams & Associates 1986). The greatest observed accretion was at the U.S. Coast Guard station, where the beach was extended 40-80 feet in width, and 4-6 feet in height during the storm. Sand was also observed to accrete on the west side of the eastern outfall pipe (Philip Williams & Associates 1986).

### 3.4.3 Soil and Substrate

The soil and underlying substrate of Crissy Field presently consist of natural dune and beach sand, and sand and debris fill covering bay mud (Dames & Moore 1995a). The debris fill consists of road base material, concrete rubble, copper pipe, metal, and brick fragments and ranges in thickness from 2 feet to 6 feet. The thickness of bay mud ranges from about 3 feet to 8 feet. Underlying the bay mud are sand and other marine sediments. The marine sediments lie on serpentine and graywacke bedrock of the Franciscan formation, which ranges in depth from 20 feet to 60 feet from the ground surface. (Figure 3-5). Although a portion of the historical tidal marsh existed in the central part of the site plan area, most of this wetland was south of the site plan area (Figure 3-3). Bay mud, however, was encountered in borings under the historical dunes, indicating dune encroachment onto former estuary and tidal marsh.

Soil samples from four borings in the eastern half of the project area were collected for chemical and nutrient testing (Dames & Moore 1995a). Two borings were under pavement, and two borings were in sparsely vegetated areas. Soil samples were taken from depths of approximately 3 feet and 6 feet in each boring, with the addition of a sample from 9.5 feet in the only boring to encounter clay or bay mud. The other samples consisted mostly of sand. All soil samples were tested for organic matter content, pH, electrical conductivity (salinity), cation exchange capacity, and macronutrient content.

The test results show that the sandy soil is slightly to moderately alkaline; nonsaline; very low in organic matter content, cation exchange capacity, nitrogen, and phosphorus; and low in potassium and sulfur. In other words, the sandy soil is largely infertile; for natural vegetation restoration, it would be suitable for pioneering or early seral dune vegetation that has the ability to colonize infertile sand dunes. Because the samples were taken at a depth of 3 feet and deeper, any increased nutrient availability from nutrient cycling in the vegetated areas was not detected.

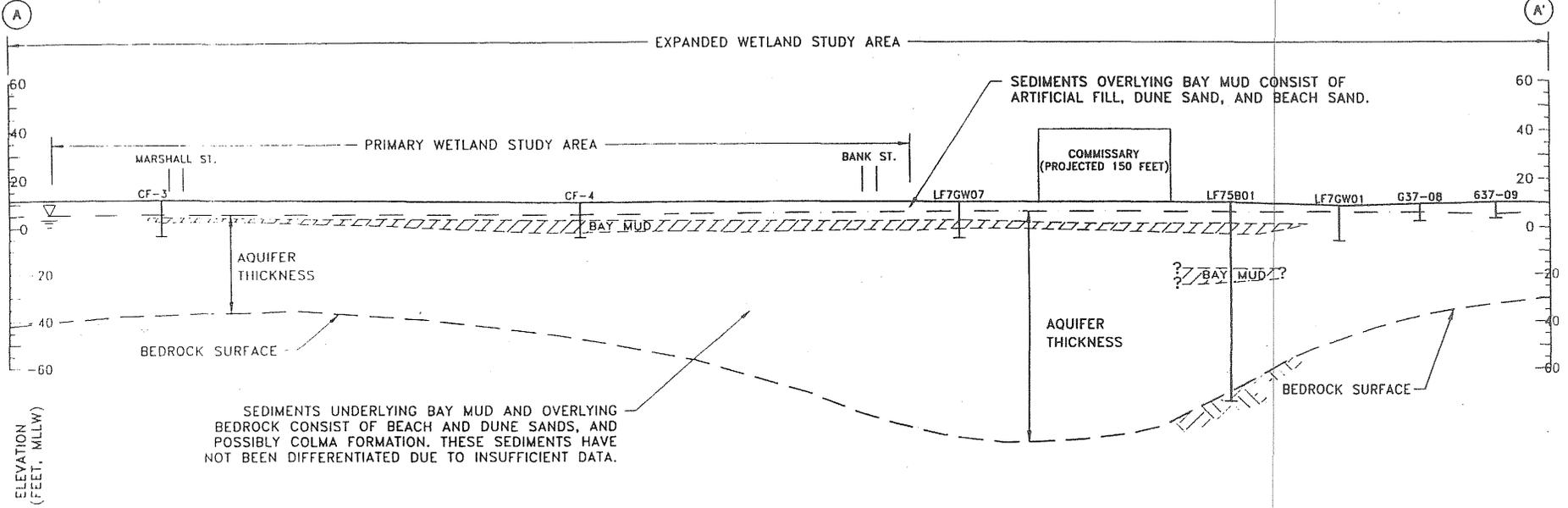
The bay mud clay and the sand layer above it have moderate levels of organic matter; low to moderate salinity; increasing salinity, alkalinity, and cation exchange capacity with depth; and elevated phosphorus, potassium, and sulfur. Nitrogen remains low; calcium content is about the same for the sand and clay and decreases with depth. The bay mud clay is more fertile than the sand and has higher salinity and alkalinity, as would be required for tidal marsh vegetation. Interestingly, sand overlying bay mud also has the same characteristics, although to a lesser degree.

### 3.4.4 Seismicity and Tsunamis

The unconsolidated sand fill, saturated with groundwater in subsurface layers, and overlying bay mud have a very high liquefaction potential during a major seismic event. Liquefaction occurred in the Marina District of San Francisco (east of Crissy Field) during the Loma Prieta earthquake of 1989, resulting in severe and widespread damage. However, little damage was sustained by the buildings at Crissy Field. The majority of buildings at Crissy Field have been removed under a separate action, the building demolition project. The remaining proposed recreational land uses would

EAST CRISSY FIELD

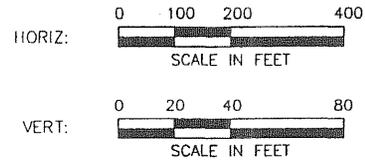
WEST CRISSY FIELD



LEGEND:

- WATER TABLE SURFACE, OCTOBER 1993
- BEDROCK SURFACE (INFERRED FROM SOIL BORING DATA IN THE CRISSY FIELD AREA)
- QUERY INDICATES UNCERTAINTY IN LATERAL EXTENT OF BAY MUD
- SOIL BORING OR MONITORING WELL

LOCATION OF PROFILE SHOWN ON FIGURE 4-5



Note: Cross section is from Janowitz Street to the helipad, between Mason Street and Old Mason Street.

Source: Dames & Moore 1995a.

Figure 3-5  
Cross Section of Soil Substrate at Crissy Field

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not subject users of Crissy Field to a substantial threat of property damage or personal injury resulting from liquefaction. Therefore, the seismic hazard of liquefaction is not discussed further in this document.

Crissy Field may also be subject to the large ocean waves generated in an earthquake, known as tsunamis. The 100-year tsunami elevation is estimated as 7.9 feet National Geodetic Vertical Datum (NGVD); the largest historical tsunami in San Francisco Bay, caused by the 1964 Alaskan earthquake, measured 7.5 feet at the Golden Gate (Dames & Moore 1995a). There is no documentation of damage at Crissy Field resulting from the 1964 tsunami.

## 3.5 Water Resources

This section describes the hydrology and water quality of existing surface water, groundwater, and historically occurring wetland resources at Crissy Field. It also describes applicable water quality laws and permit requirements.

### 3.5.1 Natural Drainages

#### 3.5.1.1 Surface Hydrology

Very little comprehensive information exists for the Presidio and Crissy Field areas regarding historical characteristics of surface water resources. Natural stream channels, including the perennial stream of the Tennessee Hollow drainage area and smaller unnamed drainages (normally dry in summer), once discharged to the large coastal wetland that extended the length of the bay shoreline for several miles (Figure 3-3) at the existing location of Crissy Field. Changes made to topography, vegetation, water courses, roads, and buildings have substantially altered the rates and volumes of drainage and recharge characteristics of the groundwater aquifer of the Presidio and Crissy Field. The wetlands were filled to facilitate development of the 1915 Panama-Pacific International Exposition and, subsequently, the airfield, and the natural streamflows were routed through buried culverts to outfalls at several locations along the shoreline.

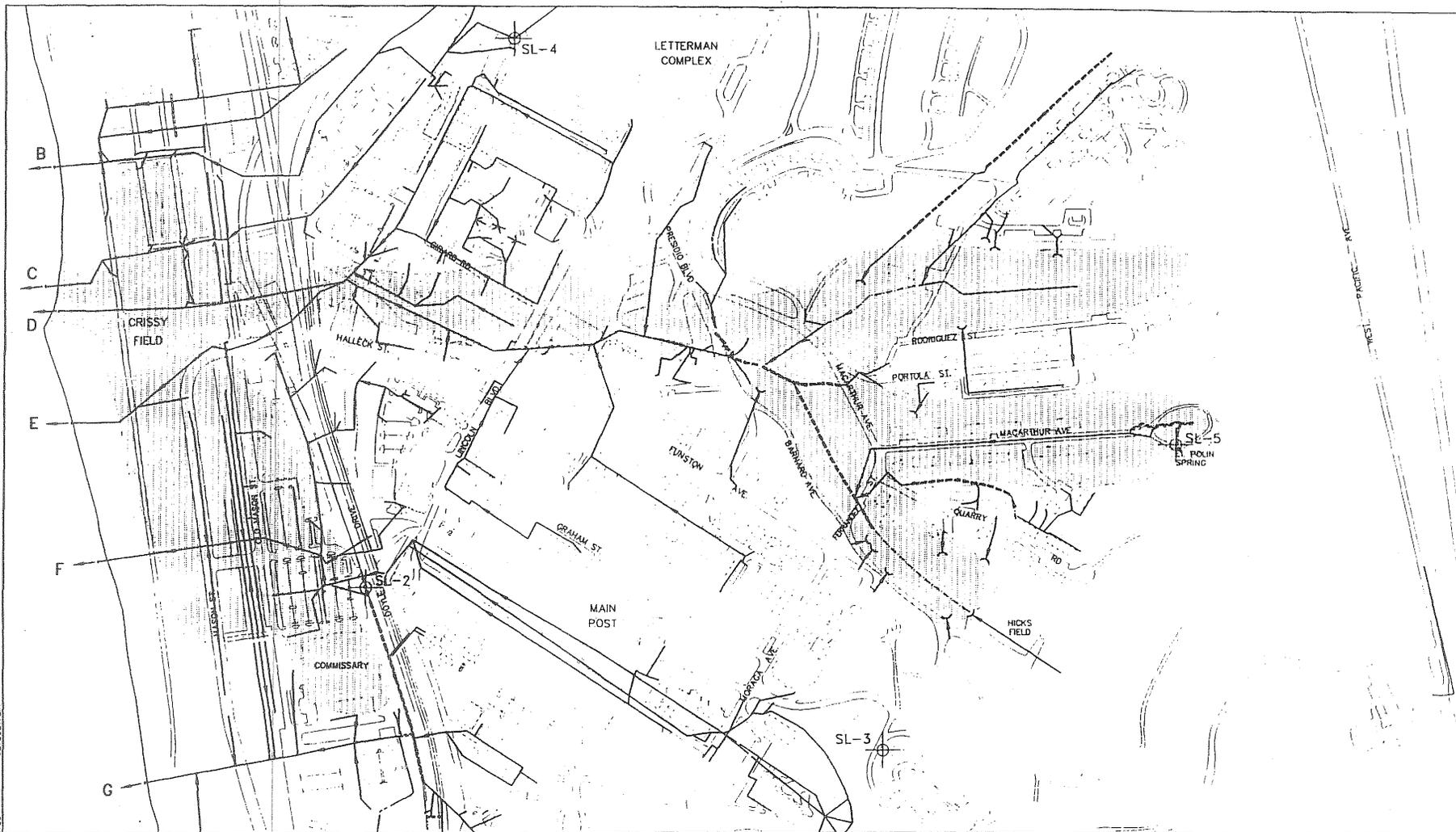
Comprehensive evaluations of hydrology for the entire Presidio were recently conducted for purposes of planning stormwater facility upgrade and wetland restoration activities (Dames & Moore 1994, 1995a). Figure 3-6 shows the natural drainage patterns and storm drainage system. The Crissy Field area of San Francisco Bay annually receives approximately 22 inches of precipitation, primarily in December through March. The soils are very permeable and runoff is very low, except under conditions of intense rainfall or long, sustained storms. The majority of surface water flows from the Presidio drain to Crissy Field and then drain to the bay in underground stormwater pipes at six outfall locations along the shoreline. Tennessee Hollow is the largest stream draining to the Crissy Field area and the only year-round stream. The hydrologic analysis found that most of the stormwater pipes in the Crissy Field area are undersized for conveying a 10-

year storm event. Inadequately sized pipes could lead to localized flooding from stormflows larger than 10-year events. The mean low-low tide in the vicinity of Crissy Field is -3.1 feet mean sea level (msl) and the difference between the low and high tides is an average of 5.8 feet and can exceed 8.5 feet.

#### 3.5.1.2 Groundwater Hydrology

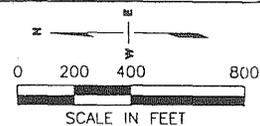
Domestic water supplies for the Crissy Field area have historically been supplied by the Presidio water supply system. Groundwater supplies have been more important in other areas of the Presidio; these supplies include the El Polin Spring, which is the source of most streamflow in Tennessee Hollow. The groundwater aquifers at Crissy Field have been studied in the past to assist with hazardous waste remediation studies and wetland restoration feasibility studies (Dames & Moore 1995a and 1995b, Watkins-Johnson Environmental et al. 1993, Stetson Engineers 1986). Shallow groundwater is located in well-sorted and unconsolidated sediment interspersed with occasional layers of silts and bay muds (Colma formation) that are generally less than 100 feet thick. The Colma formation is overlain with dune sand deposits and overlies the deeper bedrock materials (Franciscan formation) (Figure 3-5). Areas of historical wetlands that were filled generally consist of sandy soils with minor amounts of construction debris (Watkins-Johnson Environmental et al. 1993).

Water-level measurements have been taken at Crissy Field for a variety of studies over the years (Philip Williams & Associates 1989 and Dames & Moore 1995a). The studies indicate that groundwater is generally found at 4 to 5 feet below ground surface (bgs) or at 4 to 6 feet mean lower low seawater level (MLLW). The surficial deposits and Colma formation exhibit relatively high hydraulic conductivity (50 feet/day); however, the small hydraulic gradient (0.004 foot/foot) present at Crissy Field indicates that flow within the aquifer is low. Flow is generally in a northerly direction toward the bay. Tidal fluctuations can influence groundwater levels up to 2,000 feet from the shoreline, with variations of approximately 1.0-1.5 feet near the shoreline and decreasing inland to less than 0.05 foot at a distance of 500 feet from the shoreline.



**LEGEND:**

- |   |                                      |   |   |
|---|--------------------------------------|---|---|
|  | STORM SEWER PIPE                     |  | CULVERT DISCHARGE TO SURFACE                        |
|  | CONCRETE OR BRICK LINED OPEN CHANNEL |  | OUTFALL LETTER                                      |
|  | DRAINAGE DITCH                       |  | RESTORATION AREAS                                   |
|   |                                      |  | STORMWATER QUALITY SAMPLE POINT (SEE SECTION 4.5.1) |



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Source: Dames & Moore 1995a.

**Figure 3-6**  
**Existing Stormwater System at Tennessee Hollow and Crissy Field**

## 3.5.2 Wetlands

Historically, a marsh existed behind a strip of beach and dunes that bordered the bay. Currently, no wetlands exist at Crissy Field. However, based on the results of recently conducted feasibility studies, the site is proposed for restoration of a coastal tidal wetland similar to the wetland that existed there historically (Dames & Moore 1995a and Philip Williams & Associates 1996a). The feasibility studies evaluated various alternatives for wetlands restoration, including a freshwater backdune marsh and various sizes of a tidal marsh. The studies concluded that restoration of a tidally influenced marsh would be more feasible than restoration of a freshwater wetland. The historical wetlands at Crissy Field measured approximately 130 acres and were aligned generally parallel to the shoreline (Dames & Moore 1995a) (Figure 3-3). The hydraulic nature of the historical wetlands with respect to surface and groundwater interactions, tidal exchange, and water quality can only be estimated using our present-day knowledge of coastal wetlands and lagoons. Historical evidence indicates that the wetlands provided locally important habitat for aquatic organisms and terrestrial wildlife. The hydraulic forces that created the backdune marsh system were probably unique relative to the predominance of broad coastal mudflat marshes found at other areas in San Francisco Bay. Characteristics of the site would have favored a hydraulic system that alternated between saline and freshwater conditions according to the location of dune-forming processes, tidal exchange, and freshwater inputs from streams draining the Presidio. The natural landscape of Crissy Field was significantly altered during construction activities in 1914 associated with development of the 1915's Panama-Pacific International Exposition grounds. The salt marsh, which may have graded gradually into a fresh marsh, was filled with materials dredged from the bay (Dames & Moore 1995a, Philip Williams & Associates 1996a and 1996b).

## 3.5.3 Water Quality

### 3.5.3.1 Regulatory Framework for Water Quality

The San Francisco RWQCB is the state agency with primary responsibility and authority for ensuring that the beneficial uses of water resources are

protected from potential adverse impacts of development at Crissy Field. Water quality objectives and numerical water quality standards are established in the RWQCB water quality control plan (basin plan) to protect the established beneficial uses of the water bodies (California Regional Water Quality Control Board 1995). The beneficial uses for groundwater and surface water at Crissy Field are identified in the Basin Plan and are applied by the RWQCB on a case-by-case basis. Important beneficial uses designated for the bay include contact and noncontact recreation, commercial sport fishing, and shellfish harvesting. Additionally, the State of California can regulate water quality through the Water Quality Control Plan for Inland Surface Waters (ISWP) and the Enclosed Bays and Estuaries Plan (EBEP), which established numerical objectives for "priority pollutants" such as trace metals and synthetic organic compounds discharged to inland waters and estuarine environments, respectively. However, the ISWP and EBEP were the subject of a lawsuit in 1994 and eventually were overturned. The plans are currently under review and are being prepared for readoption in the near future, and Crissy Field activities will most likely be subject to the provisions of these new plans. The cleanup of contaminated groundwater at Crissy Field to acceptable levels is being conducted by the Army and is regulated by the California Department of Toxic Substances Control (DTSC) and the RWQCB (refer to Section 3.10, "Hazardous Substances and Environmental Remediation").

The RWQCB is also the primary agency for granting, administering, and enforcing a variety of waste discharge permits, including National Pollutant Discharge Elimination System (NPDES) permits. Construction projects that disturb an area greater than 5 acres require an NPDES permit for general construction activity. The permit requires development, implementation, and compliance monitoring of a stormwater pollution prevention plan (SWPPP) that prescribes best management practices (BMPs) to control erosion and contaminated runoff from the construction site.

Construction activities required for the tidal marsh creation and other shoreline modifications would be subject to federal regulation under Section 404 of the Clean Water Act. The U.S. Army Corps of Engineers requires evaluation of water quality considerations associated with modification of the bay shoreline. A Section 401 certification waiver from the San Francisco RWQCB would also be required for the Section 404 permit to be obtained.

### 3.5.3.2 Surface Water Quality

Surface water quality at Crissy Field depends primarily on mineral composition of the soils and associated parent materials within the watersheds that drain onto the site, hydrologic characteristics, and sources of contaminants in the watershed. The quality of surface water runoff is important primarily as it affects marine organisms and habitat near the outfalls along the bay shoreline and, to a smaller extent, the freshwater organisms and terrestrial wildlife that may use the fresh water before it enters the bay. Water quality is also a concern because of runoff of urban pollutants such as oils and grease, heavy metals, and pesticides that could enter the wetland restoration area from the Tennessee Hollow watershed and from other areas along the southern boundary of the Crissy Field site plan area.

Very little current data exist for surface water quality at the Presidio or Crissy Field. A sample was collected in November 1990 from El Polin Spring, a major tributary to the Tennessee Hollow drainage basin (Watkins-Johnson Environmental et al. 1993). The results indicate that surface water has a high mineral content dominated by magnesium carbonate. The common ions sodium, chloride, fluoride, and nitrate were within the maximum contaminant levels (MCLs) for state drinking water quality standards. Chromium and mercury were within drinking water MCLs but were slightly elevated with respect to EPA ambient water quality criteria for protection of freshwater life (U.S. Environmental Protection Agency 1986). No organic compounds were detected.

Water quality historically has been a concern with respect to elevated levels of coliform bacteria detected in water samples collected at nearshore areas of the bay (Dames & Moore 1994). To address this issue, improvements were made in 1994 to eliminate cross connections between the stormwater and sewer systems. The San Francisco Department of Public Works, Bureau of Water Pollution Control, has since continued monitoring and year-round sampling of total coliforms at the Crissy Field monitoring stations. Although there have been occasional high counts detected, in 1996 the recreational water contact standard was not exceeded at the Crissy Field stations. Beaches are posted when bayshore waters are not suitable for recreation contact (Navarret pers. comm.).

Surface stormwater quality data were collected in 1994 from four different land use categories (roads, residential, commercial, and open space) for the stormwater system improvement studies (Dames & Moore 1994). The results were compared with water quality objectives (WQOs) established by the RWQCB (California Regional Water Quality Control Board 1995) and EPA ambient water quality criteria (AWQC). Although no regulatory thresholds apply to stormwater or groundwater discharges to surface waters, the objectives and criteria may be applied to the regulation of the quality of surface receiving waters, such as the bay, Tennessee Hollow Creek, and the proposed marsh. The objectives and criteria provide a framework to evaluate whether chemical compounds may have an adverse effect on a proposed project and determine the type and level of protective measures required to prevent pollution from occurring. In general, constituents for which WQOs and AWQC have been established include various inorganic ions, metals, and pesticides. WQOs and AWQC have not been established for most other organic and inorganic compounds.

Individual and multiple sample composites were collected during three storms from areas in four land use categories at the Presidio during the 1994 sampling program. Five of the six sites where samples were collected drain through the buried stormwater outfall system through Crissy Field to the bay. Fecal coliform bacteria counts were within the range expected from typical urban storm event runoff. The large majority of individual and composite samples analyzed for metals were less than the detection limits. In the open space land use category, nickel and chromium concentrations were higher than the AWQC in two of the three individual samples. The AWQC for zinc was exceeded in the composite of road samples and in four of the six samples from residential and commercial areas. One of the three individual residential area samples had a level of mercury above the AWQC. Corrective measures that were identified in the stormwater management plan will be implemented to improve the quality of stormwater collected and discharged through the outfall system to the bay. Monitoring will be used to ensure that appropriate measures are in place to control the range of pollutants expected to be generated from stormwater under various land use scenarios (Dames & Moore 1994).

### 3.5.3.3 Groundwater Quality

Groundwater quality of shallow aquifers, similar to surface water quality, is determined to a large extent by the nature of geologic materials and processes present in the water-bearing strata and by the types and quantities of pollutants transported in freshwater recharge. In coastal shoreline areas, saltwater intrusion to freshwater aquifers can occur and depends on the natural extent of tidal influence, as well as groundwater withdrawals that may artificially induce intrusion. Salinity of shallow groundwater at Crissy Field generally is lower than that of seawater and is consistent with hydrologic studies that suggest the tidal influence is limited to the nearshore zone.

Dames & Moore (1995a) found that chloride concentrations in four sampled wells on Crissy Field were within drinking water standards. Results from studies conducted for hazardous waste investigations also found chloride concentrations in 10 wells to be within standards (Watkins-Johnson Environmental et al. 1993). Groundwater in the area, however, is not currently used for drinking water supplies and is not likely to provide a source of supply in the future.

Groundwater quality in localized areas of Crissy Field has been degraded in the past by the filling of wetlands with materials containing waste construction debris and migration of hazardous substances to the shallow aquifer. Concerns regarding groundwater quality at Crissy Field are primarily related to potential impacts on the marine organisms exposed to offshore discharge from the shallow aquifer. In general, the presence of organic compounds, such as pesticides and petroleum products, and heavy metals can pose an ecological risk to aquatic ecosystems. The level of risk depends on the concentration and exposure routes.

Data on groundwater quality for Crissy Field are limited to studies conducted for the Army's hazardous substances investigations (see Section 3.10, "Hazardous Substances and Environmental Remediation"). Groundwater data that were collected for the initial remedial investigation (RI) in 1993 (Watkins-Johnson Environmental et al. 1993) were reviewed for the wetland restoration planning studies (Dames & Moore 1995a).

The revised RI (Dames & Moore 1995b) provides the latest analysis of groundwater data for the Crissy Field area. An area of groundwater

contamination exists near the old petroleum, oil, and lubricants area from activities that occurred near Building 637. The plume of contaminants includes total petroleum hydrocarbon (TPH), volatile organic compounds (VOCs), and smaller contributions of metals and other organic compounds. An interim groundwater treatment unit was installed at the site in September 1994. Long-term remediation plans are being developed. Several wells in the area known as Fill Site 7, an area of mostly construction debris, have exhibited high levels of cadmium, chromium, copper, lead, nickel, silver, and zinc. Building 937, which was part of the Army's vehicle maintenance area, has localized groundwater contamination from VOCs, TPH, and several metals. The Army has already initiated interim remedial actions; a groundwater treatment system was installed in August 1994. The Army's ongoing and planned remedial actions include removal of contaminated soil and sources of groundwater contamination, followed by groundwater treatment where necessary. The cleanup will further reduce water quality degradation that has occurred and the potential risks from areas of historical contamination.

## 3.6 Biological Resources

### 3.6.1 Presettlement Habitats and Historical Changes

In 1816, the naturalists Johann Eschscholtz and Adelbert Chamisso landed at Crissy Field on the Russian ship *Rurik* and type-classified more than a dozen common California native plants. At that time, a marsh existed behind a strip of active coastal dunes and northern foredune habitat that bordered the bay. Historical vegetation surrounding the marsh likely consisted of coastal scrub and coastal prairie species. A freshwater pond and freshwater marsh were at the west end of Crissy Field and were likely surrounded by northern dune scrub habitat.

As noted in Section 3.4.1, the natural landscape of Crissy Field was significantly altered during construction activities in 1914, when the salt marsh was filled with dredged materials from the bay.

### 3.6.2 Existing Biological Habitats and Resources

Bordering San Francisco Bay, Crissy Field is located in the Central Coast subregion of the California Floristic Province (Hickman 1993). This subregion extends along the coast from Bodega Bay to Point Conception and supports an array of habitats dependent on or adapted to coastal influences such as summer fog, maritime temperatures, salt spray, and strong winds.

The Crissy Field site plan area is characterized by five habitats: northern foredune, disturbed northern foredune, active coastal dunes, non-native grassland, and developed and landscaped areas. The locations of these habitats are shown in Figure 3-7 and are described below. Because of the intensive use of Crissy Field by humans, the overall wildlife value and use of the site is low compared with that of similar sites with less human activity. Unleashed dogs and feral cats also reduce the wildlife use of the site. Twenty-two unleashed dogs were observed in a 2-hour period during a site

reconnaissance survey. The Crissy Field area is low-quality area for feral cats because it is open with no vegetation for cover, and no cat feeding stations were observed. Feral cats could be present irregularly or in low numbers at Crissy Field.

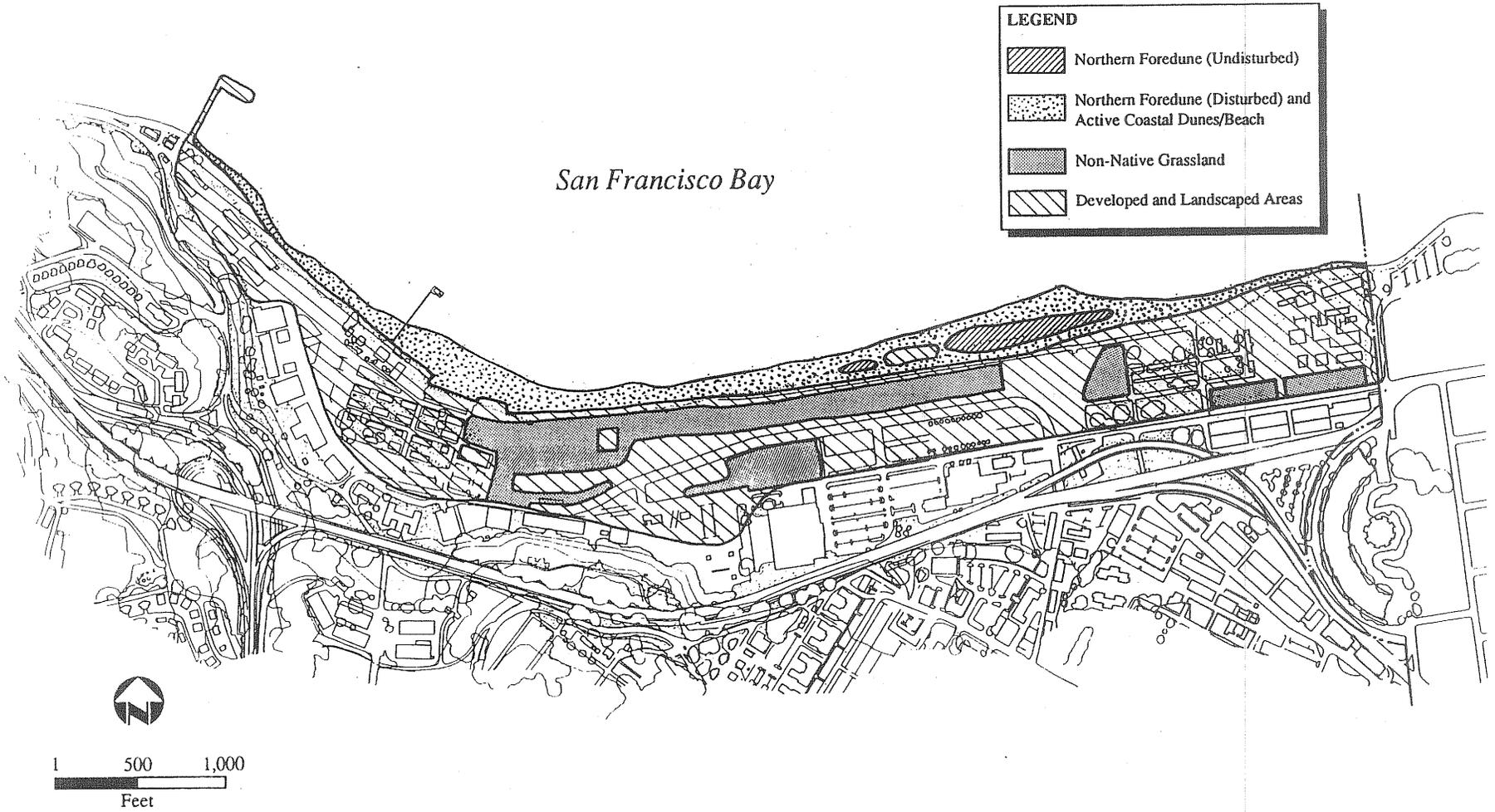
The acreage occupied by each habitat type in the site plan area is presented in Table 3-2.

Table 3-2. Acreages Occupied by Plant and Wildlife Habitats in the Crissy Field Site Plan Area

Habitat	Size (acres)
Northern foredune (undisturbed)	2.6
Disturbed northern foredune and active coastal dunes/beach	16.9
Non-native grassland	18.1
Developed and landscaped areas	62.4
Total	100.0

On July 10 and July 15, 1995, a Jones & Stokes Associates botanist and wildlife biologist conducted reconnaissance-level site surveys of the Crissy Field proposed site plan area to identify plant communities and wildlife habitats and assess the potential for special-status species to be found there. The information provided in this section is based on the field surveys, a review of existing information about the site plan area, pertinent literature, and contacts with knowledgeable individuals.

The existing vegetation and wildlife resources within each habitat type at Crissy Field, including the potential for presence of special-status species, are described below.



**Figure 3-7**  
**Habitat Types at Crissy Field**

### 3.6.2.1 Northern Foredune (Undisturbed)

Undisturbed native northern foredune habitat exists in areas of beach that have been fenced to provide protection. These areas are part of a restoration project intended to restore the native vegetation that once was common along San Francisco Bay. Many volunteers take part in restoration activities in this area. Typical native dune plant species in these areas include beach bur (*Ambrosia chamissonis*), sand verbena (*Abronia umbellata*), and beach primrose (*Camissonia cheiranthifolia*). Northern foredune is considered a special native biological community because of its limited distribution and declining status relative to historical conditions and because it provides important habitat to dependent plant species.

The native foredunes have low wildlife value and wildlife use because the existing restoration area is relatively small, the native foredunes are isolated from other native habitats, and there is intense human activity in this habitat. Common wildlife species such as mourning doves (*Zenaida macroura*), rock doves (*Columba livia*), house finches (*Carpodacus mexicanus*), and house sparrows (*Passer domesticus*) were observed during the field survey in this community.

### 3.6.2.2 Disturbed Northern Foredune

Disturbed northern foredune is a stabilized dune community that has undergone frequent disturbance from activities that were historically associated with the airfield and from ongoing disturbances associated with recreational activities. Common plant species found in disturbed dune include sea rocket (*Cakile maritima*), wild radish (*Raphanus sativus*), and ice plant (*Carpobrotus edulis*). Disturbed northern foredune is a common coastal community regionally and statewide.

The disturbed northern foredune is considered to have low wildlife value and low wildlife use because the site consists of non-native vegetation and the area is disturbed by human activity. Wildlife use is similar to that of the undisturbed northern foredunes.

### 3.6.2.3 Active Coastal Dunes and Tidal Zone

Active coastal dunes characterized by unvegetated sand with patches of native dune and disturbed dune vegetation form a linear strip along the northern perimeter of Crissy Field adjacent to the bay. Vegetation is sparse or lacking because of frequent moving of substrates by wind and because of frequent disturbance from concentrated human and dog activity. Active coastal dunes are a common natural community throughout coastal California.

Because of the intensive human use (e.g., jogging and dog walking) along the beach and the presence of unleashed dogs, the beach is used mostly by human-tolerant and dog-tolerant wildlife species, such as killdeer (*Charadrius vociferus*), ring-billed gull (*Larus delawarensis*), western gull (*Larus occidentalis*), Heermann's gull (*Larus heermanni*), Caspian tern (*Sterna caspia*), mourning dove, and rock dove. Less human-tolerant birds may use the beach late in the evenings, early mornings, and during winter, when human activity is less intensive. These species include semipalmated plover (*Charadrius semipalmatus*), western snowy plover (*Charadrius alexandrinus nivosus*), western sandpiper (*Calidris mauri*), dunlin (*Calidris alpina*), least sandpiper (*Calidris minutilla*), and sanderling (*Calidris alba*).

Many animals also forage or rest in the bay adjacent to Crissy Field. These species include common loon (*Gavia immer*), western grebe (*Aechmophorus occidentalis*), double-crested cormorant (*Phalacrocorax auritus*), brown pelican (*Pelecanus occidentalis*), greater scaup (*Aythya marila*), white-winged scoter (*Melanitta fusca*), red-breasted merganser (*Mergus serrator*), and harbor seal (*Phoca vitulina*). In addition, the rock rubble and the sandy beach in the intertidal zone support many marine invertebrates, including moon snails, dungeness crabs, starfish, clams, and barnacles. No herring (*Clupea harengus*) spawning grounds are known in the Crissy Field area (Waters pers. comm.).

### 3.6.2.4 Non-Native Grassland

Non-native grassland at Crissy Field occupies areas that historically have been heavily disturbed. This habitat is dominated by non-native annual grasses such as wild oat (*Avena fatua*) and hare barley (*Hordeum murinum*).

ssp. *leporinum*) and associated forbs such as cutleaf plantain (*Plantago coronopus*) and common sow thistle (*Sonchus oleraceus*). This habitat type is a common community both regionally and throughout the state.

The wildlife value and wildlife use of the non-native grassland area is low because of the intensive recreational use of the area. The area is used by common wildlife species such as western gulls, mourning doves, rock doves, Brewer's blackbirds (*Euphagus cyanocephalus*), house finches, and house sparrows.

### 3.6.2.5 Developed and Landscaped Areas

Developed and landscaped areas consist of paved roads and parking lots, buildings and houses, portions of the old airfield, landscaped areas surrounding structures, and ornamental plantings throughout the airfield. Twenty Monterey pines and ten cypress trees grow in the eastern part of Crissy Field and have a grassy understory. These trees also grow as a stand providing shade for a picnic area in the middle of the beach and are found around some structures in the western part of the site plan area. A row of eucalyptus trees stands along the east boundary. Forty-eight palm trees also grow along the airstrip. This type of habitat is common both locally and throughout the state.

The wildlife value and wildlife use of the developed and landscaped areas is similar to that of the annual grassland areas, except bushtit (*Psaltriparus minimus*), American robin (*Turdus migratorius*), pine siskin (*Carduelis pinus*), purple finch (*Carpodacus purpureus*), and tree swallow (*Tachycineta bicolor*) have also been observed (Conner pers. comm.).

The greater western mastiff bat (*Eumops perotis californicus*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), Yuma myotis (*Myotis yumanensis*), and Pacific western big-eared bat (*Plecotus townsendii townsendii*) roost in trees, caves, or unoccupied human structures. No bat roosts were observed at Crissy Field during bat surveys for the Presidio or during the 1995 field survey, but bats could forage at Crissy Field.

## 3.6.3 Special-Status Species

Special-status species are plants and animals that are legally protected under the state and federal Endangered Species Acts (ESAs) or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such status.

USFWS and the National Marine Fisheries Service identified species that are federally listed as endangered or threatened or federal candidate species with distributions that might include the Crissy Field area. See Section 5.0, "Consultation and Coordination", for the list of special-status species from USFWS with potential to occur in the City/County of San Francisco.

### 3.6.3.1 Special-Status Plant Species

Special-status plants are species in the following categories:

- plants listed or proposed for listing as threatened or endangered under the federal ESA (50 CFR 17.12 [listed plants] and various notices in the Federal Register [proposed species]);
- plants that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR 40:7596-7613, February 28, 1996);
- plants listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 CCR 670.5);
- plants listed under the California Native Plant Protection Act (Cal. Fish and Game Code, Section 1900 et seq.);
- plants that meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA) (State CEQA Guidelines, Section 15380);
- plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists 1B and 2 in Skinner and Pavlik 1994); and

## AFFECTED ENVIRONMENT

- plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4 in Skinner and Pavlik 1994), which may be included as special-status species on the basis of local significance or recent biological information.

No special-status plant species are known to occur at Crissy Field (Jones & Stokes Associates 1990). No special-status plants were observed during the reconnaissance-level field visit. The following paragraph discusses each of the special-status plants included in the USFWS list.

Five special-status plants are considered to have potential to occur on the project site, based on occurrence in the region and association with habitat types found at Crissy Field (Natural Diversity Data Base 1995, Skinner and Pavlik 1994). These species are San Francisco wallflower (*Erysimum franciscanum*), San Francisco campion (*Silene verecunda* ssp. *verecunda*), beach layia (*Layia carnosa*), and San Francisco lessingia (*Lessingia germanorum*). However, suitable microhabitat conditions specific to each of these species do not exist because of long-term disturbances associated with the site. Marsh sandwort (*Arenaria paludicola*), a federally listed and state-listed endangered species, may have inhabited the marsh that existed at Crissy Field before the 1914 construction activities but because of filling in the wetland that previously existed, it does not occur on the site anymore. The USFWS list also includes Presidio manzanita (*Arctostaphylos hookeri* ssp. *ravenii*), Presidio clarkia (*Clarkia franciscana*), and Marin dwarf flax (*Hesperolinon congestum*) as special-status plant species potentially occurring in the vicinity. Habitat types that support these species; however, do not occur at Crissy Field and did not historically occur.

### 3.6.3.2 Special-Status Wildlife Species

Special-status animals are species in the following categories:

- animals listed or proposed for listing as threatened or endangered under the federal ESA (50 CFR 17.11 [listed animals] and various notices in the Federal Register [proposed species]);

- animals that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR 40:7596-7613, February 28, 1996);
- animals that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines, Section 15380);
- animals listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 CCR 670.5);
- animal species of special concern to the California Department of Fish and Game (Remsen 1978 [birds] and Williams 1986 [mammals]); and
- animals fully protected in California (Cal. Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]).

The following section discusses special-status wildlife species that could occur in the vicinity of the project site according to the USFWS list. No special-status wildlife species are known to breed at or use Crissy Field extensively, although the coastal population of the western snowy plover (federally listed as threatened) is an uncommon visitor on the beach. During the 1995/1996 NPS survey, no snowy plovers were observed on Crissy Field beaches (Hatch pers. comm.). There is a museum specimen of a salt marsh vagrant shrew (*Sorex vagrans halicoetes*) (California species of special concern), which was probably found historically in the salt marsh at Crissy Field. Because no suitable salt marsh habitat exists at Crissy Field, the salt marsh vagrant shrew no longer is present. Brown pelicans (state-listed and federally listed as endangered) are often seen offshore in the bay, but they do not use Crissy Field.

The salt marsh harvest mouse (*Reithrodontomys raviventris*) (listed as endangered under the California and federal ESAs), California clapper rail (*Rallus longirostris obsoletus*) (endangered under the California and federal ESAs), saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*) (California species of special concern), and black rail (*Laterallus jamaicensis*) (listed as threatened under the California ESA) occur in salt marsh habitats. Because suitable salt marsh habitat no longer exists at Crissy