

Draft
General Management Plan Amendment
Environmental Impact Statement

Presidio of San Francisco
Golden Gate National Recreation Area
California

October 1993

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Environmental Impact Statement

Golden Gate National Recreation Area
Presidio of San Francisco
San Francisco, California



This *Draft General Management Plan Amendment and Draft Environmental Impact Statement* describes and analyzes a proposed action and three alternatives for future management and use of the Presidio of San Francisco. The proposed action (alternative A) and other alternatives have been formulated to address problems and management concerns related to visitor use and programs (access, traffic congestion, increased visitation, inadequate facilities), resource management (cultural and natural resource preservation), management of an extensive building inventory, park management, financial and legislative needs, and preservation of a sense of community. All of the alternatives have been designed to protect and preserve exceptional resources and to meet planning objectives and goals for the future Presidio. The alternatives differ primarily in approach to overall management, level and extent of resource preservation and enhancement, and diversity and level of visitor programs. Alternatives A and D call for a congressionally authorized management entity to help with overall management of the Presidio; alternatives B and C use existing NPS authorities for management. Alternatives A and C provide the highest level of overall resource protection and enhancement; alternatives B and D the lowest levels. Alternatives A and C provide the highest level of program diversity for the public; alternatives B and D provide the lowest levels. Alternatives B and C do not include the former Public Health Service Hospital within the boundaries of Golden Gate National Recreation Area. Major impact topics assessed for the proposed action and alternatives include natural and cultural resources, traffic and transportation systems, city services, native plant communities, regional economy and employment, noise, and air quality.

The comment period on the draft plan and environmental impact statement will end 60 days after the Environmental Protection Agency has accepted the document and published a notice of availability in the *Federal Register*. Comments should be addressed to:

Superintendent
Golden Gate National Recreation Area
Building 201, Fort Mason
San Francisco, CA 94123

For further information about this document, contact the Presidio Planning and Information Office at the above address or telephone (415) 556-3111.

United States Department of the Interior / National Park Service

Summary

Purpose of and Need for Action

The purpose of the action is to guide visitor use, cultural and natural resource management, development, and operation of the Presidio of San Francisco for the next 10 to 15 years. The action is needed to provide direction and policy guidance as the Presidio is converted from a military post to a park and to fulfill the legislative mandate of Golden Gate National Recreation Area.

This *Draft Environmental Impact Statement* (DEIS) analyzes the environmental consequences of four alternatives for management and use of the Presidio, which will become part of the national recreation area in 1994/95. The document provides a full discussion of the significant environmental impacts associated with the alternatives, and it identifies mitigating measures to avoid or reduce adverse effects.

The alternatives for the Presidio were formulated to reflect the site's significance and to take into consideration the issues and concerns identified in the early phases of planning. The Presidio's cultural landscape and impressive array of historic structures, its open space, scenic vistas, and many natural features, and its tremendous potential for recreation, interpretation, and programming were all factors that contributed to decisions about how the site might be managed in the future. The major impact topics assessed were based on identified issues and concerns and included the regional economy and employment, city services, housing, health care, traffic and transportation systems, land use, the community, and surrounding neighborhoods, cultural and natural resources, visitor use, human health and safety, energy consumption, and park management and operations.

Alternative A (Proposed Action): Diverse Programming/Environmental Stewardship — Public/Private Partnerships

Proposals

Alternative A is the National Park Service's proposed action. Under this alternative cultural and natural resources throughout the Presidio would be preserved and enhanced, and major new programs would be established through public/private partnerships.

Activities and programs would be carried out to protect and preserve the Presidio's cultural and natural resources and values. Nearly 475 historic buildings would be rehabilitated, preserved, or restored and adapted for new uses; 264 nonhistoric and 37 historic buildings totaling 2 million square feet of interior space would be removed to enhance cultural and natural settings and provide additional opportunities for outdoor recreation. Open space would increase from about 780 acres to 985 acres. The cultural landscape would be preserved, and linkages between areas that were once physically or visually connected would be reestablished.

The total acreage of native plant habitat would be expanded from 145 to 285 acres. About 20-80 acres of the once-extensive wetlands at Crissy Field would be restored, as would a portion of the Crissy Field dune system (about 30 acres) and the riparian corridors in Tennessee Hollow (a total of 30 acres) and Lobos Creek valley (about 2 acres). About 60 acres of native habitat would be restored within the historic Presidio forest. Rare, threatened, and endangered plants would be monitored, protected, and enhanced on the 15 acres that they occupy. The historic forest would be enlarged by 57 acres.

A variety of improvements would be implemented to make the Presidio easy to reach, explore, and enjoy. A visitor center would be established at the main post, and interpretive media and programs would be provided in all major activity areas. Recreational opportunities would also be expanded, and most of the existing recreational facilities would be made available to the public. Annual recreational visits under this alternative would be expected to reach 5.9 million in 2000 and 7.9 million in 2010.

Park partners would join the Park Service in offering a wide range of programming. They would use many of the renovated buildings to inform visitors about the Presidio's resources and history, discuss global concerns, celebrate cultural diversity, and educate the public on environmental issues. Visitors would participate in research and demonstration activities through seminars, lectures, and hands-on experiences. A small component of Sixth U.S. Army personnel would remain at the Presidio and would continue to use several of the buildings at the main post for headquarters and administrative functions.

To open the Presidio to broad public use and direct visitors to its principal features, signs and kiosks with orientation exhibits would be placed at appropriate

entrances. All existing gates would remain open, and the gates that have traditionally received the most use would be improved, especially for bicyclists and pedestrians. Orientation media at the Presidio visitor/interpretive center would provide details about the site's resources and opportunities, and each of the major Presidio planning areas would include a contact station or orientation exhibit where visitors could get information specific to that area.

Access and circulation improvements would be made, including simplifying the road network by defining visitor routes, adding signs, reducing traffic in some areas, and closing some roads to automobiles. Some large parking lots would be removed, and smaller peripheral parking areas would be established. The total number of parking spaces would be reduced from 13,000 to 7,600. Permit and fee areas, special carpool and disabled visitor parking spaces, and time limitations would be used to manage visitor and tenant parking.

Alternatives to automobile use would be promoted, and incentives would be provided to use alternative travel modes to reach the park. Presidiowide trail networks would be developed for pedestrians (11 miles) and bicyclists (11 miles), and they would connect with regional trail networks; an alternative-fuel shuttle system would be established to link the site's main activity areas; and the possibility of providing water taxi/ferry service between Crissy Field and other waterfront sites would be studied. Efforts would be coordinated with MUNI (the San Francisco Municipal Railway) and Golden Gate Transit to provide more direct cross-town service and take advantage of regional transit connections in the downtown area. Transportation hubs would be established at the main post and the Golden Gate Bridge, where people could buy transit passes and transfer between city and park public transit.

The Presidio would support an active community of NPS employees, program staff, and short-term residents. Most housing would be used by park and park partner employees, researchers, and instructors, but overnight lodging and other residential spaces would be available for visitors and program participants. By the year 2010, 738 of the 1,184 existing housing units would be removed, about 85 would be used for visitor lodging, and 361 would be used by park partners, NPS staff, and Sixth Army personnel; Fort Scott would house up to 300 conference participants. The residential population under this alternative would be about 1,400 in 2010. Basic community services would be provided for the residents and employees. Most of these services would also be available to visitors and park neighbors. Community meeting spaces would be available to regional, national, and international organizations, as would museum, gallery, performance, and workshop spaces.

The Presidio would be staffed with full-time law enforcement, firefighting, and emergency medical personnel. To coordinate emergency services, a central communication center would be established. Mutual aid response agreements would be developed with municipal authorities for disaster preparedness activities and responses.

The Presidio would become a model of environmental protection and sustainable design. Public and private organizations would join with the Park Service in demonstrating technologies and practices that reduce environmental impacts or produce environmental benefits in energy conservation, solid waste management, transportation, water conservation and reclamation, and sewage treatment.

The Park Service would take a number of actions to repair and rehabilitate the Presidio's infrastructure. Because of the magnitude of the utility requirements, actions would have to be carried out over several years to keep disruption of services within manageable limits.

The Park Service would be responsible for overall management and oversight at the Presidio. Park partners would be selected to lease buildings and develop and operate programs at the site. A federally chartered institution would be created through congressional legislation to assist in managing park partners in assigned areas. The institution would be established under the Department of the Interior and would be granted authority to conduct leasing, retain revenues, and accept donations on behalf of the Park Service for Presidio improvements and operations.

Because of the costs involved in rehabilitating the Letterman Army Medical Center, this building is proposed for removal under alternative A. If a realistic proposal for the former hospital buildings was put forth that supported the overall program objectives for the complex, the building would be retained and rehabilitated by a park partner or partners. Legislation would be submitted to adjust the park boundary to include the 36-acre Public Health Service hospital site.

Impacts

Alternative A would have generally positive impacts on the regional economy and employment. In the year 2010, Presidio employment would be 5,480, payroll would be $127 million, state sales taxes would be $1.8 million, and city revenues would be $3.63 million. Alternative A would generate nearly $35 million in the year 2010 in visitor service and overnight lodging revenues.

Alternative A would increase housing demand and transportation volumes. By the year 2010, 738 housing units would be removed. In that year, the Presidio is expected to satisfy 35% of Presidio employee housing demand and to generate a regional demand for an additional 438 units. By 2010, automobile trips into and out of the Presidio are projected to increase by 24% over existing weekday conditions and 29% over existing weekend conditions; however, the percentage of trips made by private automobile would decrease due to transit improvements. Transit use would increase by 114% on weekdays and 212% on weekend days, and bicycle and pedestrian use would increase by 92%. The parking supply would be reduced by 40%, and parking management techniques used to lessen demand. Mobile-source air contaminant levels, except for carbon monoxide, would continue to be exceeded because of automobile traffic in the vicinity of the park.

Alternative A would have a beneficial effect on the national historic landmark district and its historic buildings and cultural landscape. Nearly 475 contributing buildings would be rehabilitated and preserved for new uses. Thirty-seven contributing historic buildings would be removed, which would have an adverse effect on the district. Total building square footage would be reduced by 2 million square feet to 4.3 million.

Alternative A would have a positive effect on the Presidio's natural setting by restoring 140 acres of native plant communities, creating 20 to 80 acres of wetlands at Crissy Field, establishing a 15-acre bird sanctuary, and increasing the total amount of open space by 205 acres. These changes would benefit migratory bird species and other wildlife.

Alternative A would provide significant additional visitor opportunities. Expanded interpretive and educational programming, cultural events and activities, and recreational facilities and settings would broaden visitor choices and open the park to a variety of new uses.

Alternative B (No Action/Minimum Requirements): Public Sector Enclave

Proposals

Under alternative B only those actions necessary to meet the legislative requirements to protect the Presidio's natural and cultural resources would be carried out. The National Park Service would be responsible for overall management and oversight, but the management of leases and uses of all buildings except the housing units would become the responsibility of the General Services Administration (GSA). Uses of the buildings would not have to relate to the park's purpose. The Sixth Army personnel remaining at the Presidio would continue to use several of the buildings at the main post for headquarters and administrative functions.

GSA would be responsible for ensuring that compliance activities related to section 106 of the National Historic Preservation Act were carried out for all buildings on the National Register of Historic Places and all features identified in the national historic landmark district nomination except historic housing. Likewise, GSA and park tenants would assume responsibility for stabilization, rehabilitation, and preservation of the buildings they managed and occupied. Limited cultural landscape restoration would be carried out. No buildings would be removed to enhance scenic and natural values or expand recreational opportunities, and no major projects would be undertaken to restore historic vistas. Natural resource management would be limited primarily to protection of native plant habitats and endangered species. No wetland or stream restoration projects would be implemented.

Few actions would be taken to expand visitor opportunities. Existing visitor facilities would continue to operate at the same level. New programs and services would generally be concentrated in open space areas. The former commissary at the main post would be used as a park visitor/interpretive center, and some visitor services would be provided there. The golf course, tennis courts, gyms, and other recreational facilities would be opened for public use and managed by concessioners. Annual recreation visits under this alternative would be expected to reach 4.5 million in the year 2000 and 6.9 million in 2010.

No major road system modifications would be implemented. Actions would be taken to correct safety hazards, and minor improvements would be made to support bicycle and pedestrian use. Parking would be available in currently designated areas. Parking would be reduced from 13,000 spaces to 11,335 spaces to meet anticipated demand. Neighbors would continue to have access to the site through existing entrances. Shuttle, trolley, and water taxi systems would not be provided.

Because GSA does not have the authority to lease housing, a property management firm would be selected to rent or lease the Presidio's available housing units for the Park Service. Housing would be used for public programs, such as a residential youth corps, and would also be available for rent by staff of tenant organizations.

Of the 1,173 available housing units, about 59 would be used as overnight lodging for visitors and about 75 residences for essential park staff such as law enforcement personnel. Beyond these needs, most housing (1,039 units) would be used by non-NPS employees, tenants, and Sixth Army personnel. No housing would be removed. The residential population under this alternative is projected to be about 3,600 in both 2000 and 2010. Support facilities would be operated at the main post by concessioners under GSA lease agreements. These facilities would be available to staff, tenants, and visitors. No concession services would be provided in other planning areas. Law enforcement, fire prevention and protection, and emergency services would be provided by the Park Service.

As in alternative A, the Park Service would promote environmental protection and sustainable design. The park's infrastructure would be improved, except at the Public Health Service hospital site, which would not be included in the park boundary.

Impacts

Alternative B would have positive effects on the regional economy and employment. In the year 2010, total Presidio employment would be 7,400, payroll would be $175 million, state sales taxes would be $2.2 million, and city revenues would be $5 million. Alternative B would generate nearly $28 million in 2010 in visitor service and overnight lodging revenues. No new regional housing demand would be created, because Presidio housing would satisfy 74% of Presidio employee housing demand.

If a new health care institution used the Letterman Army Medical Center as a hospital, alternative B could have an adverse effect on acute care hospitals in the Bay Area by adding to the regional oversupply of hospital beds.

Alternative B would increase traffic. In the year 2010, automobile trips into and out of the Presidio are projected to increase by 25% over existing weekday and weekend conditions. Transit use would increase by 43% on weekdays and 34% on weekend days, and bicycle and pedestrian use would increase by 55%. With only limited transit improvements, the percentage of trips made by private automobile would be higher than under alternative A. The parking supply would be reduced by 13%. Mobile-source air contaminant levels, except for carbon monoxide, would continue to be exceeded.

Because alternative B would involve little change, it would have only minor impacts on cultural and natural resources. The Public Health Service hospital would not be included in Golden Gate National Recreation Area; therefore, the total number of historic buildings would be reduced by 16. Of the remaining 494 historic buildings, 376 would be rehabilitated to provide for new uses. Restoration of the cultural landscape would be limited. Existing native plant communities and threatened and endangered species would continue to be protected. No additional actions would be taken that would have a positive effect on wetlands, stream drainages, native vegetation, or wildlife.

Visitors would benefit from limited expansion of recreational and educational opportunities, especially in open space areas. Most recreational facilities would be opened for public use. Large areas of the park would be reserved for tenant activities.

Alternative C: Expanded Open Space/ Restoration/Interpretation — Traditional NPS Management

Proposals

Under alternative C the focus would be on increasing open space, restoring historic buildings, the cultural landscape, and native plant habitat, and interpreting the Presidio and its resources. A total of 356 historic and nonhistoric buildings with approximately 1.8 million square feet of space would be removed, and the total building square footage would be reduced to about 3.3 million square feet. Most of the reduction would result from the Letterman and Public Health Service hospital buildings being excluded from the boundary. Some historic buildings, settings, and building interiors would be restored, but most buildings would be adapted for other park uses.

Native plant and habitat restoration would be a major focus of natural resource management. Restoration projects would be carried out along stream corridors, along the Crissy Field shoreline, in areas where buildings were removed, and in other parts of the park where remnant native plant communities survive. Approximately 155 acres of native habitat would be restored, bringing the total to about 300 acres. The historic forest would be replanted and revitalized. Areas outside of the originally designed forest boundary would be part of the native habitat restoration program. The total open space within the park would increase by 230 acres to about 1,010 acres.

Under this alternative visitor experiences would be more like those in a traditional national park. The Park Service would establish many interpretive and educational programs focused on the Presidio's significant resources. Orientation would be provided at a central visitor/interpretive center at the main post, and visitor contact stations would be established throughout the site. An environmental center would be established at the cavalry stables. Other buildings would be used for interpretive purposes and for concessions such as food service, a park store, and recreation equipment rental. In general, recreational resources would be maintained and opened for public use. Annual recreation visits under this alternative are projected to reach 5.2 million in 2000 and 7.3 million in 2010.

Park partners, operating under historic leases, cooperative agreements, and special use permits, would establish a wide range of programming. They would use renovated historic structures to provide educational programs on the Presidio's history and resources and on environmental issues. Visitors would participate in programming through seminars, lectures, and hands-on experiences. The Sixth Army personnel remaining at the Presidio would continue to use several of the main post buildings for headquarters and administrative functions.

Actions to improve the Presidio road system would be similar to those under alternative A except that more secondary roads would be removed. A total of 9.5 miles of new trails and 11 miles of bicycle routes would be developed. Existing parking areas would be reduced in size and number (from 13,000 to 7,820 spaces), and large paved areas would be removed. The remaining parking would be clustered around the main activity areas. Proposals for alternative modes of access and circulation would include the establishment of an alternative-fuel shuttle system, extension of city transit service, and development of a water taxi docking site. A transportation hub would be established at the main post.

With the removal of nonhistoric buildings, the number of housing units would be reduced by more than half. Of the 1,173 existing housing units, 868 units (204 buildings) would be removed by the year 2010. Most remaining housing would be used by Sixth Army personnel and park and tenant staff who support park programs and services. Some overnight lodging would be provided for visitors. About 85 housing units would be converted as visitor accommodations, and Fort Scott would house up to 300 conference participants. The removal of most housing would result in a smaller Presidio community. The residential population is expected to be 1,000 in 2010. Thus, there will be a reduced need for support services. These services would be provided at the main post. Structures that currently support the Presidio community would be retained. Law enforcement, fire prevention and protection, and emergency services would also be provided by the Park Service at the main post.

The Park Service would have sole responsibility for administration, resource management, interpretation, maintenance, and public safety at the Presidio under this alternative. Buildings would be leased for park-related uses through existing authorities, including historic leasing, special use permits, and concession contracts and permits. The nonhistoric Letterman Army Medical Center and Letterman Army Institute of Research buildings would be deauthorized. The historic Letterman Hospital buildings would remain in the boundary. The Public Health Service hospital site would not be included within the park boundary.

Impacts

Alternative C would have generally positive effects on the regional economy and employment. In the year 2010, total Presidio employment would be 4,100, payroll would be $82 million, state sales taxes would be $1.85 million, and city revenues would be $3 million. Alternative C would generate more than $28 million in 2010 in service and overnight lodging revenues.

Alternative C would increase housing demand and transportation volumes. By the year 2010, 776 housing units would be removed. In that year, the Presidio is expected to satisfy 33% of Presidio housing demand and to generate a regional demand of 359 units. By 2010, automobile trips into and out of the Presidio are projected to increase by 23%-25% as a result of Presidio land use changes; however, the percentage of trips made by private automobiles would decrease due to transit improvements. Transit use would increase by 106% on weekdays and 208% on weekend days, and bicycle and pedestrian use would increase by 68% on weekdays and 90% on weekend days. The parking supply would be reduced by 40%, and parking management techniques used to reduce demand. Mobile-source air contaminant levels, except for carbon monoxide, would continue to be exceeded because of automobile traffic near the park.

Alternative C would have a beneficial effect on the national historic landmark district. More than 455 contributing buildings would be rehabilitated and preserved for new uses. Thirty-seven contributing historic buildings would be removed, which would have an adverse effect on the district. Total building square footage would be reduced by 3 million square feet to 3.3 million.

Effects on the Presidio's natural setting would be positive. About 155 acres of native plant communities would be restored. Some 20-80 acres of wetlands would be reestablished at Crissy Field, and a 15-acre bird sanctuary would be designated along the shoreline. The total amount of open space would increase by 230 acres. These changes would benefit migratory bird species and other wildlife.

Alternative C would provide significant additional visitor opportunities. Expanded interpretive and educational programming, cultural events and activities, and recreational facilities and setting would broaden visitor choices and open the park to a variety of new uses.

Alternative D: Partial Military Reuse — Public/Private Partnerships

Proposals

Under this alternative most of the Presidio would remain under National Park Service management, but the Department of Defense would reuse the Letterman complex (about 50 buildings; 1.3 million square feet), administrative space and the child care center at the main post, and about 800 housing units in the Wherry and Washington Boulevard housing areas and other areas of the park. Cultural and natural resource preservation actions would be undertaken, and a variety of visitor programs and activities would be established in areas not occupied by the military. As in alternative A, park partners would be selected to develop and operate many of these programs.

Cultural resource management actions would be similar to those of alternative A. Actions proposed in areas occupied by the military would be coordinated by the Park Service and the Department of Defense. The military would occupy and be responsible for maintaining a total of 275 buildings at the Letterman complex, the main post, and the Wherry and Washington Boulevard and other housing areas. About 150 buildings (0.7 million square feet) would be removed, primarily at Crissy Field and in the east housing area, to increase open space and enhance natural, cultural, and recreational values. Other buildings would be rehabilitated and adaptively used by the Park Service and park partners.

Natural resource improvements would also be similar to those of alternative A. The historic forest would be revitalized, native habitat restoration projects would be undertaken, and open space and scenic vistas would be enhanced. The forest would be expanded by 4 acres, the acreage of native habitat would nearly double to 270 acres, and total open space would increase from 780 to 910 acres.

Programs and activities would be developed by the Park Service and park partners. In most of the planning areas, actions would be similar to those of alternative A. Although there would be less space dedicated to visitor use because of military occupancy, most of the main activity areas would remain available for visitor programs and activities. The Park Service and park partners would occupy most buildings not used by the military. Public access to reserved military areas would be restricted.

Outdoor recreational resources would be enhanced and opened for public use as described in alternative A. Indoor recreational facilities would be shared by the Park Service, park partners, visitors, and military residents. A limited number of facilities would only be available for use by the military. Annual recreation visits under this alternative would be expected to reach 6.1 million in 2000 and 8.0 million in 2010.

Access and circulation improvements would be similar to those of alternative A. In areas occupied by the military, the Department of Defense would be required to make those improvements. Actions would include roadway upgrading and some roadway closures, an expanded road and trail network for pedestrians and bicyclists, transit improvements, and parking reduction and management. The total number of parking spaces would be reduced from 13,000 to about 8,710 spaces. Alternative modes of travel would also be encouraged by establishing a shuttle system, extending city transit service, and developing of a water taxi docking site. A transportation hub would be established at the main post as described in alternative A.

The Presidio community would include park and park partner staff, visiting program participants, and military residents. In the year 2010, 215 of the 1,184 housing units would be used for staff and park partner housing, 85 units would provide for overnight visitor accommodations, 792 would be occupied by the military, and 92 units would be removed to provide open space and resource enhancement. More than half of the housing units would be used by military personnel working outside the Presidio. The residential population under this alternative is projected to be about 2,800 in 2010. The levels and types of community services would be similar to those of alternative A, as would law enforcement, fire prevention and protection, and emergency services. Emergency

medical service for visitors and the entire Presidio community would be a required provision of hospital reuse by the Department of Defense.

The Park Service would have primary responsibility for management of the Presidio, but it would be assisted by a federally chartered institution in managing park partners in assigned areas. Legislation would be enacted to allow general leasing, revenue retention, and continued military activity within the Presidio and to include the Public Health Service hospital within the park.

Impacts

Alternative D would have generally positive impacts on the regional economy and employment. In the year 2010, Presidio employment would be about 7,000, payroll would be $100 million, state sales taxes would be $2.4 million, and city revenues would be $4 million. Alternative D would generate more than $40 million in the year 2010 in visitor service and overnight lodging revenues.

Alternative D would increase housing demand. Although only 92 housing units would be removed by 2010, military use of the remaining units would reduce the housing supply available to park and park partner employees. In 2010 the Presidio is expected to satisfy 29% of Presidio employee housing demand and to generate a regional demand for an additional 728 units.

Alternative D would generate the most automobile traffic of all the alternatives. By 2010, trips into and out of the Presidio are projected to increase by 32%-35% over existing conditions; however, the percentage of trips made by private automobile would decrease due to transit improvements. Transit use would increase by 148% on weekdays and 231% on weekend days, and bicycle and pedestrian use would increase by 93% on weekdays and 92% on weekend days. The parking supply would be reduced by 30%, and parking management techniques used to lessen demand. Mobile-source air contaminant levels, except for carbon monoxide, would continue to be exceeded.

Alternative D would have a beneficial effect on the national historic landmark district and its historic buildings and cultural landscape. Thirty-seven contributing historic buildings would be removed, which would have an adverse effect on the district. Nearly 475 contributing buildings would be rehabilitated and preserved for new uses. Total building square footage would be reduced by 0.7 million square feet to 5.6 million.

Alternative D would have a positive effect on the Presidio's natural setting by restoring 125 acres of native plant communities, creating 20 to 80 acres of wetlands at Crissy Field, establishing a 15-acre bird sanctuary, and increasing the total amount of open space by 110 acres. These changes would benefit migratory bird species and other wildlife.

Alternative D would provide significant additional interpretive and educational opportunities, but would involve fewer scenic viewing improvements than alternative A.

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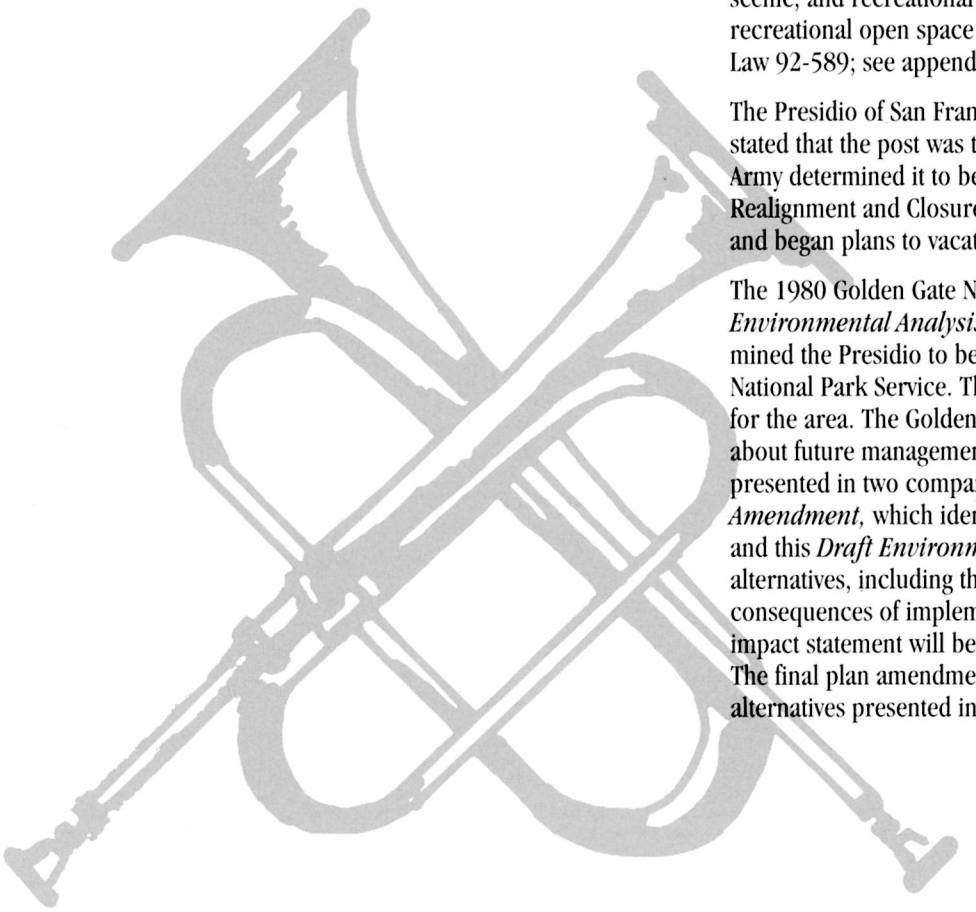
Introduction

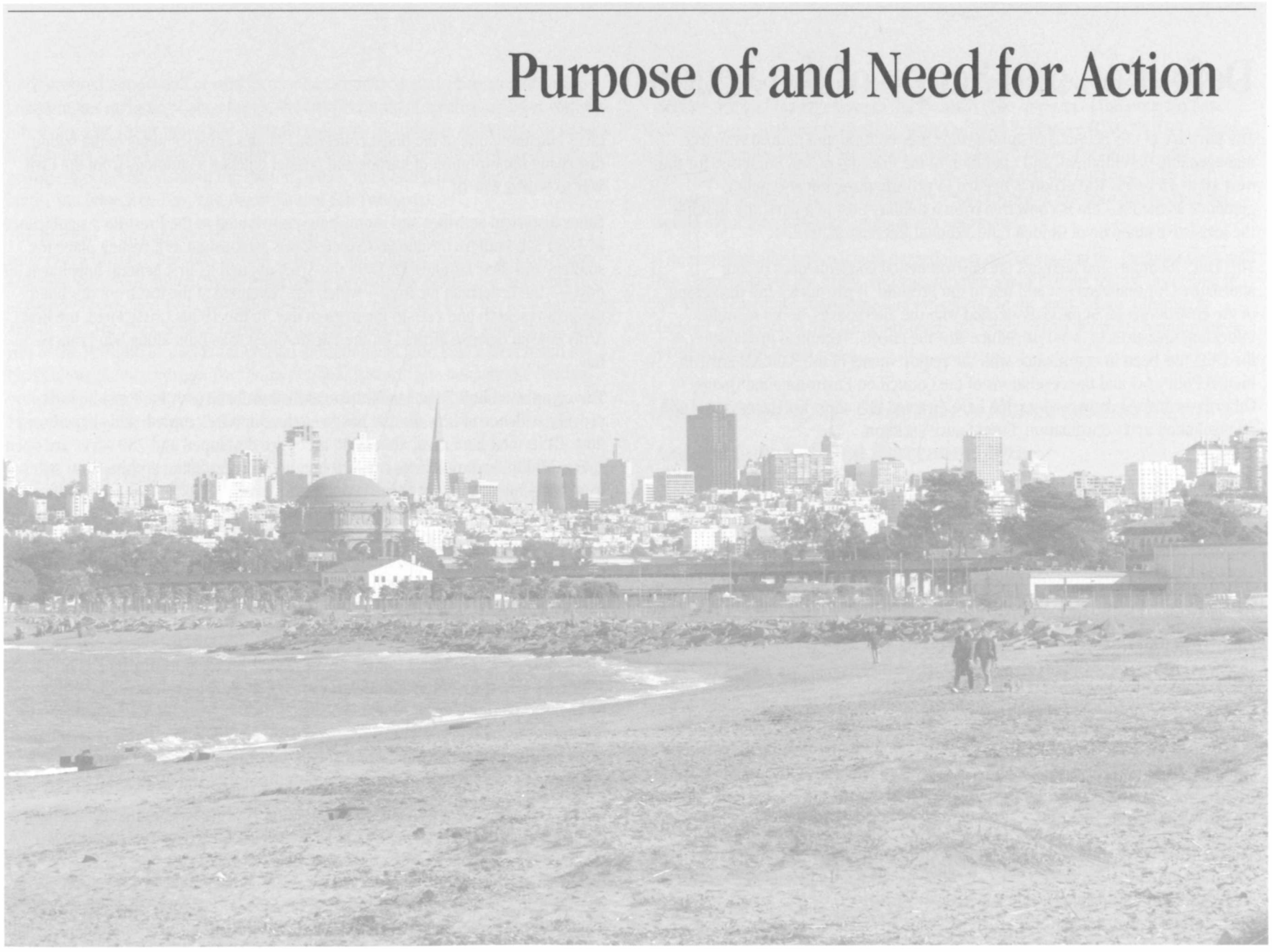


In 1972 Congress authorized the establishment of Golden Gate National Recreation Area, a collection of parklands and historic sites surrounding San Francisco's Golden Gate. The national recreation area was to "preserve for public use and enjoyment certain areas . . . possessing outstanding natural, historic, scenic, and recreational values, and . . . to provide for the maintenance of needed recreational open space necessary to urban environment and planning" (Public Law 92-589; see appendix A).

The Presidio of San Francisco was included in the 1972 authorization. The law stated that the post was to be transferred to the national recreation area when the Army determined it to be excess to its needs. In 1989, as a result of the Base Realignment and Closure Act, the Army announced that the post would be closed and began plans to vacate by 1995.

The 1980 Golden Gate National Recreation Area *General Management Plan/ Environmental Analysis* (NPS 1980) was completed before the Army determined the Presidio to be excess to its needs and began steps to transfer it to the National Park Service. Therefore, the plan did not identify management actions for the area. The Golden Gate plan is now being amended to include decisions about future management and use of the Presidio. The amendment is being presented in two companion documents — the *Draft General Management Plan Amendment,* which identifies the Park Service's proposed action for the Presidio; and this *Draft Environmental Impact Statement* (DEIS), which describes four alternatives, including the NPS proposed action, and analyzes the environmental consequences of implementing them. A final plan amendment and environmental impact statement will be prepared following public review of the draft documents. The final plan amendment may combine elements from one or more of the alternatives presented in this DEIS.

Purpose of and Need for Action



Definition and Scope of the Action

The purpose of this action is to guide visitor use, cultural and natural resource management, development, and operation of the Presidio of San Francisco for the next 10 to 15 years. The action is needed to provide direction and policy guidance as the Presidio is converted from a military post to a park and to fulfill the legislative mandate of Golden Gate National Recreation Area.

This DEIS identifies and analyzes the environmental consequences of four alternatives for management and use of the Presidio. It provides a full discussion of the environmental impacts associated with the alternatives, and it identifies mitigating measures to avoid or reduce adverse effects. Technical preparation of the DEIS has been in compliance with the requirements of the National Environmental Policy Act and the regulations of the Council on Environmental Quality. Other laws and executive orders that have directed this effort are described in the "Consultation and Coordination, Compliance" section.

Site Significance

With 1,480 acres of parklands, distinctive historic features, unique ecological characteristics, and spectacular vistas, the Presidio of San Francisco is a valuable addition to Golden Gate National Recreation Area. Bordered by the Pacific Ocean on the west, the city of San Francisco on the south and east, and San Francisco Bay and the Golden Gate on the north, the site provides an unparalleled setting for future park use.

Within the Presidio boundary are significant historic resources representing more than 200 years of military history. The site has been a national historic landmark district since 1962, recognized as a Spanish colonial military settlement founded in 1776 and as a U.S. Army post from 1846 to the present. Buildings, sites, structures, and objects related to Spanish, Mexican, and American military history have been identified as contributing to its landmark status, including Fort Point, a national historic site.

During its 200-year history the Presidio has protected commerce, trade, and migration into the area and has been an influence on the settlement and growth of the West. It has played a logistical role in every major U.S. military engagement since the Mexican-American War. The Presidio's coastal/harbor defense structures constitute one of the finest collections of gun emplacements in the nation, displaying the evolution of harbor and coastal defense technology from the Civil War to World War II.

Other historical activities and events have contributed to the Presidio's significance. In 1884 San Francisco National Cemetery was established as a resting place for soldiers and their families. In 1898 the Army opened its first general hospital at the post — the Letterman facility — which has remained at the forefront of military medical research and care to the present day. In the 1920s Crissy Field, the first Army coastal defense airfield on the Pacific Coast, was built along San Francisco Bay.

The complex of buildings, landscapes, and other features at the Presidio today provide evidence of how the site has been developed, occupied, and shaped over time. Of its total land area, about 700 acres are developed and 780 acres are open space. Within the boundaries are 870 buildings representing architectural styles from every major military construction period since 1848. In addition to office space, warehouses, and other facilities related to the post's military mission, there are residential areas, community facilities, retail stores, and a wide range of recreation facilities, including tennis courts, gymnasiums, a bowling center, a theater, a swimming pool, a golf course, and a number of small playgrounds and athletic fields. These facilities support an active community of military personnel and their dependents, retirees, and civilian staff.

The historic Presidio forest is a dominant feature on the post. Designed and planted 100 years ago, it covers about 300 acres of the post, primarily on ridges, along boundaries, and at entrances. This majestic forest, composed of eucalyptus, Monterey pine and cypress, and acacia, is even-aged in many areas, permitting views between the tree trunks and through the canopy above; in other areas it is multilayered and provides habitat for a variety of birds and other wildlife.

Geological formations, favorable climate, water resources, and open space have contributed to the biological diversity of the site. Ten rare plant communities survive within the Presidio that have disappeared in the rest of San Francisco. These remnant native communities preserve rare and endangered plant species and provide valuable wildlife habitat. They include the serpentine grasslands, where wildflower and grass species flourish; the last remnants of dune communities that

once covered almost half of what is now San Francisco; and riparian and wetland communities including Lobos Creek, the best example of a native riparian community in the city. Other important natural resources include the still visible drainages at Mountain Lake, Tennessee Hollow, and Crissy Field. Sites throughout the Presidio provide spectacular vistas of the Pacific Ocean, the Golden Gate, the Marin headlands, San Francisco Bay, and the skyline of San Francisco.

The Presidio is an exceptional recreational resource. It offers opportunities for a wide range of active pursuits as well as places for solitude, retreat, and discovery. Although the site is not currently managed to provide for public use, it is operated as an open base, and neighbors and visitors hike, bike, and tour the its scenic trails and drives. The Park Service currently manages about 150 acres along the coastal rim of the Presidio as parkland. Coastal attractions include Baker Beach and the bluffs along the oceanfront, Fort Point National Historic Site beneath the Golden Gate Bridge, and the Crissy Field shoreline and Golden Gate promenade on San Francisco Bay. More than 2 million people a year visit these areas.

Scope of the Action and the DEIS

All of the alternatives in this DEIS reflect the mission of the National Park Service to conserve park resources and provide for their enjoyment by present and future generations. The alternatives also reflect the purposes for Golden Gate National Recreation Area that were established by Congress and the goals for the Presidio that were identified through the extensive public involvement process. The Presidio goals include creating a park setting where the historic buildings and open spaces are preserved and used to encourage stewardship and cultural awareness; promoting international exchange; seeking solutions to critical environmental and social problems; developing models of sustainable design; and providing opportunities for recreational renewal. Each of the alternatives would fulfill these goals for the Presidio to a greater or lesser extent.

This DEIS is defined as a program document dealing with a number of interrelated actions in a large geographic area. The document analyzes alternative concepts for the future of the Presidio, but it does not include detailed plans and designs for the site or its component planning areas. After the DEIS is reviewed and a final plan, final environmental impact statement (FEIS), and record of decision are completed, additional plans and designs will be prepared, and site-specific environmental analyses will be conducted as required. The site analyses will be tiered on the Presidiowide FEIS.

This DEIS is intended to analyze a range of reasonable alternatives related to Park Service use and management of the Presidio. The impacts of the Presidio base closure were analyzed in the U.S. Army Corps of Engineers (USACE) 1991 *Final Environmental Impact Statement: Base Closure of the Presidio of San Francisco*. Although the Park Service has considered the data and analyses presented by the Army, issues related to the closure of the base are beyond the scope of the Presidio DEIS and are not addressed.

The responsibility for toxic and hazardous waste cleanup at the Presidio rests with the Department of the Army, and cleanup plans and actions will be described in an Army remedial action plan, due for release in the near future. Cleanup is beyond the scope of this DEIS; however, the goals and process for monitoring the project are discussed.

Relationship to Other NPS Plans and Projects

Golden Gate National Recreation Area General Management Plan

The 1980 Golden Gate National Recreation Area *General Management Plan/ Environmental Analysis* (NPS 1980) is the guiding plan for the national recreation area. It sets forth the basic management philosophy and identifies strategies for addressing issues and achieving management objectives. Planning for the national recreation area involved extensive discussions with public agencies and conservation organizations and more than 100 workshops in the Bay Area.

Crissy Field Plan

The 1988 *Crissy Field Site Improvements, Environmental Assessment* (NPS 1988b) evolved from concepts presented in the 1980 General Management Plan. The Crissy Field plan recommends native plantings, preservation and enhancement of the site's natural qualities, and preservation of views of the bay while recognizing the needs of existing and future visitors.

Raven's Manzanita Plan

The U.S. Fish and Wildlife Service *Raven's Manzanita Recovery Plan* (USFWS 1984) provides basic criteria for future manzanita recovery plans. Such a plan is needed for the Presidio because the last known plant within its natural setting is

on the site. The species is listed as endangered by the federal government (44 *Federal Register* 61909, 26 October 1979) and by the state of California (California Fish and Game Commission, 6 October 1979).

1975 Memorandum of Understanding

This memorandum identifies certain lands owned by the city within the boundary of the national recreation area that might be transferred at a future time: Fort Funston, Ocean Beach, Seal Rocks, Sutro Heights, Land's End, Phelan Beach, Baker Beach access, Yacht Harbor, Marina Green, Municipal Pier, and Aquatic Park. (Some of these properties have already been transferred to the national recreation area.) The document provides that the national recreation area will formally notify and consult with the city on all planning matters relating to these parcels, future transit system proposals, and planned construction on national recreation area lands within the boundaries of the city.

1990 Memorandum of Understanding

This memorandum stipulates that the national recreation area is to regularly advise and seek comments from the city planning department on all planning matters relating to future use of the Presidio that could result in significant impacts on the physical, social, and economic environment of the city. Similarly, the city is to advise and seek comments from the national recreation area on all matters coming before it that could have significant effects on planning for future use of the Presidio. Each party is to give good faith consideration to the comments and recommendations of the other.

Relationship to Plans, Projects, and Activities of Other Agencies

Master Plan of the City and County of San Francisco

The *Master Plan of the City and County of San Francisco* (n.d.) contains general land use policies and objectives for San Francisco. It includes housing, transportation, and commercial policies and a recreation and open space element that specifically mentions the Presidio. Generally, the master plan supports the preservation of San Francisco's relatively dense mixed-use neighborhoods. There is an emphasis on public transit and pedestrian use rather than on automobile use.

Short-Range Transit Plan and Capital Improvement Program, 1990–1999

The San Francisco Municipal Railway (MUNI) has produced a *Short-Range Transit Plan and Capital Improvement Program, 1990–1999* that outlines the agency's goals, which are to provide efficient, convenient, and cost-effective service to meet transit demand; to increase transit patronage and discourage automobile use; and to facilitate regional travel for passengers transferring between transit carriers.

Regional Transportation Plan for the San Francisco Bay Area

In the 1991 *Regional Transportation Plan for the San Francisco Bay Area* the Metropolitan Transportation Commission describes major goals, including improving carrying capacity and system convenience, efficiency, and safety; promoting equitable access for all people; enhancing sensitivity to the environment; and supporting the local and regional economy.

San Francisco Bay Plan

The *San Francisco Bay Plan*, adopted in 1968 by the San Francisco Bay Conservation and Development Commission, calls for the shoreline and undeveloped areas of the Presidio to be retained for park uses and suggests the development of a scenic transit route from the Golden Gate Bridge to downtown San Francisco. The bay plan policies identify appropriate uses of the bay and shoreline.

Doyle Drive Reconstruction

Doyle Drive passes through the Presidio at grade and on elevated viaducts. The elevated sections need to be replaced to correct corrosion problems and allow safety improvements to be made from the Golden Gate Bridge to Lombard Street and Marina Boulevard. Because Doyle Drive is a state highway, its design and reconstruction are the responsibility of Caltrans, the state transportation department, and are beyond the scope of this DEIS. However, because highway improvements would directly affect the Presidio, the document includes a preliminary analysis of the effects of such improvements on the park.

Retention of Military Functions at the Presidio of San Francisco

Public Law Number 101-510, adopted in 1990, required the secretary of defense and the Base Closure and Realignment Commission to prepare recommendations

for closing or realigning military installations in the United States. As a part of this process, the Base Closure and Realignment Commission submitted a report to the president of the United States on July 1, 1993, recommending that the Sixth U.S. Army headquarters remain at the Presidio and that the Presidio contingent become a tenant of the Park Service. This recommendation constituted a change to the Base Closure and Realignment Act of 1988, which required that all military functions be terminated at the Presidio. The president subsequently approved the commission's recommendation, and final approval by Congress is pending. If the commission's findings are approved by Congress, approximately 500 military and civilian personnel associated with the Sixth Army headquarters will remain at the Presidio. It is likely that their administrative offices will be in the main post area and that military personnel will occupy about 150 units of housing on the post.

Consistency with the City and County of San Francisco Master Plan

In general, policies and objectives for proposed uses at the Presidio are consistent with the policies in the *Master Plan of the City and County of San Francisco*, including the recreation and open space, transportation, urban design, community facilities, and community safety elements. Certain elements of the alternatives differ from some of the city policies regarding the management of private development activities within the city's boundaries. In particular, there are conflicts in Presidio alternatives A, C and D with the residence element policy against demolition of the existing housing and conflicts in alternative B with the commerce and industry element policy to promote location of governmental functions within the downtown near the civic center. No site specific plans have been developed by the city for Presidio property. The Presidio is under exclusive federal jurisdiction and therefore is not subject to state and local land use plans and policies. The Park Service has sought to reduce possible conflicts between NPS mandates and city policies and will continue to consult with the city to achieve consistency wherever possible.

Issues and Concerns

The concerns identified in this section are based on comments gathered in public meetings, workshops, and scoping sessions about the Presidio and on extensive resource analysis. These concerns, together with the park's purpose and vision, provided the basis for decisions about possible future uses of the site and for the selection of impact topics for environmental analysis.

Regional Economy and Employment, City Services, Housing, Health Care, Traffic and Transportation

Concerns were expressed by city agencies, private organizations, and Bay Area residents about the potential effects of actions taken at the Presidio on the surrounding community and region. The following specific concerns were mentioned.

The Presidio has a large amount of building space that is potentially usable for a variety of purposes. As the post is converted into a public park, uses selected for those buildings, as well as major increases in the numbers of visitors to the site, could have effects on the city and region. Future construction/rehabilitation activities at the Presidio would contribute to the local and regional economy, as would any sales and use taxes and expenditures by Presidio visitors, employees, residents, and tenants. The new park population would place additional requirements on city services, including public safety services, transportation systems, utility systems, and the public school system. Use of the extensive housing stock at the Presidio could have an impact on Bay Area housing needs and demands, and decisions about future use of hospital and research facilities at the Letterman complex and the Public Health Service hospital could affect the provision of health care in the region.

Two regional highways pass through the Presidio — Highway 101 (Doyle Drive) and Highway 1 (Park Presidio Boulevard). The Golden Gate Bridge carries about 120,000 commuter vehicles per day to and from these highways and is also one of the major tourist attractions in San Francisco. Because of this, traffic congestion is a serious problem in the vicinity. Increased traffic to, from, and within the

Presidio would contribute to this congestion and to related noise and air quality problems. Park traffic could also have an impact on travel on nearby city streets and on parking in adjacent neighborhoods.

Doyle Drive passes through the Presidio at grade and on elevated viaducts, and some sections require reconstruction to address safety concerns. Caltrans is responsible for the design and reconstruction of Doyle Drive. Although this DEIS covers a preliminary analysis of impacts of reconstruction on the Presidio, the design and construction are beyond the scope of this DEIS.

Land Use, the Presidio Community, and Surrounding Neighborhoods

The Presidio today has well-established land uses related to its military role. In addition to administrative and operational support, there is a substantial amount of residential use. An estimated 4,700 people live and work at the Presidio, and residents and staff enjoy the benefits of good housing, community services, and a variety of recreational and commercial facilities (U.S. Department of Commerce 1991). Under the NPS action, land use patterns would change, and the existing community would be replaced by a new community of residents, tenants, employees, and visitors. The nature of those changes and the effects on the community and surrounding neighborhoods were concerns expressed by local agencies and the general public.

National Historic Landmark District

Historic Buildings

The Park Service has a primary responsibility to preserve and maintain historic buildings under its administration. Most of the Presidio's historic buildings are in good to fair condition, although building code deficiencies such as inadequate fire exits and the lack of handicap access are evident. Many of these buildings have been altered to provide for new uses over time. As a result, the condition of the historic materials and finishes varies from building to building. Some interiors have been completely gutted, while others — particularly in historic housing — have had few alterations.

The conversion of the Presidio from military post to park would require historic building rehabilitation to accommodate new uses and to bring the buildings up to code. To preserve the integrity of those resources, uses would need to be selected that would minimize impacts on the buildings' character-defining features and original fabric and setting. In addition, methods would need to be identified to eliminate hazardous materials, secure and protect vacant buildings, provide for fire detection and suppression, and accommodate disabled visitors with minimal impact on the buildings. Decisions about the preservation and use of the Presidio's historic buildings are major concerns of this document.

Cultural Landscape

The Presidio's cultural landscape includes not just the buildings and vegetation, but the land use patterns, the clusters of buildings, the circulation networks, the open spaces and vistas, the small-scale distinguishing features, and the way cultural values have been reflected through development over time. The majority of this landscape retains a great deal of historical integrity, but there are areas that have been diminished. For example, many locations that historically provided views of natural, cultural, and scenic features have been obscured by forest growth and recent construction. Decisions about the cultural landscape, including the many historical vistas and viewpoints and the forested areas, are also major concerns.

Archeology

The potential for discovering archeological resources at the Presidio is high. Some prehistoric remains have been documented, and seasonally or permanently occupied prehistoric sites are likely because of the extensive freshwater resources and the large estuarine lagoons and sloughs that once extended along the waterfront areas from Fort Mason to Fort Point. Historic archeological resources are known to exist and are concentrated at sites throughout the post. The remains of numerous ships known to have wrecked along the Presidio coast might still exist offshore. All significant archeological resources need to be identified and evaluated, and methods determined for their preservation and interpretation. In addition, any future rehabilitation and construction activities, such as upgrading or replacing infrastructure or eliminating toxic waste, need to consider potential impacts on these resources.

Wetlands and Stream Drainages, Native Plant Communities, Wildlife, Threatened and Endangered Species, Soils

The 780 acres of open space within the Presidio include the stream drainages along Lobos Creek and Tennessee Hollow, 145 acres of native plant communities, a number of rare and endangered plant species, and the Presidio forest; all of these natural areas provide important wildlife habitat. Nonnative plant species, feral animals, water diversion projects, maintenance and construction, and recreational use all have the potential to damage or further reduce the size of native plant communities and to decrease species diversity. Stream drainages and soils, which have been substantially modified by water diversion, landfilling, and construction, could also be further disturbed by future activities. These and related resource management concerns (water quality, fire management, air quality, and noise) were identified during scoping and are major considerations in this document.

Interpretation and Education, Recreation, Scenic Viewing

Although the Presidio is currently managed as an open base, the majority of its historic structures, facilities, and grounds are not known or available to the public. Virtually no information is provided about public attractions, and visitors are often unsure about where they can go and where use is restricted. Interpretive tours and programs have increased in recent years — through Army, Park Service, and private efforts — but they are not yet widely known or attended. Fort Point and the Golden Gate remain the focus of interpretation. Most of the built recreational facilities on the site are maintained for use by military residents. Roads, trails, and paths are available for scenic driving, walking, jogging, and bicycling, but are not widely used by the visiting public. The effects of opening the Presidio for public use and providing new interpretive and recreational opportunities are considered in this document.

Human Health, Safety, and the Environment

A number of hazardous substances, pollutants, and contaminants have been identified in both the soils and groundwater at the Presidio. The responsibility for cleanup of these substances rests with the Army, which is in the process of finalizing a federal facility site remediation agreement (FFSRA) with the California Environmental Protection Agency (Cal EPA). The FFSRA process, which is described in the environmental remediation portion of the "Affected Environment" section, will require the Army to establish cleanup requirements and timetables. This DEIS does not address the specifics of the Army's environmental remediation process. It does, however, identify substances currently known to be present at the Presidio and their effects on human health, safety, and the environment.

Energy Consumption

The Presidio's 870 buildings, with more than 6 million square feet of interior space, are major energy consumers. Reduction in energy use and implementation of conservation measures were concerns expressed by many agencies and the public. In compliance with the National Environmental Policy Act, the DEIS discusses the general energy requirements of the proposed action and alternatives.

Park Management and Operations

Extensive site development would be required to make the Presidio usable by the public. This would include building rehabilitation and removal, site restoration and landscaping, and modifications to access and circulation systems to improve safety and accessibility. Utility systems would also have to be upgraded. Based on recent evaluations, most of the Presidio's utility systems are beyond their useful life and in need of repair. Both public and private monies would be needed to complete site development and infrastructure upgrades. The cost of these activities and how funds would be provided are major concerns.

At present, law enforcement is provided by the Presidio military police. Park rangers and U.S. Park Police patrol areas of Baker Beach, Fort Point, and Crissy Field. The Presidio has its own fire department, which provides firefighting, fire

prevention, and rescue services to the post, as well as emergency medical treatment and transportation. When the Presidio is incorporated into Golden Gate National Recreation Area, law enforcement, emergency medical services, fire protection, and other public safety services would become the responsibility of the Park Service. Adequate staffing and funding for each of these functions as well as other day-to-day operations and maintenance are important concerns.

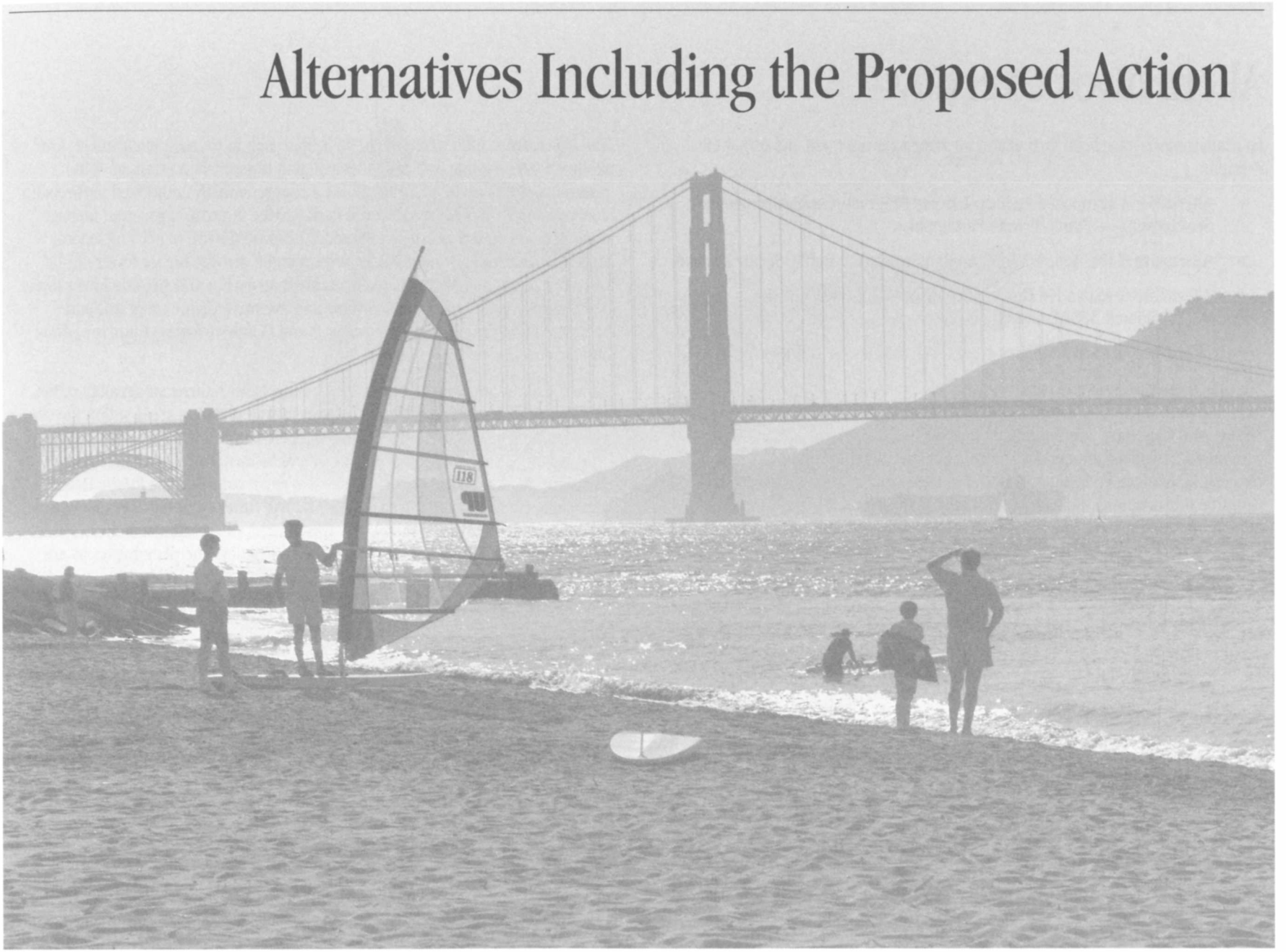
Selection of Impact Topics

The following impact topics were selected as a result of an analysis of significant resources and the potential for beneficial or adverse effects on them. Selection was also based on the above concerns expressed during scoping and public involvement activities and on statutory, regulatory, and NPS policy requirements.

- Regional Economy and Employment
- City Services
- Housing
- Health Care and Medical Research
- Medical Aid Incidents
- Traffic and Transportation Systems
- Land Use, the Presidio Community, and Surrounding Neighborhoods
- National Historic Landmark District
- Archeology
- Wetlands and Stream Drainages
- Native Plant Communities
- Wildlife
- Threatened, Endangered, Rare, and Sensitive Species
- Topography and Soils
- Air Quality
- Noise
- Interpretation and Education
- Recreation
- Scenic Viewing
- Human Health, Safety and the Environment
- Energy Consumption
- NPS Management and Operations

A more detailed description of the impact topics is presented at the beginning of the "Environmental Consequences" section.

Alternatives Including the Proposed Action



Alternatives Overview

Four alternatives have been formulated for future management and use of the Presidio:

- Alternative A (Proposed Action): Diverse Programming/Environmental Stewardship — Public/Private Partnerships
- Alternative B (No Action/Minimum Requirements): Public Sector Enclave
- Alternative C: Expanded Open Space/Restoration/Interpretation — Traditional NPS Management
- Alternative D: Partial Military Reuse — Public/Private Partnerships

The alternatives present a reasonable array of management options, and they all fulfill the park purpose and address the management concerns identified in the "Issues and Concerns" section related to increased visitor use and a new park community (required city services, access and circulation problems, traffic congestion, inadequate facilities), resource management (cultural and natural resource preservation), management of the extensive building inventory, park operations, and financial and legislative requirements.

The alternatives differ primarily in their approach to overall management, level of resource preservation and enhancement, and diversity and extent of visitor programs. Alternatives A and D call for a congressionally authorized partnership institution to work with the National Park Service in providing overall management at the Presidio; alternatives B and C propose the use of existing federal authorities for management. Alternatives A and C provide higher levels of resource protection and enhancement; alternatives B and D provide lower levels. Alternatives A and C offer more diverse and extensive visitor programs and recreational opportunities; alternatives B and D involve fewer visitor programs and opportunities.

All of the alternatives include parkwide concepts for future management of the Presidio as well as more specific concepts for the planning areas within the site. Thirteen such areas have been identified, each with its own character, building style, landscape setting, points of access, and history. The more heavily developed areas are the main post, Fort Scott, the Letterman complex, the Public Health Service hospital site, and the east housing area. Other planning areas include a mix of built and natural features, like Crissy Field, or are almost entirely open space, like the Presidio forest and Lobos Creek valley. The planning areas are illustrated on the Program/Activity and Open Space Areas map.



Presidio Planning Areas

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Alternative A (Proposed Action): Diverse Programming/Environmental Stewardship – Public/Private Partnerships

Presidiowide Concepts

Under alternative A, cultural and natural resources throughout the Presidio would be preserved and enhanced, and major new programs would be established through public/private partnerships to provide understanding of those resources, encourage stewardship and cultural awareness, promote international exchange, and seek solutions to critical global problems.

The National Park Service would be responsible for overall management and oversight at the Presidio. Park partners would be selected to lease buildings and develop and operate programs at the site. A federally chartered partnership institution would be created through congressional legislation to assist in managing park partners in assigned areas. The institution would be established under the Department of the Interior and would be granted authority to conduct leasing, retain revenues, and accept donations on behalf of the Park Service for Presidio improvements and operations.

The former Public Health Service hospital complex (21 buildings on 36 acres) was not included in the area designated in 1972 for transfer to the Golden Gate National Recreation Area. Because the complex is an integral part of the Presidio and is included in the national historic landmark district, a boundary adjustment would be sought under this alternative to include the property within the park.

Resource Management

Activities and programs would be carried out to protect and preserve the Presidio's cultural and natural resources. Most of its 510 historic buildings would be rehabilitated and adapted for new uses; 264 nonhistoric and 37 historic buildings totaling 2 million square feet of interior space would be removed to enhance cultural and natural settings and provide additional opportunities for outdoor recreation. The cultural landscape would be preserved, and linkages between areas that were once physically or visually connected would be reestablished. Museum collections would be preserved and displayed on an interim basis at a parkwide collections management facility at the former commissary near the north end of the main post north of Doyle Drive. Because of the reconstruction proposals for Doyle Drive, the future of the commissary cannot be determined at this time. The building may be affected by the reconstruction, and partial or full demolition may be required.

Open space within the Presidio would increase from about 780 acres to 985 acres, and the acreage of native plant habitat would be expanded from 145 to 285 acres. About 20-80 acres of the once-extensive wetlands at Crissy Field would be restored, as would a portion of the Crissy Field dune system (about 30 acres) and the riparian corridors in Tennessee Hollow (a total of 31 acres) and Lobos Creek valley (about 2 acres). About 60 acres of native habitat would be restored within the historic Presidio forest. Rare, threatened, and endangered plants would be monitored, protected, and enhanced on the 15 acres that they occupy. The historic forest would be replanted and enlarged by 57 acres.

Park partners and other tenants would be required to comply with all laws, regulations, and NPS policies related to cultural and natural resource preservation. The Park Service would be responsible for ensuring their compliance.

Visitor Use and Programming

The Presidio would be opened to public use, and a variety of improvements would be implemented to make the site easy to reach, explore, and enjoy. A visitor/interpretive center would be established at the main post, and interpretive media and programs would be provided in all major activity areas. Recreational opportunities would also be expanded, and most of the existing recreational facilities — the golf course, tennis courts, pool, and gym — would be made available to the public.

Park partners would join the Park Service in offering a wide range of programs to inform visitors about the Presidio's resources and history, celebrate cultural diversity, educate the public on environmental issues, and discuss global concerns. Visitors would participate in research and demonstration activities through seminars, lectures, and hands-on experiences. Annual recreational visits to the park are expected to reach 5.9 million by the year 2000 and 7.9 million by 2010 (Peccia & Associates 1993).



Golden Gate / Fort Point
- Visitor information and comfort facilities
- Fort Point interpretation
- Scenic viewing/GGNRA orientation
- Coastal defense/natural resource interpretation

Fort Scott
- Park staff and tenant housing
- Conference and training center
- Environmental research
- Guest lodging
- Bridge district maintenance

Coastal Bluffs
- Coastal hiking/biking
- Coastal defense interpretation

Lobos Creek Valley
- Stream corridor restoration/Presidio water supply
- Park maintenance

Crissy Field (west)
- Aviation museum/innovative technology
- Marine-related activities
- Historic airfield restoration

Cavalry Stables
- Preservation technology applications/training

National Cemetery
- Memorial landscape management

Crissy Field (east)
- Natural systems restoration
- Recreational staging area

Main Post
- Visitor and community services
- Cultural and educational activities
- Guest lodging/tenant housing
- U.S. 6th Army headquarters

Letterman Complex
- Scientific research/education
- Guest lodging/tenant housing

East Housing Area
- Park staff and tenant housing
- Stream corridor restoration

Presidio Forest
- Historic forest/native plant restoration
- Natural area recreation

Presidio Hill
- Public golfing
- Historic forest/native plant restoration
- Park staff and tenant housing

Public Health Service Hospital
- Residential education/conference facilities

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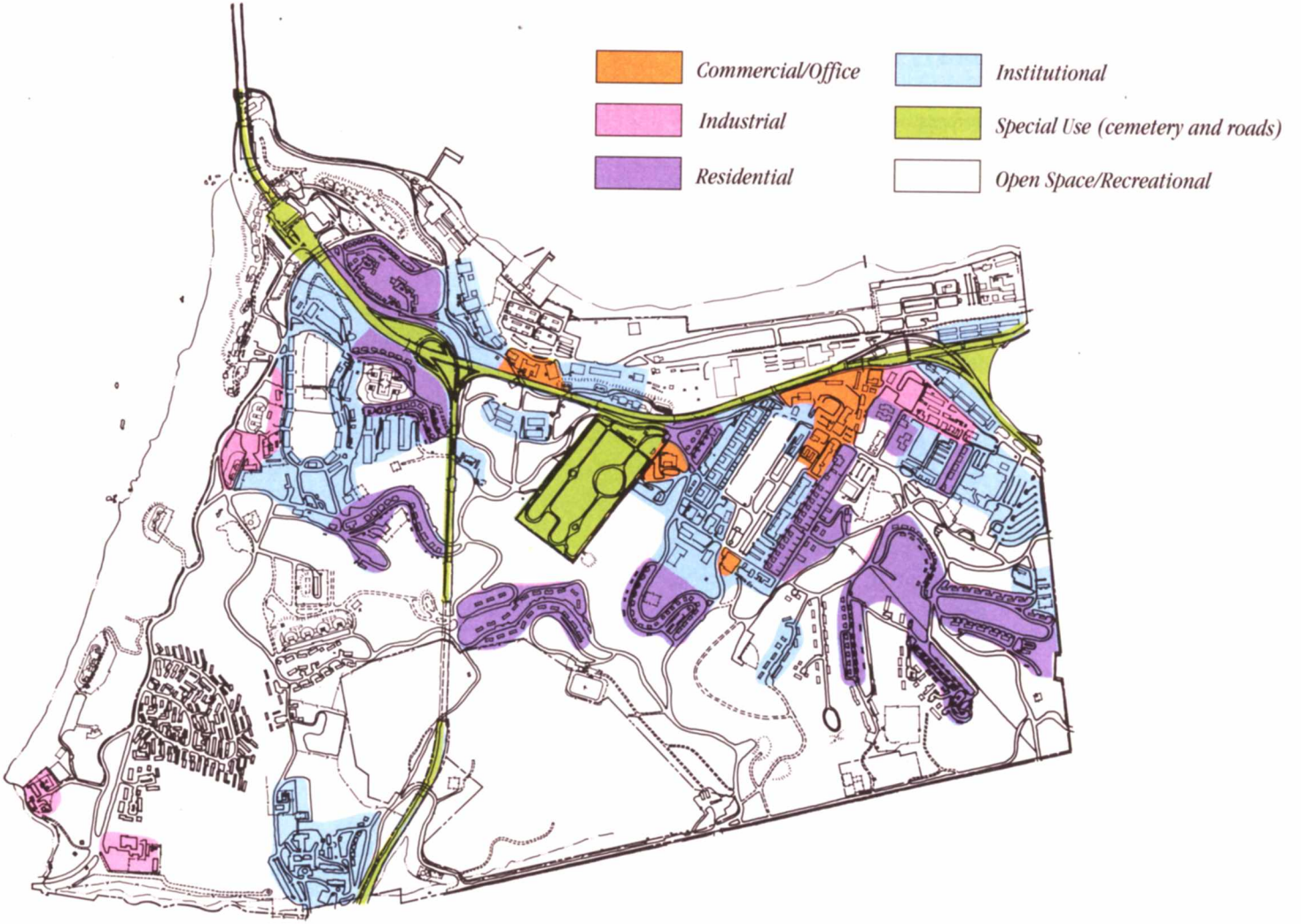
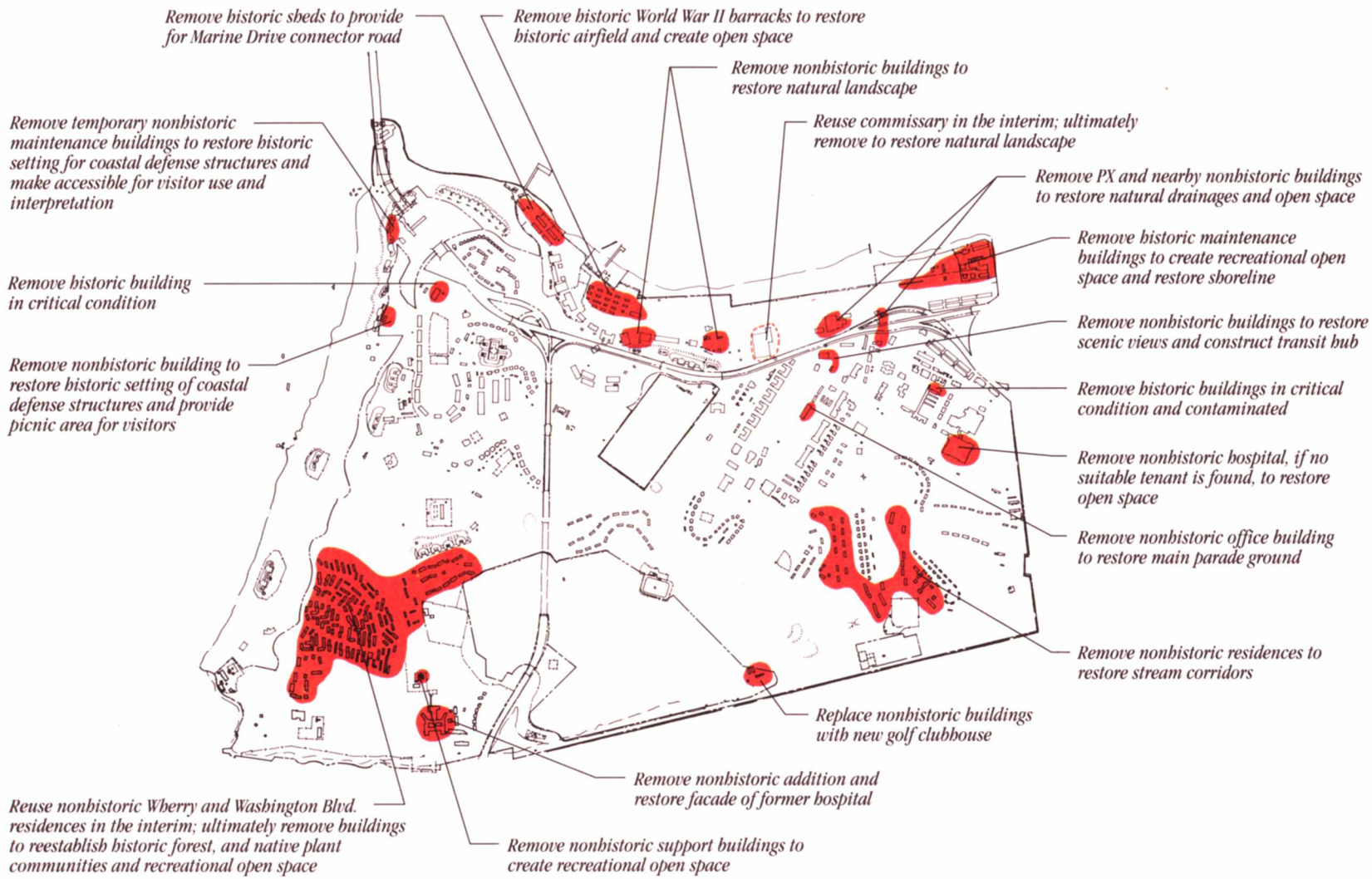
Management Emphasis – Alternative A



General Land Use – Alternative A



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Building Removal/Site Improvements – Alternative A

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Access and Circulation

To open the Presidio to broad public use and direct visitors to its principal features, signs and kiosks with orientation exhibits would be placed at appropriate entry sites. All existing gates would remain open, and the gates that have traditionally received the most use — Lombard Gate, the Golden Gate Bridge exits, Lincoln Boulevard at 25th Avenue, and Mason Street — would be improved, especially for bicyclists and pedestrians. Orientation media at the Presidio visitor/interpretive center would provide details about the site's resources and opportunities, and each of the major Presidio planning areas would include a contact station or orientation exhibit where visitors could get information specific to that area.

Access and circulation improvements would be made, including simplifying the road network by defining visitor routes, adding signs, reducing traffic in some areas, and closing some roads to automobiles. Seventeen intersections would be redesigned to improve safety. Some large parking lots would be removed, and smaller peripheral parking areas would be established. Based on projected parking demands in the year 2010, the total number of parking spaces would be reduced from 13,000 to 7,600 (Peccia & Associates 1993). Permit and fee areas, special carpool and disabled visitor parking spaces, and time limitations would be used to manage both visitor and tenant parking.

Alternatives to automobile use would be promoted, and incentives would be provided to use alternative travel modes to reach the park. Presidiowide trail networks would be established for pedestrians (11 miles) and bicyclists (11 miles), and they would connect with regional trail networks. An alternative-fuel shuttle system would be established to link the site's main activity areas. The possibility of providing water taxi/ferry service between Crissy Field and other waterfront sites would be studied, and the service implemented if and when feasible.

Efforts would be coordinated with MUNI (the San Francisco Municipal Railway) and Golden Gate Transit to provide more direct downtown service and regional transit connections. Transportation hubs would be established at the main post and the Golden Gate Bridge, where people could buy transit passes and transfer between city and park public transit. The Park Service would continue to encourage and support regional public transit improvements proposed by other agencies or private service providers that would increase access to the Presidio, for example, charter tour service or an F line light rail extension from the Embarcadero.

The Park Service would also continue to support long-range improvements to Doyle Drive and would consider design alternatives as they were prepared by Caltrans and other agencies. The Park Service recommends that Doyle Drive be designed as a parkway, with respect for the cultural and natural values of the Presidio, and that safe, more direct access to and from the Presidio be incorporated into the parkway design.

Community

The Presidio would support an active community of NPS and military employees, program/tenant staff, and short-term residents. Most housing would be used by military staff, park and park partner employees, researchers, and instructors, but overnight lodging and other residential spaces would be available for visitors and program participants. The Presidio contains 1,184 housing units (including the units at the former Public Health Service hospital) in 383 buildings. Proposed uses of the units are shown below. It is estimated that the residential population would be about 3,600 in the year 2000 and would drop to 1,400 in 2010 because of housing removals. The guest population would remain fairly stable at about 750 people (Jones & Jones 1993a).

Proposed Uses	No. of Units/Buildings Year 2010	No. of Units/Buildings Year 2010
Visitor lodging/training and conference accommodations	85/56	85/56
Residential use - DOD	746/205	150/76
Residential use - park and partner staff	301/107	211/97
Removal	52/15	738/154

Basic community services would be provided for the residents and employees. Most of these services would also be available to visitors and park neighbors. Services would be operated by private enterprise under concessions contracts or lease arrangements; they would be close to residential areas to reduce the need for daily trips outside the Presidio. Community meeting spaces — the theater, recreation halls, and banquet halls — would be available to regional, national,

and international organizations, as would museum, gallery, performance, and workshop spaces. Employment is estimated to reach about 5,900 employees in the year 2000 and drop to about 5,480 employees in 2010, again because of building removals (Jones & Jones 1993a).

Public Health and Safety

The Presidio would be staffed with full-time law enforcement personnel to provide traffic control and enforcement, criminal investigation, riot and crowd control, targeted patrol, speed enforcement, and routine uniformed patrol in vehicles, on horseback, and on trail bikes. Security would be provided primarily by the U.S. Park Police. Law enforcement park rangers would be available as additional support for the basic urban police commitment by the Park Police. Based on projections, approximately 70 officers would be needed to carry out major security functions at the Presidio in the year 2010 (Jones & Jones 1993b).

The existing fire management function at Golden Gate National Recreation Area would be expanded to up to 35 positions to increase structural fire, search and rescue, and emergency medical capabilities. This staff would be responsible for providing fire inspection, enforcement of national fire codes, tenant consultation on fire safety issues, and fire education programs. Personnel would be organized to efficiently combat fires, including saving lives, controlling fires and limiting their spread, and protecting property from fire-related hazards. The fire management function would also be responsible for managing hazardous material emergencies and for limiting the risks to surrounding areas from the storage, use, transportation, and disposal of hazardous materials.

Primary search and rescue services and emergency medical services would be provided by the fire management function. At least one first-responder emergency medical technician and one paramedic would be on duty per shift.

To coordinate emergency services, a central communication (911) center would be established that would receive calls and dispatch emergency services for the entire national recreation area. The center would be staffed with trained operators to ensure that all communication needs were met on a 24-hour basis. Mutual aid response agreements would be developed with municipal authorities for disaster preparedness activities and responses.

Environmental Protection and Sustainable Design

The Presidio would become a model of environmental protection and appropriate sustainable design. Public and private organizations would join with the Park Service in demonstrating technologies and practices that reduce environmental impacts or produce environmental benefits in energy conservation, solid waste management, transportation, water conservation and reclamation, and sewage treatment. Park facilities would be designed, constructed, retrofitted, and operated to minimize adverse effects on natural and cultural resource values, reflect their environmental setting, and maintain and encourage biological diversity. Energy-efficient materials and building techniques would be employed, and facilities would be maintained to ensure their sustainability. Conservation principles and practices would be illustrated through design and ecologically sensitive techniques, in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1992f).

The Park Service would take a number of actions to repair and rehabilitate the Presidio's infrastructure. Engineering studies have been commissioned by the Army (CH2M Hill and Nakata Planning Group 1989a, b, c) and the Park Service (Nolte and Associates 1991a, b, 1992a, b) to determine the needs for repair, replacement, or augmentation of utility systems to meet future needs. Because of the magnitude of the utility requirements, actions would have to be carried out over several years to keep disruption of services within manageable limits.

The deficient water treatment plant and three reservoirs would be upgraded to meet applicable laws, standards, and codes. Current plans include rehabilitating the main reservoir and abandoning the Fort Scott reservoir and replacing service with water from the main reservoir via a pressure valve.

Two types of improvements are proposed to correct water distribution deficiencies — upgrading firefighting capacity and replacing deteriorated pipes that leak or are ready to rupture. Distribution improvements would include new fire hydrants, replacement pipe, replacement pumps, check valves, and pressure regulating valves. Current water pressure does not meet the PUC standard for minimum pressure (40 pounds per square inch [psi]) at three locations. The new water system would restructure water pressure to a maximum of 125 psi and a minimum of 40 psi. The new system would have metering to track water consumption and monitor system leaks.

Infrastructure studies have found about 15,000 feet of storm drain pipe to be inadequate for conveying the runoff from a 10-year storm. A 1985 inspection found an additional 2,000 feet of pipe to be in poor condition (Nolte and Associates 1991b). These 17,000 feet of pipe would be replaced.

Sanitary wastewater is conveyed to the city/county sewer system. A study for the Park Service (Nolte and Associates 1991b) noted that most of the individual pipelines are in need of some rehabilitation and repair to permit unobstructed flow. The primary problem is tree root infiltration, affecting about 60% of all sanitary sewage mains. The entire sanitary wastewater system would be rehabilitated to meet applicable laws, codes, and standards.

The Army's electrical distribution facilities would be upgraded to PG&E standards. All 4,160-volt facilities would be replaced with 12,000-volt facilities; all transformers would be tested for polychlorinated biphenyls (PCBs), and removed where established limits were exceeded; meters would be provided for all buildings; and all substandard facilities would be replaced (Crane 1991).

The Park Service would continue using the natural gas system maintained by PG&E.

Planning Area Concepts

Main Post

The main post would be the center of visitor activities at the Presidio, and it would offer a variety of programming and interpretation. Its buildings and grounds would be rehabilitated to provide for new uses. Most of the paving would be removed from the main parade ground to return it to its historical appearance. Over time two historic and 27 nonhistoric buildings (about 208,000 square feet of space) would be removed to enhance the historic setting and expand open space.

The buildings surrounding the main parade ground would be adapted to support activities involving environmental, cultural, and educational concerns. Park partners would sponsor workshops, educational activities, and joint studies that would involve Presidio visitors as well as experts and international representatives. The Sixth Army would use buildings on the east side of the complex for administrative and headquarters functions. A public space would be created on the main parade ground to complement and support activities in the surrounding buildings.

A visitor/interpretive center would be established in one of the Montgomery Street barracks on the west side of the main parade ground to provide orientation and interpretation for park visitors. The facility would be staffed by park personnel who would answer questions and provide detailed information. Exhibits and other media would describe the range of experiences available at the Presidio. The former commissary would be used on an interim basis for a collections storage facility until it was determined whether future plans for Doyle Drive reconstruction would require removal of the building.

Presidio history would be the focus of interpretation at the main post. Funston Avenue would be partially restored to its late 19th century appearance, and other buildings and landscape features would be preserved and used to interpret the evolution of the post over time. Military pageantry and multicultural demonstrations on the main parade ground would commemorate the Presidio's past and celebrate its future. The historic archeological resources of the early Spanish/Mexican presidios would be researched and studied, and a commemorative site would be established north of the officers' club.

The main post would be the site of the main transportation hub for the Presidio shuttle system, allowing visitors to travel easily between the site's major activity areas. The main post would also be a key transit transfer point between the Presidio and other park and regional tourist areas. Graham Street would be closed to vehicles and established as a pedestrian route. Other improvements and amenities for pedestrians would be provided throughout the area, including curb cuts, new walks and trails, benches, and drinking fountains.

As the central visitor area, the main post would provide services for park residents, staff, and visitors, including concessioner-operated food service; picnic areas; a convenience store; a central office supply center for tenant groups; a post office; public safety services (emergency medical, rescue, and firefighting); and some recreational facilities. Short-term lodging operated by concessioners would be available along Funston and Riley avenues and at Infantry Terrace to allow visitors to explore the Presidio for extended periods.

The main post's natural features and scenic vistas would be preserved and enhanced. The riparian corridor in Tennessee Hollow east of Funston Avenue would be restored as part of the Crissy Field wetland restoration project.

Golden Gate/Fort Point

The Golden Gate Bridge plaza would be redesigned to improve scenic vistas, enhance the historic setting, and upgrade existing access to the site. Nonhistoric buildings on the west side of the bridge plaza, which block scenic views and intrude on the nearby coastal defense structures, would be removed. The Golden Gate Bridge District currently uses the buildings to support maintenance functions; the maintenance functions would be relocated to a site west of the Fort Scott parade ground. After the maintenance buildings were removed, a visitor parking and viewing area would be designed and developed. Several of the coastal defense structures would be preserved and interpreted, and their historic settings would be restored. Multilingual interpretive facilities would be provided on the east side of the bridge plaza.

At Fort Point the visitor contact station at the torpedo wharf would be rehabilitated to accommodate visitor needs; orientation materials, restrooms, and limited food service would be provided. To simplify access from Crissy Field, a new westbound roadway would be established from old Mason Street to Marine Drive, and return eastbound access would be designated on Long Avenue and Crissy Field Avenue. Two-way bicycle access would be established along Long Avenue.

Hiking and bicycle connections between the Golden Gate promenade at Fort Point and the Golden Gate Bridge plaza would be improved to provide easier access and better resource protection. The serpentine areas and other significant natural features on the Fort Point cliffs would be protected.

Fort Scott

The campuslike setting at Fort Scott would be used for conferences, applied research, and training. The Park Service and park partners would establish programs focused on solving global environmental problems and demonstrating principles of resource stewardship. Participating groups and individuals would attend sessions ranging from one-day events to extended internships. Existing space and facilities would be used for classrooms, workshops, laboratories, assembly and training rooms, and cafeterias. Overnight and long-term lodging would be available for program participants. An employee development center would be established at Fort Scott for the training of NPS, other agency, and international park staff. The center would occupy some of the housing and one building on the parade ground.

Fort Scott's historic buildings would be preserved through rehabilitation and adaptive use. The historic parade ground would be restored, and one historic and 13 nonhistoric buildings (17,000 square feet of space) would be removed to increase open space and enhance the historic setting. Historic views would be reestablished wherever possible. Overgrown gardens would be restored, and historic landscape features (roads, paths, walls) would be preserved. The historic ballfield at the north end of the fort would be maintained in its historic configuration, but the associated lighting system and other nonhistoric features would be removed. The ballfield would be used by people attending Fort Scott programs; it would not be open to the general public.

Remnant natural systems at Fort Scott would be managed to restore their environmental integrity. The riparian area north of Kobbe Avenue would be protected and managed to increase species diversity. Rare plants and serpentine habitat would be protected and enhanced.

The current maintenance facility south of the Battery Dynamite area would be used by the Golden Gate Bridge District as a maintenance site. The battery and adjacent powerhouse would be opened to the public and interpreted.

Letterman Complex

The Letterman complex would continue to be a center of scientific research and education, focusing on issues in human health and life sciences. The facilities would primarily be used by park partners, visiting researchers, and program participants, but public information and education about ongoing activities would be an important component of all research.

Both historic and nonhistoric hospital facilities at the complex would be rehabilitated to support proposed uses and might become part of a learning center for science-oriented institutions. The O'Reilly Avenue houses and the barracks near Girard Road would provide housing and lodging for staff and program/seminar participants. Five buildings (two historic) with about 20,000 square feet of building space would be removed because they are in poor or critical condition or are nonhistoric and an intrusion on the historic scene. Limited new development would be allowed in the area if it was compatible with the setting of the national historic landmark district.

Because of the costs involved in rehabilitating the 440,000-square-foot Letterman Army Medical Center (in excess of $100 million), this building is proposed for

removal. If a realistic proposal for the former hospital was put forth that supported the overall program theme of the complex, the building would be retained and rehabilitated by a park partner. Any proposal considered would require additional analysis.

Significant streetscapes and landscape features in the Letterman complex would be preserved. Excess pavement would be removed, and areas adapted for pedestrians. The former courtyard space at the historic hospital complex would be rehabilitated, and the parking lot removed. The drainage between Lincoln Boulevard and Crissy Field would be restored as a seasonal riparian stream. O'Reilly Avenue would be closed to vehicles and redesigned for pedestrian use. It would extend to a new at-grade or overpass link to the Palace of Fine Arts.

Cavalry Stables

The cavalry stables would include workshop, office, and classroom space for demonstrating new technologies and sustainable systems and providing other educational programs. One stable and a nearby former barracks would be adapted to provide a hands-on working environment for experimentation and training in the application of conservation technology. Visitors would be invited to view and participate in these programs.

The overall integrity of the site and its structures would be preserved. One of the stables would be rehabilitated for use by the U.S. Park Police and partially restored for interpretation of the early Army cavalry. Three nonhistoric utility buildings (total 2,000 square feet) would be removed. Nonnative vegetation in the area would be removed, and remnant natural dune and riparian areas south and southwest of the structures would be protected and enhanced as wildlife habitat.

Public Health Service Hospital

Because of the isolation of this area and the size and arrangement of the buildings, the former Public Health Service hospital complex would be used for in-depth, extended conferences or educational activities. Depending on the park partner that was selected, the complex might serve as an international school or a youth job training center. Residences and dormitories at the site would be used to house program participants. To improve automobile circulation within the complex, the 14th Avenue Gate would be opened for entering traffic, and 15th Avenue would be converted as a one-way route for exiting traffic.

The area contains a number of historic buildings, including the original hospital. The plan proposes removing the nonhistoric 1950s addition to the hospital (115,000 square feet of space) and rehabilitating the historic hospital building to accommodate dining, assembly, and overnight lodging space for program participants. If a suitable tenant could not be found to rehabilitate the hospital, the building would be removed and the site restored to open space. Additional analysis would be required before final decisions were made. Five other nonhistoric buildings (total 4,500 square feet) and excess pavement at the complex would be removed to expand open space and enhance the historic setting. The unmarked former Marine hospital cemetery would be located and protected.

North of the hospital are several remnant natural systems, including coastal scrub, wetland, riparian woodland, and coastal strand communities; one state-listed rare and endangered species is present. These natural resources would be preserved and revitalized.

East Housing Area

This area would be maintained primarily as a residential area for military, NPS, and park partner staff. The nonhistoric housing on Quarry Road west of El Polin Spring valley would be converted for residential environmental education programming; classrooms and lodging would be provided.

The historic housing in the area would be preserved through continuing residential use. The cultural and natural resources of the El Polin Spring area and adjacent valleys would be enhanced by removing 37 nonhistoric buildings (215,000 square feet of space, mostly housing) and restoring the three riparian corridors. Archeological resources in this area would be identified and protected. The natural resources and historic uses of the area would be interpreted, and opportunities for hiking and picnicking would be provided.

Historic Lovers Lane and other existing foot trails would be improved. New trail segments would provide more hiking opportunities and allow foot traffic to be routed away from fragile resource areas.

The Pop Hicks ballfield would continue to provide recreational opportunities.

Crissy Field

Crissy Field would become the "front yard" of the Presidio. Currently the most public of the Presidio open spaces, it would be managed to enhance the setting

for recreational opportunities while preserving important cultural resources and restoring natural systems. The Golden Gate promenade along the water's edge would be renovated to provide opportunities for a variety of passive recreational pursuits — walking, jogging, running, biking, picnicking, and scenic viewing. Activities like boardsailing would take place offshore. Support facilities and services would be provided to meet the needs of a wide spectrum of users. Only moderate-sized special events would be possible when the areas now used for large events like 4th of July celebrations were restored to more natural conditions.

Many actions would be taken to enhance the area's scenic qualities and to restore its natural setting. A total of 32 historic and 29 nonhistoric buildings with 272,000 square feet of space would be removed throughout the field. Paved areas would be substantially reduced (by 72 acres), and nonnative vegetation would be removed.

At the east end the historic maintenance buildings north of Mason Street would be demolished, and the entryway redesigned to provide a continuous public open space from Marina Green through Crissy Field. Based on the results of further study, 20-80 acres of the former wetlands along the bayshore at the east end would be restored and reconnected to the freshwater surface flows from the Tennessee Hollow drainage.

Other natural resource improvements would be made, including expanding the native dune system (30 acres) on the central shoreline, protecting shorebird habitat between the Fort Point and Coast Guard lifesaving station piers (about 15 acres), and restoring native plant communities in the serpentine outcrop at the west end (0.5 acre). Visitor uses would be restricted as necessary to protect native systems and species.

The historic airfield structures at the west end of the field would be the focus of preservation and interpretation. These structures would be rehabilitated for new uses, and the airfield itself would be restored to its historic (ca. 1920s) appearance. The temporary World War II barracks between the airfield and the lifesaving station would be removed because they do not date from the airfield's period of significance. An aviation museum would be established in the west end hangars where visitors could learn about the history of the airfield and past, present, and future transportation technology. The nearby lifesaving station would also be rehabilitated to provide space for educational programs related to the maritime environment.

One-way road access would be established between Crissy Field and the torpedo wharf at Fort Point. Westbound traffic would travel along a new extension of Mason Street connecting with Marine Drive; eastbound traffic would use Long Avenue and Crissy Field Avenue.

Presidio Hill

This area would continue to provide for a variety of outdoor recreational activities, in particular golfing and hiking. The historic golf course would continue to operate but as a public course available to all visitors. It would be maintained as part of the national historic landmark district. A new 8,000-square-foot clubhouse and maintenance facility would replace the existing Army clubhouse; it would include a new 150-space parking area.

To expand open space, the nonhistoric Wherry housing area (about 525 units) and Washington Boulevard housing area near Battery Stotsenberg-McKinnon (about 75 units) would eventually be removed. In the short term the military and park partners would occupy these areas, but the long-term goal would be to remove a total of 141 buildings (819,000 square feet of space) from the Presidio Hill area and restore native plant communities and the historic forest. The remaining houses on Washington Boulevard, between Park Boulevard and Arguello Boulevard, would be retained for park partner use because of their proximity to the main post.

Mountain Lake and the adjoining riparian system would be protected. The San Francisco Recreation and Park Department would continue to manage Mountain Lake Park.

National Cemetery

The national cemetery would remain a quiet place for remembrance and reflection. The size of visiting groups would be limited, and tours would be conducted in a respectful manner. The site would continue to be administered by the Veterans Administration. Consistent with the NPS *Management Policies* (NPS 1988a), it would not be expanded.

Presidio Forest

The Presidio forest would continue to provide a woodland retreat in the midst of its urban setting. The forest, which was planted by the Army nearly 100 years ago, would be revitalized using species selected for the original design. Research would be conducted to determine the extent of the forest as originally planted,

and areas outside that boundary would be cleared and planted with native species to expand open space and restore important vistas. The parts of the existing forest that provide important wildlife habitat would be maintained.

Areas with remnant native plant communities, including the serpentine grassland at Inspiration Point, would be protected and restored wherever possible. Sections of trails would be relocated to reduce erosion and damage to sensitive habitats.

Cultural resources within the Presidio forest area would also be preserved. These include the Presidio Gate entrance, historic roads, and Battery Stotsenberg-McKinnon. The battery would be stabilized and included on an interpretive tour of Presidio coastal defenses.

The forest would provide a setting for many activities, from hiking and biking to quiet contemplation. A trail system would be developed to provide access to the area's natural and historic sites. This system would connect with other regional trails. Interpretation would be provided at appropriate sites along the trails.

The Rob Hill group camping area would be redesigned. Outdoor interpretive presentations would be held in the amphitheater there.

The Julius Kahn Playground would continue to be operated by the San Francisco Recreation and Park Department as a recreation area. A 50-space parking area would be constructed near the playground to concentrate parked cars and reduce safety hazards in the vicinity.

Lobos Creek Valley

This area would receive maximum resource protection and enhancement. The streambed and riparian corridor would be restored, and instream flows would be maintained to support aquatic habitat. Remnant riparian and dune systems would be protected, and portions of the historic forest preserved. The ballfield near the former Army Reserve center would be removed, and the area restored with native plants. Visitor use in the valley would be limited to supervised environmental education and interpretation.

The Army Reserve center would be adapted for use as a park maintenance facility. The dune community along the creek next to the center would receive additional protection to ensure that there was no damage to rare plant species there. Activities at the maintenance facility would be carefully monitored to avoid any negative effects on water, wildlife, native plants, and other sensitive resources.

The historic water treatment plant and associated structures on the coast would be rehabilitated, and new equipment installed to meet applicable drinking water standards and regulations. The nearby residential duplex would be adapted for use as a resource management field station. Resource conservation measures would be demonstrated there, and visitors could learn about efficient water use and water treatment technologies.

Coastal Bluffs

The coastal bluffs would be preserved as the wildest and most natural part of the Presidio. Some of the last undisturbed native plant communities in the city are found along the bluffs. To protect rare and sensitive plants, visitor access would continue to be confined to developed trails. No new interpretive facilities would be provided, except along the Coastal Trail above the bluffs. Nonnative species would be replaced with native species, and threatened and endangered species (including the Raven's manzanita, Presidio clarkia, San Francisco lessingia, and Marin dwarf flax) would be protected and subject to restoration efforts. Habitats that have developed on serpentine rock would be managed to minimize disturbance.

The remnant portion of the historic Presidio forest above the coastal bluffs would be restored and replanted as directed in the forest management plan. Trees that have become established outside the boundaries of the historic forest would be removed, and the sites replanted with native vegetation. Historic structures along this stretch of the coast would be stabilized and preserved.

Baker Beach, which is currently a popular recreational destination, would continue to be maintained as an easy-to-reach coastal site where people could come to beachcomb, sunbathe, and fish. A new intersection to permit safer access to Baker Beach would be created by extending Gibson Road to Lincoln Boulevard. Both ends of Bowley Street would be closed, and the roadway converted to parking. Parking along the shoulders of Lincoln Boulevard would be eliminated, and a bike lane established. Twelve parking spaces would be paved and striped at the World War II memorial.

Implementation

Management and Governance

The Park Service would provide oversight and general management of the Presidio. To assist in meeting overall management challenges and specific management of

park partners, a federally chartered partnership institution would be created through congressional legislation. The institution would be established under the Department of the Interior. Members would be sought who could provide expertise in areas critical to Presidio management; they would be appointed by the secretary of the interior after recommendations from various sources were considered to ensure broad representation of all levels of government and the private sector. The institution would have links with key public agencies and the Golden Gate National Recreation Area Advisory Commission.

The partnership institution would have a formal management structure for coordinating park partner activities and developing nonfederal sources of funding. It would be empowered to retain revenues, accept donations on behalf of the Park Service for Presidio improvements and operations, and enter into leases for assigned areas with park partners that provide programs in keeping with the park purpose. Funding for the institution would initially be through federal appropriations. As lease revenues and income grew, the institution would become more self-sufficient.

An NPS and partnership institution staff of 350 would be needed to administer and operate the Presidio under this alternative. The estimated operating budget would be $38 million with the potential of $24 million to be recovered from tenants. Development costs for building rehabilitation, site improvements, and building removals would be about $196 million for the Park Service, $470 million for park partners/tenants and concessioners, and $111 million for D.O.D.

Legislative Authorities

Legislation would be sought to accomplish the following: Create a federally chartered institution to assist with NPS management of the Presidio and future park partners; provide needed authorities for general leasing of buildings and the retention of revenues by Golden Gate National Recreation Area and the proposed institution; allow the use of fees from parking, concessions, and/or tenants to subsidize or implement proposed shuttle bus and ferry operations; and adjust the boundary to include the 36-acre Public Health Service hospital site in the national recreation area.

Mitigating Measures

The following measures would be taken to mitigate or minimize the impacts that might result from implementation of alternative A. All of these measures would be regularly evaluated and monitored by Park Service staff to determine their effectiveness in reducing impacts. A mitigation matrix would be developed for the final EIS to identify the parties responsible for implementing and monitoring mitigating measures.

City Services

Although water used within the Presidio would come primarily from onsite sources and would be treated by onsite facilities operated by the Park Service, a minimum amount of city of San Francisco water might be needed if uses at the Letterman Army Institute of Research (LAIR) required water of a purity that is not available from onsite sources. Under alternative A an estimated 10,000 gallons of city water per day could be needed for such special uses. During the design and replacement of the water treatment and distribution system, the Park Service would work with city of San Francisco officials to reduce this projected amount of water use or offset the loss of city water. Solutions might include providing Presidio water to San Francisco for any city water used or mixing city water with Presidio water to reduce the total amount of city water used.

Housing

Under alternative A the Presidio housing stock would meet about 38% of projected employee housing demand in the year 2000 and 35% in 2010. As the Presidio buildings were reoccupied and park programs and activities were established, the need for additional onsite housing would be analyzed based on actual employment patterns and related housing demands associated with building uses. If additional housing for park and park partner staff was required, the conversion or adaptive rehabilitation of structures for residential use would be considered.

Traffic and Transportation Systems

Monitoring of Alternative Travel Modes (Bicycle, Pedestrian, Public Transit). To determine the success of measures implemented to encourage alternative modes of travel, the Park Service would periodically collect data on traffic volumes, vehicle occupancy, use of transit services, and amount of pedestrian and bicyclist use to, from, and within the park. Based on this data, the Park Service would expand or modify existing facilities and services for alternative transportation modes or implement other measures to increase the use of those modes.

Transportation Information Services. Comprehensive regional transit information, pass sales, and traveler convenience services would be provided at or near the proposed transportation hub. Efforts would be made to coordinate with the

Metropolitan Transportation Commission's program to incorporate their planned "advanced traveler information system" (TravInfo) at the Presidio transportation hub. Tenants would be required to provide transit information to visitors and to assist guests in making arrangements for nonauto transportation.

Employee Transit Incentives. The tenants would be required to promote ride sharing, transit patronage, and other nonauto travel by their employees and guests. Flexible working hours to reduce traffic volumes during peak hours, employer-subsidized transit passes, and van pool matching services would be encouraged.

Transit Brokerage. A transit brokerage/coordination operation would be established to provide or obtain varying transit services on an as-needed basis for Presidio conference and training activities. The operation would arrange for needed transportation using existing transportation services (MUNI, Golden Gate Transit, BART, and private services) and planned park or concessioner-operated services at the Presidio. Van pools could also be made available to tenants. The services would provide for all of the transportation needs of persons attending conferences and training, to eliminate their dependence on private autos while visiting the Presidio.

Parking Fee Support of Transit Services. The Park Service would consider implementing parking fees in certain areas to further discourage automobile use and to offset the costs to provide transit services; for instance, fee-paid permits could be required to use long-term parking near the main post, the Letterman facility, Fort Scott, the ferry terminal, and the golf course.

Increased MUNI Service on Existing Lines. More frequent service on existing routes should be considered by MUNI as demand increased and crowding on existing lines was experienced. Cooperation between the city and the Park Service would be needed.

New Radial Transit Service. A new dedicated MUNI radial connection from downtown to the Presidio would be encouraged, as recommended for consideration by the city's Doyle Drive Task Force in early 1993. Radial service would increase the capability for commuter connections to regional transit services that are concentrated downtown, such as BART (Bay Area Rapid Transit) stations, the Caltrain station, and bus depots. The Park Service would work with city of San Francisco officials and other agencies to obtain funds for this service.

Light Rail Extension. Extension of MUNI's proposed light rail F line along the northern waterfront would increase alternative mode travel to the Crissy Field area and reduce the number of vehicle trips to the Presidio. This service extension has been discussed for many years, but current plans do not include it. The Park Service would support efforts to review the possibility of instituting this service.

Golden Gate Transit Transfer Facility. Golden Gate Transit provides service between San Francisco and Marin County. Additional transfer locations are needed to improve this service. A new transfer site near the Presidio transportation hub should be considered as direct Doyle Drive access to the Presidio is planned.

Bicyclist and Pedestrian Amenities. Shelters, benches, water fountains, secure bike racks, route lighting, and other facilities would be provided in all NPS site developments to encourage travel by foot and bicycle. Tenants would be required to provide similar facilities.

Monitoring and Adjusting of Parking. The amount of long-term versus short-term parking and the overall supply of parking throughout the Presidio would be monitored and adjusted to encourage transit use and other nonauto modes of travel.

Event Coordination. Parking supply would be a determining factor in scheduling events that would generate large parking demand. Such events would be scheduled so that they did not coincide with other high-demand events or normal daily peaks in parking demand in the area. The Park Service, San Francisco Recreation and Park Department, Fort Mason Foundation, and Exploratorium would coordinate event planning to ensure that their events did not compete for parking.

Intersection Capacity Improvements. The level of service analyses for seven intersections on the boundary or within several blocks of the Presidio indicate that at least one turning movement in each intersection would fall to marginal or unacceptable levels by the year 2010, in part due to Presidio and regional traffic increases. In some cases, where only a small fraction of the traffic through an intersection would be affected, the conditions might be acceptable. In other cases, improvements are warranted because of the number of vehicles that would be affected and the unreasonable delays created. Recommendations have been proposed in the Presidio transportation analysis to improve the operation of the exterior intersections (Peccia & Associates 1993). The Park Service would coordinate with the city to ensure that funding was obtained and improvements were made as needed. Staged solutions would be recommended where minor improvements could be made to improve conditions before more costly solutions became necessary.

Monitoring of Intersections. The Park Service would periodically monitor the operation of intersections on the Presidio road network and just outside the boundary to determine if recommended traffic flow improvements were effective or if additional improvements were needed. Traffic counts and turning movement data would be collected at important locations on the road network to facilitate analyses. Signalized intersections would be reviewed to determine the effectiveness of timings and phasings for measured traffic volumes.

Transportation Coordinator. A Park Service or partnership institution employee would be stationed at the Presidio as its transportation coordinator. This person would be responsible for marketing and administering the Presidio's transportation demand management (TDM) program aimed at reducing the number of vehicles trips and improving alternative modes of travel such as public transit. Responsibilities would also include coordinating with the city, the Metropolitan Transportation Commission, and other agencies to maximize benefits from the TDM investment.

Doyle Drive Reconstruction. No mitigating measures would be required of the National Park Service. Mitigating measures by Caltrans and others would be identified as the state highway project proceeded.

National Historic Landmark District

Documentation of Historic Buildings to be Removed. Before historic buildings or additions to historic buildings were removed, appropriate mitigating measures would be determined in consultation with the California historic preservation officer and the Advisory Council on Historic Preservation. Measures would include recordation according to Historic American Building Survey standards (photographs, drawings, and written histories). All other effects on historic buildings identified in the national historic landmark nomination form would also be mitigated.

Inventory of Historic Buildings and Preparation of Rehabilitation Guidelines. The Park Service has completed an inventory of all buildings in the Presidio and an assessment of the condition of those buildings (NPS 1992e); for buildings that contribute to national historic landmark status this information is being entered into the NPS List of Classified Structures. Approximately 250 buildings, both historic and nonhistoric, have been surveyed and entered into the NPS computerized inventory and condition assessment program. In addition, the character-defining features of the exteriors and interiors of about 300 historic buildings, as well as their physical histories, are being identified. All of this information would be used in preparing tenant packages for leasing buildings.

Rehabilitation guidelines are being developed by the Park Service to aid in modifying historic buildings and to establish criteria for meeting national building codes. These guidelines would provide Presidio-specific direction in applying the guidelines for rehabilitating historic buildings that are included in *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, and they would ensure that the integrity of historic buildings was maintained during rehabilitation. All building treatments would conform to the *Standards for the Treatment of Historic Properties*. All proposed actions would be reviewed by the Park Service for compliance with these standards before their implementation. Rehabilitation work would be done by tenants. Most costs would be covered by tenants and the future partnership institution.

Code Compliance. Many Presidio buildings would need to be upgraded to meet life/safety standards in order to permit existing uses to continue or new uses to be established. As part of rehabilitation, these buildings would be modified to meet applicable model national building codes to the maximum extent feasible. The Park Service would establish a plan review and construction office to ensure compliance with building codes as well as historic preservation regulations. The Park Service would be responsible for enforcement.

Preparation of Maintenance Plans. After each building was rehabilitated and/or occupied, the tenant would be required to prepare a long-term maintenance plan for the building. This would include a cyclic maintenance program to prevent damage to historic features and ensure that the building was properly cared for. Unoccupied, stabilized buildings, such as coastal defense structures, would be regularly monitored and inspected by the Park Service to ensure long-term preservation and safe conditions for visitors.

Inspection and Preservation of Vacant Buildings. During the transition period and the initial years of Park Service management, many of the Presidio's buildings would be unoccupied. A guideline for treatment of vacant buildings would be developed by the Park Service to ensure their preservation and protection. Actions would include physical inspection and documentation before mothballing as well as establishment of a monitoring program. For historic buildings in particular, minimum heat, adequate ventilation, and frequent monitoring of building interiors would be required. U.S. Park Police patrols would be increased in all areas with vacant buildings.

Guidelines for the Treatment of the Cultural Landscape. A cultural landscape report is being prepared to guide treatment and management of significant landscape features at the Presidio. This report, together with the rehabilitation guidelines for buildings, would guide future planners and tenants in design decisions.

Guidelines for Compatible New Construction. New construction — for example, support buildings, building additions, and landscape furniture such as lighting and benches — would be required to support proposed uses. Design guidelines to assist in new construction would be prepared by the Park Service as a companion document to the building rehabilitation guidelines and the cultural landscape report. All designs would be reviewed for compatibility with the cultural landscape and for compliance with the *Standards for the Treatment of Historic Properties*. Additional coordination and consultation would be carried out with the state historic preservation officer and the Advisory Council on Historic Preservation to assess and mitigate any adverse effects of new construction on the national historic landmark district. All new buildings, additions, and landscape features would be designed and sited to harmonize with their historic settings.

Historic Forest Restoration. Before the historic forest was restored, additional research would be conducted to determine the evolution of the forest and its existing conditions, and a forest management plan would be prepared to guide future actions. This plan would identify appropriate replacement species and exact areas for nonhistoric forest removal. Historic trees that have become hazardous would be documented for the historic record before removal.

Areas where forest species were recommended for removal would be surveyed for wildlife habitat and sensitive native plant communities. A tree removal plan would be developed to ensure that any significant wildlife and plants in these areas were protected, and further mitigating measures would be developed as needed.

Monitoring of Visitor Impacts on Sensitive Cultural Resources. Sensitive cultural resources such as archeological sites and vacant structures would be monitored, and mitigating measures employed to reduce any adverse impacts on these resources caused by park visitors. Mitigating measures might include temporary closure of areas, protective barriers, and regulatory and informational signs.

Archeology

Preconstruction Archeological Surveying. The Park Service is currently preparing an archeological resource management plan for the Presidio. This plan provides a context for examining and evaluating archeological resources, establishes a formula for future mitigation, and contains assessment and overview information useful in predicting what types of resources might be found in various locations. Because little is known about the extent, nature, or location of artifact caches and the integrity of prehistoric and historic archeological deposits, additional preconstruction archeological testing would be required in areas identified in the plan as having high archeological potential. Every effort would be made at the design stage to avoid impacts on archeological resources. If impacts could not be avoided, mitigating measures would be developed at that time in consultation with the state historic preservation officer and Advisory Council on Historic Preservation. All work involving ground disturbance would comply with federal laws and regulations and NPS policy.

Archeological Monitoring during Excavation. The park archeologist and consultants would conduct a program of onsite monitoring during site excavation in rehabilitation/construction areas with the potential for significant archeological resources. Observations would be recorded in NPS Western Regional Office archeological clearance program reports, and clearance reports would be forwarded to the state historic preservation officer.

If prehistoric or historic artifacts were discovered during excavation, the archeologist would assess the significance of those artifacts, report the findings to the park superintendent, and recommend specific mitigating measures as necessary. If previously unknown resources were uncovered, work would be stopped in the discovery area, and the Park Service would consult with all concerned parties according to the *Code of Federal Regulations*, title 36, part 800, and, as appropriate, the Native American Graves Protection and Repatriation Act of 1990.

Report Distribution. The results of both preconstruction surveying and excavation monitoring would be documented in written reports to be submitted to the park superintendent for review and approval. Following the superintendent's approval, a final combined report would be prepared and sent to the state historic preservation officer, regulatory and other government agencies, academic libraries, and interested parties.

Security Program. If significant archeological resources were discovered, a security program would be implemented to prevent looting or destruction. Security would be provided by prompt curatorial treatment, onsite protection if necessary, and withholding information about the resources, as permitted under the Archeological Resources Protection Act. All archeological collections assessed to be significant would be cataloged as part of the Golden Gate National Recreation Area museum collection.

Nomination of Discovered Archeological Sites. Any prehistoric archeological sites discovered during construction/rehabilitation would be documented and evaluated for significance. Significant resources would be nominated to the National Register of Historic Places.

Wetlands and Stream Drainages

Wetland Stabilization. Native marsh species would be planted in the graded area of the new Crissy Field wetland no later than 120 days after grading was complete to prevent the contours from eroding while natural vegetation was becoming established. Early planting would speed stabilization of the graded slopes and establishment of the wetlands. Water quality would be monitored on an annual basis.

Control and Monitoring of Visitor Impacts. To reduce potential visitor impacts on the restored wetland, visitor numbers and uses would be monitored on an semi-annual basis, and measures would be taken to reduce impacts as necessary. Informational leaflets, wayside signs, and regulatory measures might be necessary in the future.

Native Plant Communities

To reduce the possibility of colonization by nonnative plant species, areas disturbed by construction and infrastructure repair would be immediately revegetated with native species. A site-specific revegetation plan would be prepared for each construction project. Revegetation would proceed according to NPS policies and guidelines. Revegetation needs would be identified early to allow time to establish seedlings from onsite plants and thus avoid contamination of the gene pool. Wherever possible, planting materials (seeds and cuttings) from the local Presidio gene pool would be used. The Park Service would seek to establish a native plant propagation center and nursery to ensure that local stock was available for use in revegetation. The Park Service would consult with the Soil Conservation Service and the California Native Plant Society on native plant propagation techniques.

Wildlife

A monitoring program would be established to identify potential impacts on marine species such as sea lions and harbor seals. From monitoring information, mitigating measures would be developed to reduce any impacts.

Threatened, Endangered, Rare, and Sensitive Species

To ensure long-term protection and mitigate any visitor-related impacts, a Presidiowide inventory and monitoring program for rare and endangered plant and animal species would be established. A native plant survey is currently underway that would provide information on the distribution and abundance of rare and endangered plants. The results of the survey would be used to establish management objectives for each rare and endangered species, including definitions of acceptable population levels in accordance with *NPS-77, Natural Resource Management Guidelines* (NPS 1991a). These objectives would stipulate actions and specific techniques for protection, enhancement, and restoration of each species.

When construction or infrastructure repair was to take place near threatened, endangered, or other species of special concern, a qualified biologist would be onsite to monitor the work and stop it if necessary.

Topography and Soils

A program to reduce dust and soil loss would be instituted for all demolition, excavation, grading, construction, and other dust-generating and soil-disturbing activities. This program would be monitored by park staff and would include 1) sprinkling all unpaved construction areas with water at least twice a day to reduce fugitive dust emissions by approximately 50% and covering or seeding disturbed areas, as appropriate; 2) imposing speed limits for construction vehicles (about 10 miles per hour) in unpaved areas; 3) covering hauling trucks containing dirt and debris; 4) covering storage piles of dirt or construction debris with plastic sheeting to prevent wind and water erosion; 5) scheduling major dust-generating activities (such as excavation and demolition) for time periods when local winds were anticipated to be less than 12 mph.

The Park Service would require that all road reconstruction contractors implement measures to control dust from disturbed areas. These measures would include watering and covering or seeding disturbed areas to prevent dust raised during clearing, excavation, grading, and earth moving from leaving the work site. NPS project supervisors would monitor contractor activities to control dust.

Air Quality

All measures listed in the transportation mitigation section would contribute to improvement of air quality.

Noise

Reduction of Construction Noise. During construction, contractors and other equipment operators would be required to comply with the San Francisco noise ordinance (*San Francisco Municipal Code*, section 2907b), which requires that each piece of powered equipment, other than impact tools, emit noise levels of not more than 80 A-weighted decibels (dBA) at 100 feet. To reduce noise impacts, barriers would be erected around construction sites and stationary equipment such as compressors; this would reduce noise by as much as 5 dBA. To further reduce noise impacts on visitors, some construction sites would be temporarily closed, and appropriate barriers placed at a distance of 250 feet from the sites.

Vehicle Noise Reduction. Vehicle traffic throughout the Presidio represents the major source of existing and future noise, especially from Highways 101 and 1. Although the Park Service cannot control the level of noise produced by privately owned vehicles, it can control which types of transit vehicles are used at the Presidio. The Park Service would use and encourage other city and transit providers to select transit vehicles that produce less noise pollution. Energy-conserving government vehicles would be used by maintenance and other divisions. If possible, electric or other alternative vehicles would be used to reduce noise levels.

Human Health, Safety, and the Environment

Emergency Response Plan. An emergency response plan would be formulated for the Presidio and integrated into emergency response planning for San Francisco. The plan would include information about employee organization, employee training, communications, equipment, building survey, evacuation, medical services, security, and cleanup. It would provide required response procedures for each building or complex on the site; the tenants of each building or complex would be responsible for carrying out those procedures. The plan would be regularly reviewed by the Park Service to ensure that it was up to date.

Fire Protection. Except for approved repair and maintenance, no work would be performed in Presidio buildings and no members of the public would be permitted to enter those buildings unless they were protected by water supplies and fire hydrants conforming to the 1991 *Uniform Fire Code* and its appendixes (UFC).

The Park Service would maintain a list of all buildings proposed for future use. When the use of a building or group of buildings was determined, the fire protection requirements for that use would be entered from the UFC onto the list, and condition of the buildings would be obtained from available documents or through tests to determine whether the buildings were adequately protected. If UFC requirements were not met, use would be limited; for example, the maximum occupancy of a public assembly area might be reduced to a smaller number of persons.

Where fire flow information for buildings intended for occupancy was not available, such information would be obtained through computer modeling or actual flow tests. Priority for determination of fire flows would be given to buildings already in use or intended for early occupancy.

Cleanup of Hazardous Substances, Pollutants, and Contaminants. Cal EPA is overseeing the Army's cleanup of hazardous substances, pollutants, and contaminants on the Presidio. The Army's cleanup plans and activities must conform to applicable federal and state laws and regulations and must also be approved by Cal EPA. The Park Service would monitor the Army's cleanup of hazardous substances, pollutants, and contaminants and would work with the Army and Cal EPA to determine whether public access would be permitted in areas that pose a potential risk to human health, safety, or the environment.

Mitigation of Potential Asbestos Exposure. In accordance with NPS policy, asbestos would be fully abated during building rehabilitation. The Army is responsible for abating all identified friable asbestos in buildings at the Presidio.

Before any activity was undertaken requiring the fracturing of serpentine rock, the Park Service would have the rock sampled and analyzed for naturally occurring asbestos. If a certified industrial hygienist determined it to be necessary, the contractor or park staff would implement measures to monitor, and control if necessary, airborne asbestos from the rock during excavation. Park visitors would be prevented from entering areas where rock was being removed. Any off-site disposal of serpentine would comply with relevant regulations concerning asbestos-containing materials.

Before any grading was done, a minimum of two soil samples from the area would be analyzed for asbestos. If asbestos was found, the San Francisco Department of Public Health would be consulted on appropriate measures to protect workers and park visitors from inhaling asbestos.

The Park Service would prepare a written plan outlining procedures to protect park employees, contractor personnel, and park visitors from asbestos exposure. Contractors whose work would involve excavation of serpentine rock would be required to have asbestos coverage in their health and safety plans.

Mitigation of Potential Lead Exposure. The Army has begun a lead-based paint condition survey of all Presidio housing to identify the condition of lead-based paint in housing. The Park Service would implement its policy of monitoring lead levels in the blood of children living at the Presidio and of abating lead paint in Presidio housing. Parents would be confidentially informed of their children's blood levels. In any case in which a child's blood lead level was confirmed to be above 9 µg/dl (micrograms of lead/deciliter) by a second blood test, past monitoring and abatement of lead in the home would be reviewed, and additional monitoring and abatement undertaken as appropriate.

Because of widespread lead contamination of soils at the Presidio, soils adjacent to all homes with children having lead levels above 9 µg/dl would be monitored. Lead sampling would be performed in accordance with the procedures described in the *Federal Register*, 57, 28910-28943, June 29, 1991. Based on recommendations of the California Department of Health Services (CADHS 1991), when soils near homes to be retained were found to contain more than 200 parts per million (ppm) of lead, one of the following would be done: Grass or other thick ground cover would be planted to completely cover the soils; at least three inches of gravel, wood chips, or other material would be placed over the soils; the area would be paved; or the top 6 inches of soils would be removed and replaced with uncontaminated soils. If lead levels greater than 1,000 ppm were found, the soils would be treated as hazardous waste, per California law.

All workers involved in lead abatement would be required to use safe lead removal methods and to follow required procedures to protect themselves and family members from exposure. Warning signs would be posted to mark the boundaries of lead-contaminated work areas. These signs would warn about the lead hazard, prohibit eating, drinking, and smoking in the area, and specify any personal protective equipment required.

The blood levels of all workers potentially exposed to lead would be monitored in accordance with the *Code of Federal Regulations*, title 29, section 1910.25. The results of such monitoring would be communicated to the individuals involved and would be treated as confidential medical information. The blood lead analyses would be performed by a laboratory listed by the Occupational Health and Safety Administration. Blood lead levels over 25 µg/dl would be reported to Occupational Health Program, California Department of Health Services, per state of California requirements.

In conformance with NPS policy, all work on lead abatement would become part of a permanent record in the building files at the Presidio. Confidential information about individual blood lead levels would not be publicly available.

Mitigation of Potential Mercury Exposure. Mercury levels in air above soils with excess mercury would be measured before final decisions on land use were made. If the mercury-contaminated soils were not removed or sealed to prevent migration of mercury vapor, landscaping or other site development would be designed so that people would not engage in activities involving prolonged presence near the soil surface; for example, grass would not be planted in such areas.

Mitigation of Potential Nickel Exposure. The Park Service would monitor Army remediation efforts and would not allow landscaping, restoration, or public access to contaminated areas until nickel levels were remediated in accordance with state regulatory standards.

Mitigation of Potential Pesticide Impacts. Pesticides would be cleaned up to levels acceptable to the appropriate state regulatory agency. The Park Service would monitor the Army's remediation efforts and would not allow landscaping, restoration, or public access to contaminated areas until pesticide levels were remediated in accordance with state regulatory standards.

Mitigation of Potential Exposure to Carcinogens. The Park Service would monitor the Army's remediation efforts and would not allow landscaping, restoration, or public access to contaminated areas until levels of carcinogens were remediated in accordance with state regulatory standards.

Mitigation of Contamination from Underground Storage Tanks. The Army has developed an underground storage tank management plan that includes the removal of approximately 236 tanks over the next several years. Cleanup of contamination from underground tanks must meet state regulatory standards. The Park Service would monitor the Army's remediation efforts and would not allow landscaping, restoration, or public access to contaminated areas until contaminants were remediated in accordance with state regulatory standards.

Protection of San Francisco Bay. To prevent release of existing contaminated sediments from storm sewers into the proposed Crissy Field wetland and/or bay, storm sewers known to be contaminated would be flushed and the dislodged sediments trapped, removed, chemically analyzed, and disposed of at an appropriate site.

To prevent release of new contaminated sediments from storm sewers into the wetland, sediment traps would be constructed and the trapped sediments would be periodically removed and analyzed. This would also decrease sedimentation in the wetland as a whole and decrease wetland maintenance costs by focusing sediment management on a few defined locations. The required frequency of chemical analysis would depend on the results of the first few sediment analyses — the greater the level of contamination, the more frequent the analyses would be. The frequency of removal of accumulated sediments would depend on the rate of deposition and the level of contamination — the greater the level of contamination, the more often the sediments would be removed.

The Park Service would monitor the Army's remediation efforts and would not allow landscaping, restoration, or public access to contaminated areas until petroleum hydrocarbons or any other contaminants were remediated in accordance with state regulatory standards.

Groundwater Quality Improvement. Wherever possible, pavement would be removed and replaced with landscaping. This would increase the permeable surface area and increase groundwater recharge by rain and irrigation water. Any contaminated ground would have to be cleaned up before planting so that the contaminants would not be carried into groundwater.

Because of excess levels of antimony, arsenic, benzene, boron, cadmium, chromium, etc., in groundwater near one of the hangars at the west end of Crissy Field (building 937), the Park Service would pay particular attention to the Army's plans for remediation there. If the Army's plans did not call for pumping out the contaminated water and treating it or disposing of it offsite, the Park Service would request a study by the Army to establish that this groundwater did not pose a threat to San Francisco Bay.

The San Francisco Bay Area Regional Water Quality Board would be consulted on remediation levels and groundwater protection.

Protection of Drinking Water Quality. To ensure that arsenic levels in drinking water would not be elevated, water from wells with high arsenic levels would not be blended with other sources of drinking water. If it was decided to divert this water for nonpotable uses such as irrigation, a risk assessment would be performed for human exposure and water would not be diverted unless the cancer risk would be less than 1 in a 1,000,000.

Drinking water would be monitored for benzene, and any water exceeding the maximum contaminant level (MCL) for benzene would not be discharged into the water distribution system.

All potable water from surface sources at Lobos Creek and Crissy Field would be tested on a regular basis according to applicable standards and regulations.

Protection of Mountain Lake Water Quality. Water in Mountain Lake would be retested for cyanide twice. If levels continued to exceed the MCL, an effort would be made to determine the source of the excess cyanide, and public access to the lake would be restricted until appropriate measures were developed and implemented. If the cyanide level in Mountain Lake consistently exceeded the MCL, a risk assessment for swimmers accidentally swallowing water would be performed to determine if any restrictions on use of Mountain Lake were appropriate.

Alternative B (No Action/Minimum Requirements): Public Sector Enclave

Presidiowide Concepts

The Golden Gate National Recreation Area enabling legislation requires the Park Service to assume control of and manage the Presidio to preserve its public values and provide for recreational open space and other educational opportunities. Alternative B assesses how the Presidio would be managed under existing NPS authorities if only those actions necessary to meet legislative requirements were carried out.

Continued use of the Presidio by the Sixth Army was not considered as a no-action/minimum requirements alternative. The Base Closure and Realignment Act of 1988 requires that the Presidio's use as a military installation be terminated and that the Presidio's military functions and personnel be transferred to other military bases (USACE 1991). Because Congress has already determined that the base is to be closed and jurisdiction transferred to the National Park Service, retention of the Presidio by the Army and continued use as a fully operating military post is not a viable no-action alternative.

Under alternative B the National Park Service would be responsible for overall management and oversight, but the management of leases and uses of all buildings except the housing units would become the responsibility of the General Services Administration (GSA). Buildings under GSA management would first be offered to meet the needs of public agencies, including the Sixth Army, and then be put out for competitive lease. Under historic property leasing and other authorities, tenants would be required to rehabilitate and preserve the buildings that they occupied. Uses of the buildings would not have to relate to the park's purpose; however, preference would be given to organizations proposing to offer park or public programs or visitor services.

Because GSA does not have the authority to lease housing, a property management firm would be selected to rent or lease the Presidio's 1,173 units (376 buildings) for the Park Service (this total excludes 11 housing units at the Public Health Service hospital). Housing would be used for public programs, such as a residential youth corps, and would also be available for rent by staff of tenant organizations.

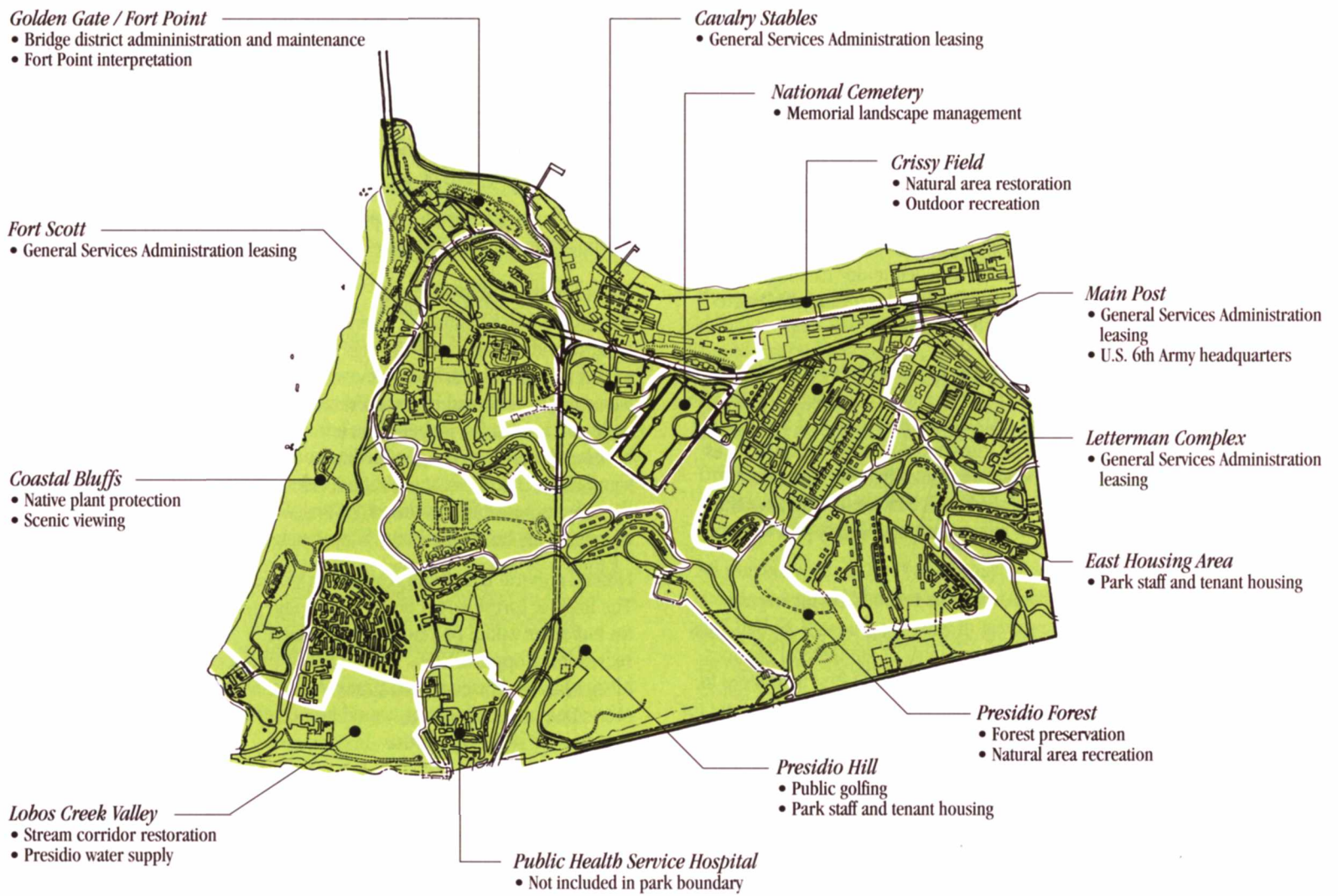
The Public Health Service hospital complex would not be included in the park boundary under this alternative.

Resource Management

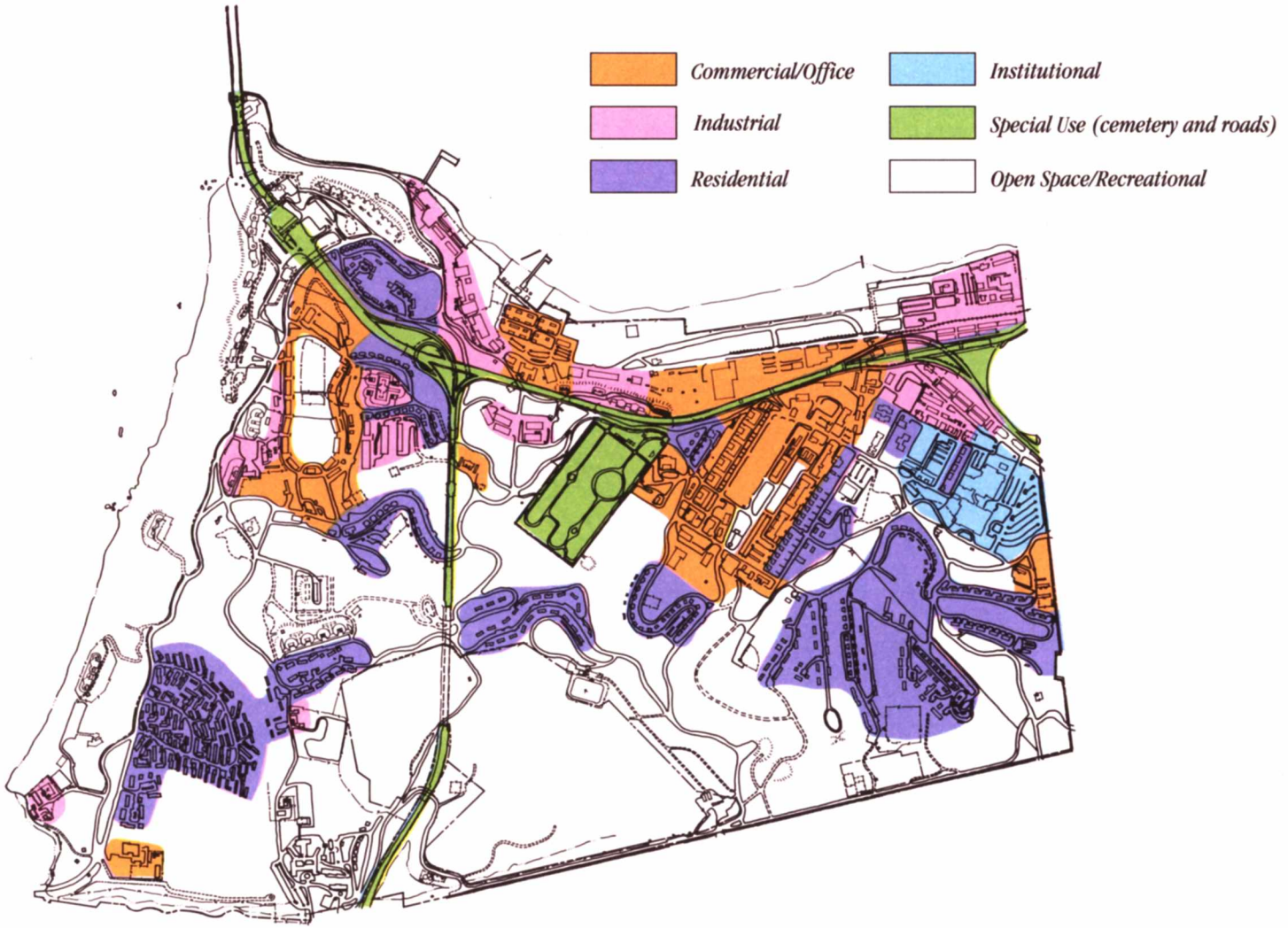
The Park Service would not have direct management responsibility for most of the historic and nonhistoric buildings or for carrying out compliance activities related to them; GSA, with Park Service oversight and review, would be responsible for ensuring that National Historic Preservation Act section 106 compliance activities were carried out for all buildings and other cultural resources except historic housing that have been identified as contributing to national historic landmark significance. Likewise, stabilization, rehabilitation, and preservation would not be the sole responsibility of the Park Service; GSA and park tenants would assume this responsibility for the buildings they managed and occupied.

Limited cultural landscape restoration would be carried out under this alternative. The historic forest would be preserved and maintained in its current configuration. No buildings would be removed to enhance scenic and natural values or expand recreational opportunities, and no major projects would be undertaken to restore historic vistas. Museum collections, including the current Presidio and national recreation area collections, would be preserved and displayed at the former commissary at the main post.

Natural resource management would be limited primarily to protection of existing native plant habitats and endangered species. No wetland or stream restoration projects would be implemented. Open space areas would remain at approximately 780 acres, and native plant communities would continue to occupy 145 acres.



Management Emphasis – Alternative B



General Land Use – Alternative B

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

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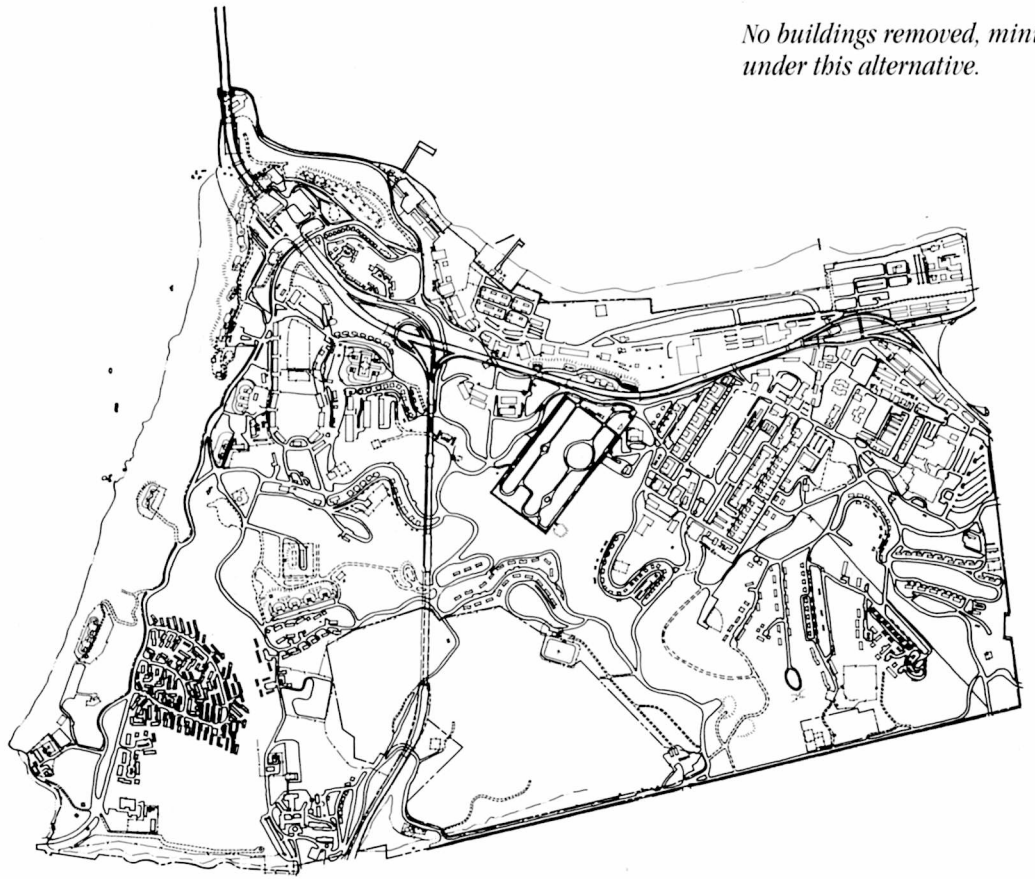
No buildings removed, minimum site improvements under this alternative.



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Building Removal/Site Improvements – Alternative B

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

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Visitor Use and Programming

Few actions would be taken to expand visitor opportunities. Existing park facilities like those at Fort Point and Baker Beach would continue to operate at the same level. New programs and services would be concentrated in the open space areas at Crissy Field, Golden Gate/Fort Point, Presidio Hill, and the coastal bluffs. The former commissary at the main post would be used as a park visitor center and museum collections facility, and some visitor services would be provided there and at the former post exchange. All existing recreational facilities would be retained. The golf course, tennis courts, gyms, and other facilities would be opened for public use and managed by concessioners. Public sector tenants managed by GSA would be encouraged, but not required, to provide public programs related to the park's purpose. Annual recreational visits under this alternative would be expected to reach 4.5 million in the year 2000 and 6.9 million in 2010 (Peccia & Associates 1993).

Access and Circulation

No major road system modifications would be implemented under this alternative. Actions would be taken to correct safety hazards, and minor improvements would be made to support bicycle and pedestrian use. Traffic would be primarily related to tenant uses. Parking would be available in currently designated areas. Based on projected demand, the total number of parking spaces would be reduced from 13,000 to 11,400 (Peccia & Associates 1993). Neighbors would continue to have access to the site through existing entrances.

Efforts would be coordinated with MUNI and Golden Gate Transit to provide more direct downtown service and regional transit connections. Transportation hubs would be established at the main post and the Golden Gate Bridge, where people could buy transit passes and transfer to city service. No additional transit services (Park Service shuttle, water taxi) would be provided. The Park Service and GSA would continue to encourage and support regional public transit improvements proposed by other agencies or private sector providers that would increase access to the Presidio. The Park Service would also continue to support long-range improvements to Doyle Drive and would consider design alternatives as they were prepared by Caltrans and other agencies.

Community

Of the 1,173 available housing units (376 buildings), a small number would be used as overnight lodging for visitors and residences for essential park staff such as law enforcement personnel. Beyond these needs, most housing would be used by non-NPS employees and tenants. Proposed uses of the units are shown below. A property management firm would lease the housing under NPS and GSA direction. If needed, housing could be used for office space and other uses. No housing would be removed. The residential population under this alternative is projected to be about 3,600 in both 2000 and 2010 (Jones & Jones 1993a).

Proposed Uses	No. of Units/Buildings Year 2010	No. of Units/Buildings Year 2010
Visitor lodging/training and conference accommodations	59/44	59/44
Residential use - DOD	150/76	150/76
Residential use - park and partner staff	964/256	964/256
Removal	0/0	0/0

Support facilities — food and other essential services — would be operated at the main post by concessioners under GSA lease agreements. These facilities would be available to staff, tenants, and visitors. No concession services would be provided in other planning areas. Presidio employees are projected to number about 7,400 in both 2000 and 2010 (Jones & Jones 1993a).

Public Health and Safety

Law enforcement, fire prevention and protection, and emergency services would be provided by the National Park Service, as described in alternative A.

Environmental Protection and Sustainable Design

As in alternative A, the Park Service would promote environmental protection and sustainable design and would demonstrate technologies and practices that reduce environmental impacts or produce environmental benefits in energy conservation, solid waste management, transportation, water conservation and reclamation, and sewage treatment. The park's infrastructure would be improved as described in alternative A, except at the Public Health Service hospital site, which would not be included in the park boundary.

Planning Area Concepts

Main Post

The visitor center/administrative complex for the Presidio would be established at the former commissary and post exchange buildings at the north end of the main post. The facility would be staffed by park personnel who would provide orientation and interpretation. Site-specific information about recreational opportunities in the Presidio and Golden Gate National Recreation Area would be available in an exhibit area. Exhibits would also interpret the significance of the park's cultural and natural resources.

The Sixth Army would use the main office buildings on the east side of the main post for administrative and headquarters functions. Other buildings on the main post would be leased by GSA and the property management firm for a variety of public and private uses. As in alternative A, concessioner-operated support services and public safety functions such as the fire department would be located here. The parade ground would not be restored and would continue to be used for parking.

A transportation hub would be constructed at the north end of the main post to serve visitors and tenants who used public transit to reach the park. No restoration projects would be carried out in the riparian corridor along Tennessee Hollow.

Golden Gate/Fort Point

Visitor use would be improved at the Golden Gate Bridge plaza by providing information kiosks and other services. The maintenance facilities for the Golden Gate Bridge District would remain in their present location.

At Fort Point the visitor contact station at the torpedo wharf would be rehabilitated to accommodate visitor needs; orientation materials, restrooms, and limited food service would be provided. A new westbound roadway would be established from old Mason Street on Crissy Field to Marine Drive, and return eastbound access would be designated on Long and Crissy Field avenues. Two-way bicycle access would be provided along Long Avenue.

Hiking and bicycling connections between the Golden Gate promenade at Fort Point and the Golden Gate Bridge plaza would be improved to provide easier access and better resource protection. The serpentine areas and other natural features on the Fort Point cliffs would be protected.

Fort Scott

Buildings at Fort Scott would be leased by GSA and the property management firm for public and private uses. They would be rehabilitated and adapted by the tenants. No action would be taken to restore the parade ground or the riparian area and historic gardens around the former officers' club. Rare plants and serpentine habitat would be protected. Park maintenance facilities would be located at the existing maintenance site south of Battery Dynamite.

Letterman Complex

Uses of the Letterman complex would be determined by GSA and would not necessarily be related to the park's purpose. The main facilities — the former Letterman hospital and the Letterman Army Institute of Research (LAMC and LAIR) — might be used as a hospital or research complex. Historic buildings would be rehabilitated to support new uses. Limited new development would be allowed if it was compatible with the historic setting and structures. No site improvements would be made.

Cavalry Stables

The stables would be leased, probably for use as workshop space or warehouse space. One of the buildings would be rehabilitated for use by the U.S. Park Police as a stable for its mounted patrol horses.

Public Health Service Hospital

The Public Health Service hospital would not be included within the Presidio boundary. This would reduce the park's building space by 400,000 square feet (21 buildings) and the total park acreage by approximately 36 acres. The Park Service would not have responsibility for the protection of cultural resources, native plant communities, and water resources in this area or for decisions about uses of the facilities. The connector roads from the hospital grounds into the Presidio would be closed. The site and facilities would not be accessible to visitors.

The hospital property would be conveyed and disposed of by GSA according to the Federal Surplus Property Act. Deed restrictions or easements would be placed on future use of the site to ensure that the Presidio's water supply sources — Mountain Lake and Lobos Creek and its underlying aquifer — were protected from contamination.

East Housing Area

Some housing in this area would be used by NPS staff, but most would be leased to tenants and military staff. The Pop Hicks ballfield would remain available for public use. The El Polin Spring area would also be open to visitors, but no actions would be taken to restore and enhance the natural stream drainages. Native plant communities in the area would be preserved and protected. Lovers Lane would be resurfaced and improved for walking and hiking; it would continue to provide access from Presidio Gate to the main post.

Crissy Field

Crissy Field would continue to provide outdoor recreational opportunities for city residents and the visiting public. The promenade would be rehabilitated from the marina entrance to Fort Point, and a restroom and 400-space parking area would be built at the east end for boardsailing activities; however, no major changes would be made to expand open space, interpret the airfield's history, or provide additional recreational amenities. Minor improvements would be made to enhance scenic qualities — excess fencing on the north side of Mason Street and some excess pavement would be removed. The Coast Guard pier would be stabilized and preserved. About 30 acres of dunes would be enhanced, and existing native plant communities would be preserved and protected. No wetlands or native plant communities would be reestablished. Access between Crissy Field and the Fort Point torpedo wharf would be improved.

Presidio Hill

This area would continue to provide for a variety of outdoor activities, in particular hiking and golfing. The golf course would be operated by a concessioner as a public facility. A new 8,000-square-foot clubhouse and maintenance facility would be constructed to replace the existing Army clubhouse, and a 150-space parking area would be provided. Mountain Lake Park and adjoining riparian habitat would be protected. The area would continue to be administered by the city of San Francisco. No housing would be removed in the Wherry and Washington Boulevard housing areas, and no native plant or historic forest restoration would take place.

National Cemetery

The national cemetery would remain a quiet place for remembrance and reflection. The size of visiting groups would be limited, and tours would be conducted in a respectful manner. The site would continue to be administered by the Veterans Administration. Consistent with the NPS *Management Policies*, it would not be expanded.

Presidio Forest

The historic forest would be preserved within its current boundaries. A forest management plan would be prepared to direct future NPS management of forested areas and to reduce potential public safety hazards. The forest would be a setting for many outdoor activities, from hiking to biking to quiet contemplation. No new trails would be developed. Historic resources in the forest, including the Presidio Gate, historic roads, and Battery Stotsenberg-McKinnon, would be stabilized and preserved. The battery would be a part of interpretive tours.

Areas with remnant native plant communities, including the serpentine grassland at Inspiration Point, would be protected. Sections of trails would be relocated to reduce erosion and damage to sensitive habitats.

Julius Kahn Playground would continue to be administered by the city of San Francisco as a recreational facility, and new parking areas (a total of 50 spaces) would be constructed. The Rob Hill camping area would be redesigned and improved for camping and educational activities.

Lobos Creek Valley

There would be no stream or native plant restoration in the Lobos Creek valley. Endangered and sensitive species would be protected and preserved. The former Army Reserve center would be adapted for use by a public or private sector tenant.

The water treatment plant would be rehabilitated to meet applicable codes and regulations. No interpretation would be provided there.

Coastal Bluffs

The natural qualities of the coastal bluffs would be protected, but no native plant restoration would take place. No major site improvements would be made; informational kiosks would be provided. The historic structures along this stretch of coast would be stabilized and preserved. Baker Beach would continue to be maintained as an easy-to-reach coastal site where people could beachcomb, sunbathe, and fish. Bowley Street would be closed and converted to parking for the beach (120 spaces). Twelve parking spaces would be paved and striped at the World War II memorial.

Implementation

Management and Governance

The Park Service would provide general management and oversight at the Presidio and would be responsible for all open space areas. GSA and the private property management firm would be responsible for administering tenant leases for all historic and nonhistoric buildings not needed for essential park purposes. Historic property leasing authority would be used to lease buildings, but additional authority, such as general leasing legislation, might be required to provide for the scale and variety of nonpark uses that would likely occur within the park.

The Park Service would need an additional 288 employees to manage the site under this alternative. GSA would also need additional staff to accomplish their responsibilities. Development costs would be $730 million for tenants, $88 million for the Park Service, and $80 million for D.O.D. Operating costs for the Presidio would be about $43 million annually; $22 million would be recovered from tenant revenues.

Legislative Requirements

Legislation might be required to authorize GSA to manage buildings for nonpark purposes. Legislation might also be required for general leasing authority, but would not be needed to retain revenues from public and private tenants.

No legislation would be needed for boundary adjustments. The 36-acre Public Health Service hospital site would not be included in the park.

Mitigating Measures

Following is a summary of the measures that would be taken to mitigate or minimize the potential impacts of alternative B. Most of the measures are the same as under alternative A, and their details are described in that section. All measures would be regularly evaluated and monitored by Park Service staff to determine their effectiveness in reducing impacts.

City Services

A minimum amount of city of San Francisco water might be needed if uses at the Letterman Army Institute of Research (LAIR) and Letterman Army Medical Center (LAMC) required water of a purity that is not available from onsite sources. Under alternative B an estimated 50,000 gallons of city water per day could be needed for such special uses. During the design and replacement of the water treatment and distribution system, the Park Service would work with city officials to reduce this projected amount of water use or offset the loss of city water. Solutions might include providing Presidio water to San Francisco for any city water used or mixing city water with Presidio water to reduce the total amount of city water used.

Traffic and Transportation Systems

All of the mitigating measures related to traffic and transportation systems would be the same as under alternative A. They would include

- monitoring of alternative travel modes, expansion or modification of support facilities and services, and implementation of other measures to increase pedestrian, bicycle, and transit use
- transportation information services
- employee transit incentives (e.g., flexible hours, subsidized transit passes, van pool matching services)
- a transit brokerage/coordination operation to support conference and training activities
- parking fee support of transit services
- support for increased MUNI service on existing lines, new MUNI radial transit service, and MUNI light rail extension
- support for a Golden Gate Transit transfer facility near the main post transportation hub
- bicyclist and pedestrian amenities (e.g., shelters, benches, bike racks)
- monitoring and adjusting of parking to encourage transit use
- event coordination with the San Francisco Recreation and Park Department, Fort Mason Foundation, and Exploratorium
- intersection capacity improvements, particularly at Presidio entrances, and monitoring of intersections to determine if recommended traffic flow improvements were effective
- designation of a transportation coordinator for the Presidio

National Historic Landmark District

The mitigating measures dealing with the national historic landmark district would be the same as under alternative A except that no buildings would be removed and therefore no recording and documenting of such buildings according to HABS standards would not be required. Other measures would include

- mitigation of effects on national historic landmark structures in consultation with the state historic preservation officer and Advisory Council on Historic Preservation
- inventory of historic buildings and preparation of rehabilitation guidelines
- upgrading of buildings to meet life/safety codes and establishment of a plan review and construction office to ensure compliance with codes and historic preservation guidelines
- preparation of maintenance plans for individual buildings or groups of buildings by tenants or, in the case of unoccupied structures, the National Park Service
- preparation of guidelines for treatment of vacant buildings; inspection, preservation, monitoring, and patrolling of vacant buildings
- preparation of guidelines for the treatment of the cultural landscape
- preparation of guidelines for compatible new construction
- preparation of a forest management plan and tree removal plan
- monitoring of visitor impacts on sensitive cultural resources and implementation of measures to reduce impacts

Archeology

Mitigating measures for archeological resources would be the same as under alternative A and would include

- preconstruction surveying in areas with high potential for archeological resources; implementation of mitigating measures, in consultation with the state historic preservation officer and Advisory Council on Historic Preservation, for any impacts that could not be avoided
- archeological monitoring during excavation and official recordation of findings
- distribution of final reports on preconstruction surveying and excavation monitoring to the state historic preservation officer and other interested parties
- implementation of a security program for the protection of any significant resources that were discovered; cataloging of all significant collections
- nomination to the National Register of any archeological resources determined to be significant

Wetlands and Stream Drainages

There would be no mitigating measures related to wetlands and stream drainages under this alternative because no actions would be taken to restore these natural habitats.

Native Plant Communities

The mitigating measures for native plant communities would be the same as under alternative A. Areas disturbed by construction or infrastructure repair would be immediately revegetated with native species, and site-specific revegetation plans would be prepared for each construction project. Wherever possible, seeds and plantings from the Presidio gene pool would be used. The Park Service would consult with the Soil Conservation Service and the California Native Plant Society on native plant propagation techniques.

Wildlife

There would be no mitigating measures related to wildlife management actions. No water taxi service would be instituted.

Threatened, Endangered, Rare, and Sensitive Species

The mitigating measures would be the same as under alternative A. A Presidiowide inventory and monitoring program for rare and endangered plant and animal species would be established, and management objectives would be developed to stipulate actions and specific techniques for protection, enhancement, and restoration of each species. When construction or infrastructure repair was to take place near threatened, endangered, or other species of special concern, a qualified biologist would be onsite to monitor the work and stop it if necessary.

Topography and Soils

As in alternative A, a program to reduce dust and soil loss would be instituted for all excavation, grading, construction, and other dust-generating and soil-disturbing activities. NPS project supervisors would monitor contractor activities to control dust.

Air Quality

All measures listed in the transportation mitigation section would contribute to improvement of air quality.

Noise

Mitigating measures would be the same as under alternative A and would involve actions to reduce both construction and vehicle noise. During construction, contractors and other equipment operators would be required to comply with the San Francisco noise ordinance and to erect barriers as necessary to reduce noise impacts. To reduce the noise from vehicle traffic, the Park Service would use and encourage other city and transit providers to select transit vehicles that make less noise. Energy-conserving government vehicles would be used by maintenance and other divisions. If possible, electric or other alternative vehicles would be used to reduce noise levels.

Human Health, Safety, and the Environment

The mitigating measures related to health, safety, and the environment would be the same as under alternative A and would include

- preparation of an emergency response plan in coordination with the city of San Francisco
- provision of adequate fire protection in all Presidio buildings by conforming to the *Uniform Fire Code*; restricting use of buildings that did not meet code
- monitoring by both Cal EPA and the Park Service of the Army's hazardous substances cleanup program, including underground storage tanks
- mitigation of potential exposure to asbestos, lead, mercury, nickel, and carcinogens by restricting public access and preventing landscaping and restoration of contaminated areas until the Army meets state regulatory standards
- control of toxic contaminants from storm sewers by trapping, removing, analyzing, and disposing of dislodged sediments on a regular basis
- monitoring by both Cal EPA and the Park Service of the Army's remediation and removal of petroleum hydrocarbons and any other contaminants at Crissy Field; the Park Service would restrict public access, landscaping, or restoration work until the Army meets state regulatory standards
- removal of pavement and landscaping to increase permeable surface area and groundwater recharge
- protection of drinking water quality by avoiding sources with high arsenic or benzene levels and by regularly testing Lobos Creek sources
- protection of Mountain Lake water quality

Alternative C: Expanded Open Space/Restoration/Interpretation – Traditional NPS Management

Presidiowide Concepts

Under alternative C the focus would be on increasing open space, restoring historic settings and native habitat, and interpreting the Presidio and its resources. Many historic buildings and their settings would be restored, and most nonhistoric buildings would be removed to reduce the building stock and open natural areas. Wetland, stream, dune, and native habitat restoration projects would be carried out to enhance resource values.

The National Park Service would have sole responsibility for administration, resource management, interpretation, maintenance, and public safety at the Presidio. Buildings would be leased for park-related uses through existing authorities, including historic property leasing, special use permits, and concession contracts and permits. The Sixth Army would continue to use housing units and administrative buildings primarily in east housing area and the main post. The nonhistoric Letterman hospital and research institute (LAMC and LAIR) would be deauthorized and excluded from the Presidio boundary. Other buildings within the Letterman complex would remain in the park because of their historical value and potential for fulfilling the park purpose. The Public Health Service hospital complex would not be included within the park boundary.

Resource Management

Under this alternative 37 historic and 319 nonhistoric buildings (a total of 356 buildings with approximately 1.8 million square feet of space) would be removed. These removals, together with the exclusion of the LAMC, LAIR, and Public Health Service hospital buildings from the boundary, would reduce total building square footage from 6.3 to about 3 million square feet. Some historic buildings and their settings would be restored to depict historically significant time periods (from 1770 to the 1940s), and some building interiors would be restored. All other buildings would be rehabilitated for other park uses. Essential park services and functions would be placed in historic buildings rather than nonhistoric structures to aid in preserving these important resources. A few nonhistoric facilities, for example the post gym and child care center, would be maintained to support the new park community. Museum collections would be preserved and displayed at a parkwide collections management facility at the former commissary on the main post.

The historic forest would be replanted and revitalized as described in alternative A. The total acreage of the forest would be increased by about 72 acres. Areas outside the historically designed forest boundary would be cleared and restored with native plants. Native plant and habitat restoration would be a major focus of resource management. As described in alternative A, restoration projects would be carried out along stream corridors, along the Crissy Field shoreline, in areas where buildings were removed, and in other parts of the park where remnant native plant communities survive. Approximately 155 acres of native habitat would be restored, bringing the total to about 295 acres.

Because of the extent of building removal, a large number of scenic and historic vistas could be restored. These views would enhance visitor experiences and aid in interpreting the history and the resources of the site. The total open space within the park would increase by 230 acres to a total of 1,010 acres.

Park partners, concessioners, and other tenants would be required to comply with all laws, regulations, and NPS policies related to cultural and natural resource preservation. The Park Service would be responsible for ensuring compliance with those laws, regulations, and policies.

Visitor Use and Programming

Under this alternative visitor experiences would be more like those in a traditional national park. The Park Service would establish many interpretive and educational programs focused on the Presidio's significant resources. Orientation to the Presidio, Golden Gate National Recreation Area, and the national park system would be provided at a central visitor/interpretive center at the main post, and visitor contact stations would be established throughout the site.

The main park facilities would be the visitor/interpretive center and an environmental center at the cavalry stables. Some historic buildings and settings would be restored to specific time periods for interpretation. Other buildings would be



Management Emphasis – Alternative C

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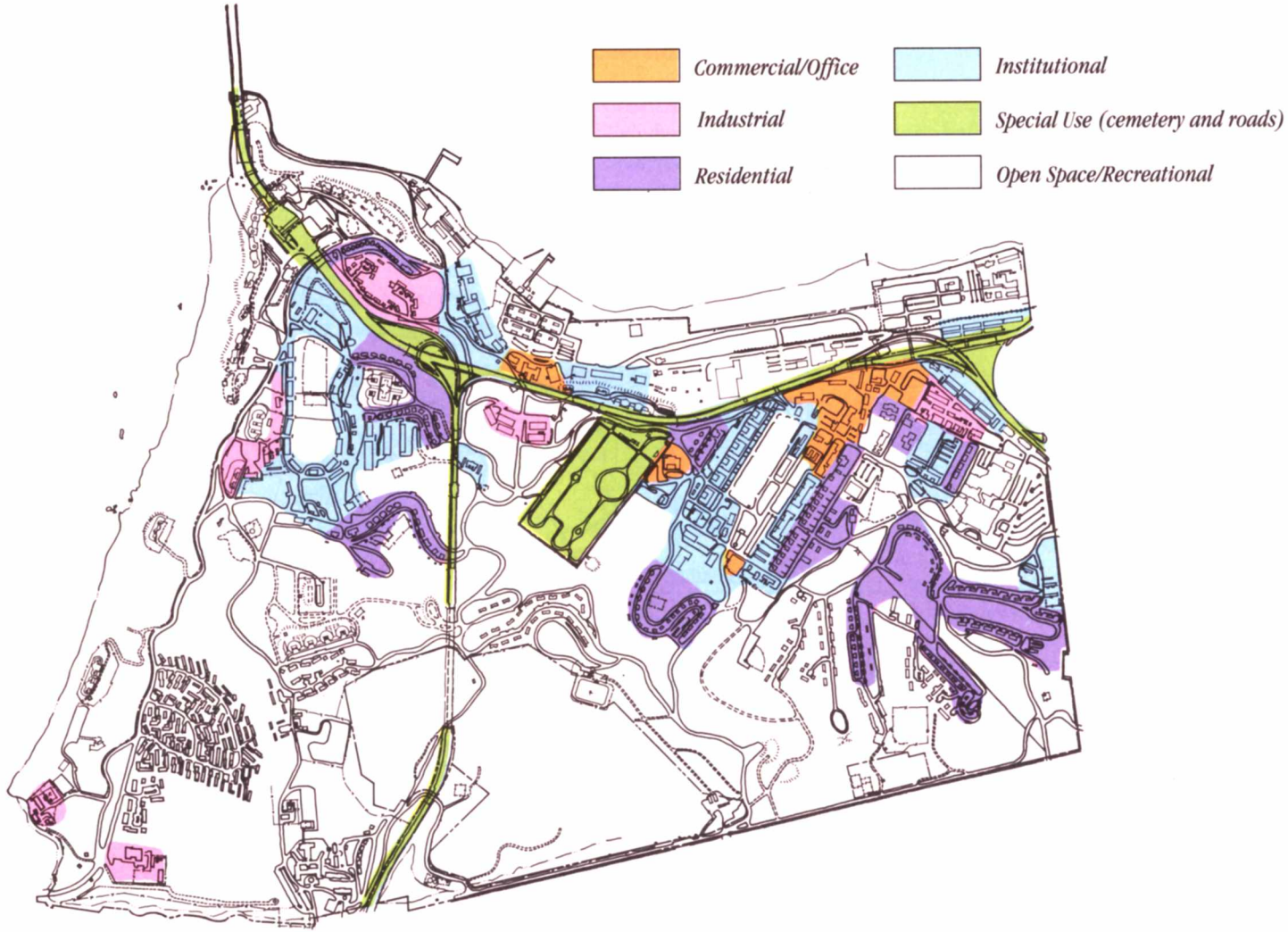

General Land Use – Alternative C

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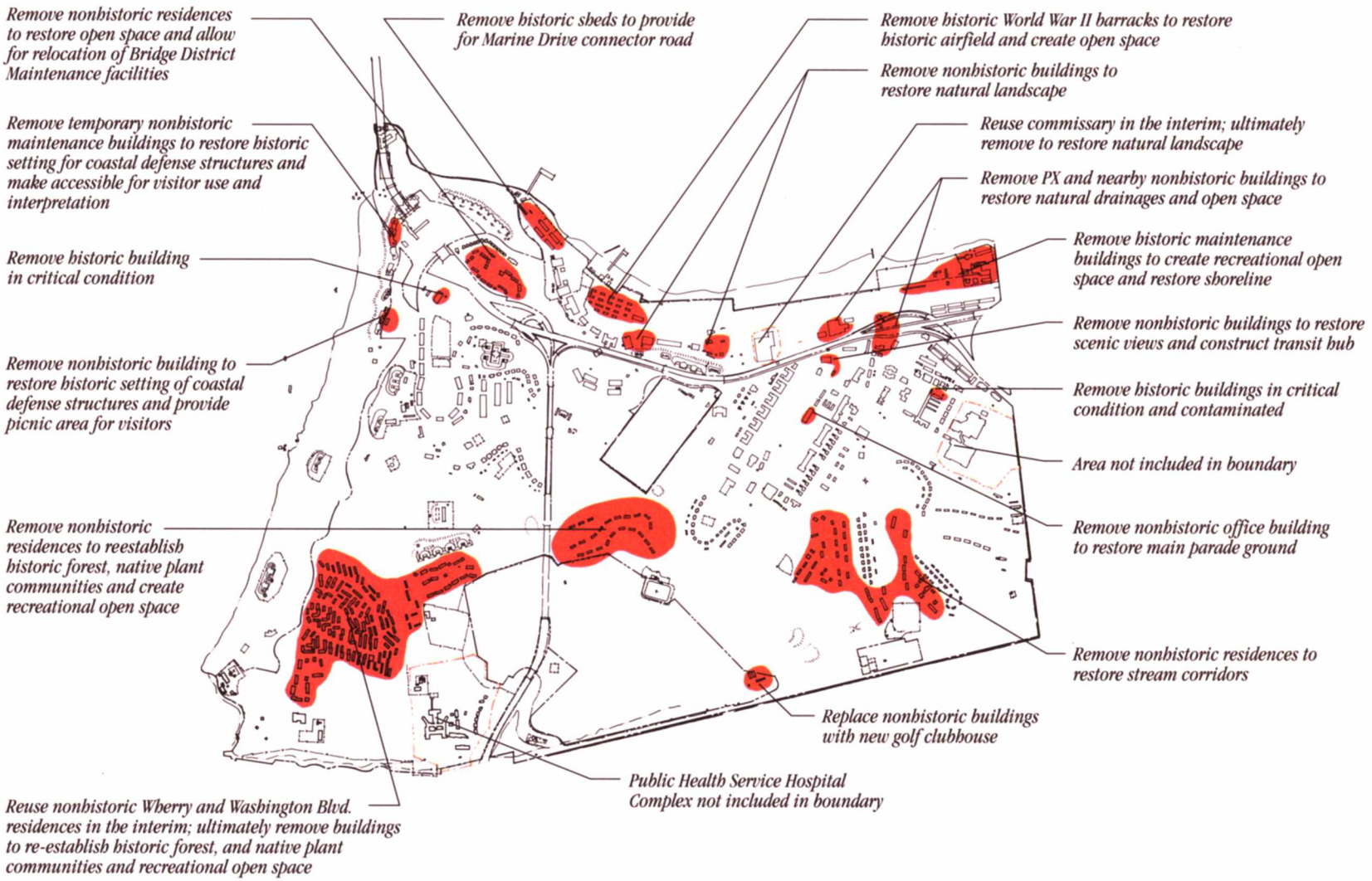

Building Removal/Site Improvements – Alternative C

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used for concessions such as food service, a park store, and recreation equipment rental. In general, recreational resources would be maintained and opened for public use as described in alternative A.

Park partners, operating under historic property leases, cooperative agreements, and special use permits would establish a wide range of programs similar to those described in alternative A. They would use rehabilitated historic buildings to provide educational programs on the Presidio's history, its resources, and environmental issues. Visitors would participate in programming through seminars, lectures, and hands-on opportunities. Annual recreational visits are projected to reach 5.2 million in the year 2000 and 7.3 million in 2010 (Peccia & Associates 1993).

Access and Circulation

Actions to improve the Presidio road system would be similar to those under alternative A except that more secondary roads would be removed because of the removal of the buildings that they service. Trails for pedestrians and bicyclists would generally follow existing corridors; in some cases, they would be built on former nonhistoric roadbeds so that new terrain would not have to be disturbed. A total of 10 miles of pedestrian trails and 11 miles of bicycle routes would be established.

Because the amount of occupied building space would be reduced, the demand for parking and access to facilities would decrease. Based on demand projections, existing parking areas would be reduced in size and number (from 13,000 to 8,200 spaces), and large paved areas would be removed (Peccia & Associates 1993). The remaining parking would be clustered around the main activity areas.

Proposals for alternative modes of access and circulation would be the same as described in alternative A and would include the establishment of an alternative-fuel shuttle system, extension of city transit service, and development of a water taxi docking site. Efforts would be coordinated with MUNI and Golden Gate Transit to provide more direct downtown service and regional transit connections. Transportation hubs would be established at the main post and the Golden Gate Bridge, where people could buy transit passes and transfer to city service. The Park Service would continue to encourage and support regional public transit improvements proposed by other agencies or private sector providers that would increase access to the Presidio, for example charter tour service or F line light rail extension from the Embarcadero. The Park Service would also continue to support long-range improvements to Doyle Drive and would consider design alternatives as they were prepared by Caltrans and other agencies.

Community

With the removal of most nonhistoric buildings, the number of housing units would be substantially reduced. Of the 1,173 available units (376 buildings, excluding the Public Health Service hospital), nearly three-quarters would be removed; the remaining units would be used for military, NPS, and park partner housing and overnight accommodations for visitors. In addition, Fort Scott would house up to 300 conference participants. With all guest facilities at full capacity, the number of overnight visitors could reach 600. Proposed uses of the housing units are shown below.

Proposed Uses	No. of Units/Buildings Year 2010	No. of Units/Buildings Year 2010
Visitor lodging/training and conference accommodations	85/56	85/56
Residential use - DOD	150/76	150/76
Residential use - park and partner staff	836/215	70/40
Removal	102/29	868/204

The reduction in housing would result in a smaller Presidio community and therefore a reduced need for support services. These services would be provided at the main post. Contemporary structures that currently support the Presidio community, such as the child care center, the post gym, and the bowling alley, would be retained. The residential population is projected to reach 3,600 in 2000 and drop to 1,000 in 2010. The number of employees is projected at 4,500 in 2000 and 4,100 in 2010 (Jones & Jones 1993a).

Public Health and Safety

Law enforcement, fire prevention and protection, and emergency services would be provided by the National Park Service as described in alternative A. Offices for these services would be at the main post. No public health and safety services would be provided to LAMC, LAIR, or the Public Health Service hospital complex.

Environmental Protection and Sustainable Design

Conservation measures would be implemented as described in alternative A, including actions to upgrade the Presidio infrastructure. Because of the reduced building stock, the infrastructure requirements would not be as great under this alternative. The LAMC, LAIR, and Public Health Service hospital complex currently operate on independent utility systems that would be kept separate from NPS-operated systems. Runoff water from the grounds of the Public Health Service hospital into Lobos Creek would be monitored to ensure that there was no contamination from new uses.

Planning Area Concepts

Main Post

As in alternative A, the buildings and grounds of the main post would be adaptively restored for new uses. Most of the paving would be removed on the main parade ground, and it would be returned to its historic appearance. Over time, two historic and 28 nonhistoric buildings (about 208,000 square feet) would be removed to enhance the historic setting and expand open space. The historic archeological resources of the early Spanish/Mexican presidios would be extensively studied, and a commemorative site established north of the officers' club. Several historic buildings, including the former post sutler's store, would be restored.

Educational and cultural programs, youth programs, and interpretation would be the focus of visitor activities at the main post. Tenants under lease and permit arrangements would occupy many of the post's historic buildings and assist the Park Service in providing programming. The park's visitor/interpretive center would be in one of the Montgomery Street buildings facing the main parade ground, and community services and public health and safety facilities would be concentrated in this area. The Sixth Army would occupy several office buildings on the east side of the complex.

The main post would be the transportation hub for the Presidio shuttle system, allowing visitors to travel easily between the site's major activity areas. The main post would also be a key transit transfer point between the Presidio and other park and regional tourist areas. Graham Street would be closed to vehicles and established as a pedestrian route. Other improvements and amenities for pedestrians would be included throughout the area, including curb cuts, new walks and trails, benches, and drinking fountains.

As the central visitor area, the main post would provide services for park residents, staff, and visitors, including concessioner-operated food service; picnic areas; a convenience store; a central office supply center for tenant groups; a post office; public safety services (emergency medical, rescue, and firefighting); and some recreational facilities. Short-term lodging operated by concessioners would be provided along Funston and Riley avenues and at Infantry Terrace to allow visitors to explore the Presidio for extended periods.

The main post's remnant natural features and scenic vistas would be preserved and enhanced. The riparian corridor in Tennessee Hollow east of Funston Avenue would be restored as part of the Crissy Field wetland restoration project.

Golden Gate/Fort Point

The Golden Gate Bridge plaza would be redesigned as described in alternative A to improve scenic vistas, enhance the historic setting, and upgrade existing access to the site. The Golden Gate Bridge District maintenance functions would be relocated to the Armistead Road area north of Fort Scott, and the nonhistoric buildings that they now occupy, which block scenic views, would be removed. Several of the coastal defense structures would be preserved and interpreted, and their historic settings would be restored. The Fort Point visitor contact station at the torpedo wharf would be rehabilitated to provide orientation, interpretation, and visitor services. To simplify access, a new westbound roadway would be established from old Mason Street on Crissy Field to Marine Drive, and return eastbound access would be designated on Long Avenue and Crissy Field Avenue. Two-way bicycle access would be established along Long Avenue. The pedestrian/bicycle connection between Fort Point and the Golden Gate Bridge area would be improved as described in alternative A.

Fort Scott

Proposals for Fort Scott would be similar to those of alternative A. The historic buildings and grounds would be rehabilitated to support groups and individuals who would carry out research, training, and conferences. Space would be provided for classrooms, workshops, laboratories, assembly and training rooms, and food service. As in alternative A, the National Park Service would establish an

employee development center for the training of NPS, other agency, and international park staff.

The industrial area south of Battery Dynamite would serve Fort Scott's maintenance and warehouse needs. In addition to the 14 buildings removed under alternative A, 20 nonhistoric buildings (42 housing units, 76,500 square feet) would be removed at the north end of the fort just north of Doyle Drive. This area, along Armistead Road, would be used to accommodate the Golden Gate Bridge District maintenance functions; some new construction might be required.

Letterman Complex

The LAMC and LAIR buildings would be deauthorized and excluded from the Presidio boundary. The Park Service would no longer have responsibility for decisions about uses of these facilities. The buildings would be surveyed and conveyed by GSA or the Bureau of Land Management according to the Federal Surplus Property Act. The exclusion of the buildings would reduce the site's building space by 800,000 square feet and the total park acreage by 20 acres.

Historic buildings in the remaining Letterman complex would be rehabilitated to support new park activities. The O'Reilly Avenue houses and the barracks near Girard Road would provide housing and lodging for park and tenant staff. Two historic and four nonhistoric buildings with about 26,000 square feet of building space would be removed from the complex because they are in poor or critical condition or are nonhistoric and an intrusion on the historic scene. This action would increase open space and allow for restoration of the historic setting.

Significant streetscapes and landscape features would be preserved and in some cases restored. Excess pavement would be removed, and areas adapted for pedestrians. The former courtyard space at the historic hospital complex would be rehabilitated, and the parking lot removed. O'Reilly Avenue would be closed to vehicles and redesigned for pedestrian use. It would extend to a new at-grade or overpass connector to the Palace of Fine Arts.

New uses at LAMC and LAIR could cause significant increases in incoming worker traffic at the Lombard Gate and Gorgas Avenue entrances, which could conflict with park traffic. Access into the hospital/research facilities would be designed and marked to separate it from the entrance into the park.

Cavalry Stables

The former cavalry barracks would be rehabilitated to accommodate a residential environmental center similar to that described in alternative A. Some of the former stables would support the center's activities and be used as workshop and classroom space. Park partners would demonstrate new environmental technologies and sustainable systems and provide other educational programs. One stable would be adapted to provide a hands-on working environment for experimentation and training in the application of conservation technology. Visitors would be invited to view and participate in all of these programs.

The overall integrity of the site and its structures would be preserved, and one of the stables would be rehabilitated for use by the U.S. Park Police and for interpretation of the early Army cavalry. Four nonhistoric utility buildings (total 2,000 square feet) would be removed. The historic landscape would be restored as much as possible to evoke the historic setting of the stables. Nonnative vegetation in the area would be removed, and remnant natural dune and riparian areas south and southwest of the structures would be protected and enhanced as wildlife habitat.

Public Health Service Hospital

The Public Health Service hospital would not be included within the Presidio boundary. The exclusion of the facility would reduce the park's building space by 400,000 square feet (17 buildings) and the total park acreage by approximately 36 acres. The Park Service would no longer have responsibility for the protection of cultural and natural resources in this area or for decisions about uses of the facilities. The connector roads from the hospital grounds into the Presidio would be closed.

The property would be disposed of by GSA according to the Federal Property Surplus Act. Deed restrictions or easements would be placed on use of the site to ensure that the Presidio's water supply sources — Mountain Lake and Lobos Creek and its underlying aquifer — were protected from contamination.

East Housing Area

Most of the historic housing in this area would be used by military and park staff and tenants. The 184 nonhistoric housing units along Quarry Road and near El Polin Spring would be removed (47 buildings, 272,000 square feet). The cultural landscape and the natural qualities of the El Polin Spring area and adjacent

valleys would be enhanced, and archeological resources would be identified and protected, as described in alternative A. The Pop Hicks ballfield would be maintained for public use.

Crissy Field

As in alternative A, Crissy Field would be managed to enhance the setting for recreational opportunities while preserving important cultural resources and restoring natural systems. The Golden Gate promenade along the water's edge would be renovated to provide opportunities for a variety of passive recreational pursuits — walking, jogging, running, biking, picnicking, and scenic viewing. Activities like boardsailing would take place offshore. Support facilities and services would be provided to meet the needs of a wide spectrum of users. Only moderate-sized events would be possible when the areas now used for large events were restored to more natural conditions.

Many actions would be taken to enhance the area's scenic qualities and restore its natural setting. A total of 32 historic and 32 nonhistoric buildings with 272,000 square feet of space would be removed throughout the field. Paved areas would be substantially reduced (by 72 acres), and nonnative vegetation would be removed.

At the east end the historic maintenance buildings north of Mason Street would be demolished, and the entryway redesigned to provide a continuous public open space from Marina Green through Crissy Field. Based on the results of further study, 20-80 acres of the former wetlands along the bayshore at the east end would be restored and reconnected to the freshwater surface flows from the Tennessee Hollow drainage.

Other natural resource improvements would be made, including expanding the native dune system (30 acres) on the central shoreline, protecting shorebird habitat between the Fort Point and Coast Guard lifesaving station piers (about 15 acres), and restoring native plant communities in the serpentine outcrop at the west end (0.5 acre). Visitor uses would be restricted as necessary to protect native systems and species.

The historic airfield structures at the west end of the field would be the focus of preservation and interpretation. These structures would be rehabilitated for new uses, and the airfield itself would be restored to its historic (ca. 1920s) appearance. The temporary World War II barracks between the airfield and the lifesaving station would be removed because they do not date from the airfield's period of significance. An aviation museum would be established in the west end hangars where visitors could learn about the history of the airfield and past, present, and future transportation technology. The nearby lifesaving station would also be rehabilitated and would provide space for educational programs related to the maritime environment. Access between Crissy Field and the Fort Point torpedo wharf would be improved.

Presidio Hill

This area would continue to provide for a variety of outdoor activities, in particular hiking and golfing. The golf course would be opened to public use and administered under a concession contract. A new clubhouse and maintenance facility (8,000 square feet) with 150 parking spaces would be constructed to replace the existing Army facility. Mountain Lake Park would continue to be managed by the city of San Francisco for public use.

To expand open space, all of the 642 nonhistoric housing units in the Wherry and two Washington Boulevard housing areas would be removed (166 buildings, 940,000 square feet), and the sites restored to earlier conditions. This would involve restoration of both the historic forest and native plant communities.

National Cemetery

The national cemetery would remain a quiet place for remembrance and reflection. The size of visiting groups would be limited, and tours would be conducted in a respectful manner. The site would continue to be administered by the Veterans Administration. Consistent with the NPS *Management Policies*, it would not be expanded.

Presidio Forest

As in alternative A, the Presidio forest would continue to provide a woodland retreat. The forest would be revitalized using species selected for the original design. Research would be conducted to determine the extent of the forest as originally planted, and areas outside that boundary would be cleared and planted with native species to expand open space and restore important vistas. The parts of the existing forest that provide important wildlife habitat would be maintained.

Areas with remnant native plant communities, including the serpentine grassland at Inspiration Point, would be protected, and the areas restored wherever possible. Sections of trails would be relocated to reduce erosion and damage to

sensitive habitats. All new trails would be located in previously disturbed areas. Historic resources within the forest — the Presidio Gate entrance, historic roads, and Battery Stotsenberg-McKinnon — would also be preserved. The battery would be stabilized and included on the interpretive tour of Presidio coastal defenses.

The forest would provide a setting for many activities, from hiking and biking to quiet contemplation. A trail system would be developed to provide access to the area's many natural and historic sites. This system would connect with other regional trails. Interpretation would be provided at appropriate sites along the trails.

The Rob Hill group camping area would be redesigned to improve camping and interpretive experiences and reduce impacts. Outdoor interpretive presentations would be held in the amphitheater there. The Julius Kahn Playground would continue as a public recreational facility managed by the San Francisco Recreation and Park Department. A 50-space parking area would be constructed to concentrate parked cars and reduce safety hazards in the area.

Lobos Creek Valley

This area would be managed to restore and enhance the natural stream corridor. Stream and native habitat restoration projects would be undertaken as described in alternative A. Visitor use would be limited to reduce the potential for impacts on the corridor. The Army Reserve building near Lobos Creek would be used for park maintenance. Activities at the facility would be monitored to avoid any negative effects on water, wildlife, native plants, and other sensitive resources. The water treatment plant would be rehabilitated and upgraded to meet current safe drinking water standards.

Coastal Bluffs

As in alternative A, the coastal bluffs would be preserved as the wildest and most natural part of the Presidio. To protect rare and sensitive plants, visitor access would continue to be confined to developed trails. No new interpretive facilities would be provided, except along the Coastal Trail above the bluffs. Nonnative species would be replaced with native species, and threatened and endangered species would be protected and subject to restoration efforts. Habitats that have developed on serpentine rock would be managed to minimize disturbance.

The remnant portion of the historic forest above the coastal bluffs would be restored and replanted as directed in the forest management plan. Trees that have become established outside the boundaries of the historic forest would be removed, and the sites replanted with native vegetation. Historic structures along this stretch of the coast would be stabilized and preserved.

Baker Beach would be maintained as a coastal site for beachcombing, sunbathing, and fishing. A new intersection to permit safer access to Baker Beach would be created by extending Gibson Road to Lincoln Boulevard. Both ends of Bowley Street would be closed, and the roadway converted to parking. Parking along the shoulders of Lincoln Boulevard would be eliminated, and a bike lane established. Twelve parking spaces would be paved and striped at the World War II memorial.

Implementation

Management and Governance

The Park Service would be responsible for all administration and oversight at the park. This would include staffing and managing leasing, tenant activities, and all park operations. An NPS staff of 388 would be required to monitor, review, and carry out these functions. Administrative facilities for the Presidio would be in historic buildings at the main post. Development costs would total $193 million for the Park Service, $322 million for tenants, including concessioners and park partners, and $113 million for D.O.D. Annual operating costs for the NPS would be about $32 million; $17 million would be recovered from tenant revenues.

Legislative Requirements

Legislation would be needed to adjust the boundary to exclude the LAMC and LAIR buildings. No legislation would be sought to include the Public Health Service hospital in the Presidio.

No legislation would be required for general leasing authority, revenue retention capability, or creation of a federally chartered institution to assist with management. Leasing of buildings would be under existing authorities — historic property leasing, cooperative agreements, and special permits. Legislation would be sought to allow the use of fees from parking, concessions, and/or tenants to subsidize or implement proposed shuttle bus and ferry operations.

Mitigating Measures

The mitigating measures under alternative C are summarized below. The measures are identical to those under alternative A, and their details are described in that section. All measures would be regularly evaluated and monitored by Park Service staff to determine their effectiveness in reducing impacts.

City Services

There would be no mitigating measures related to city services under this alternative. The LAMC and LAIR facilities would be excluded from the park, and their water requirements would not be the responsibility of the Park Service.

Traffic and Transportation Systems

All of the mitigating measures related to traffic and transportation systems would be the same as under alternative A. They would include

- monitoring of alternative travel modes, expansion or modification of support facilities and services, and implementation of other measures to increase pedestrian, bicycle, and transit use
- transportation information services
- employee transit incentives (e.g., flexible hours, subsidized transit passes, van pool matching services)
- a transit brokerage/coordination operation to support conference and training activities
- parking fee support of transit services
- support for increased MUNI service on existing lines, new MUNI radial transit service, and MUNI light rail extension
- support for a Golden Gate Transit transfer facility near the main post transportation hub
- bicyclist and pedestrian amenities (e.g., shelters, benches, bike racks)
- monitoring and adjusting of parking to encourage transit use
- event coordination with the San Francisco Recreation and Parks Department, Fort Mason Foundation, and Exploratorium
- intersection capacity improvements, particularly at Presidio entrances, and monitoring of intersections to determine if recommended traffic flow improvements were effective
- designation of a transportation coordinator for the Presidio

National Historic Landmark District

The mitigating measures dealing with the national historic landmark district would be the same as under alternative A and would include

- documentation of buildings to be removed according to HABS standards
- mitigation of effects on national historic landmark structures in consultation with the state historic preservation officer and Advisory Council on Historic Preservation
- inventory of historic buildings and preparation of rehabilitation guidelines
- upgrading of buildings to meet life/safety codes and establishment of a plan review and construction office to ensure compliance with codes and historic preservation guidelines
- preparation of maintenance plans for individual buildings or groups of buildings by tenants or, in the case of unoccupied structures, the National Park Service
- preparation of guidelines for treatment of vacant buildings; inspection, preservation, monitoring, and patrolling of vacant buildings
- preparation of guidelines for the treatment of the cultural landscape
- preparation of guidelines for compatible new construction
- preparation of a forest management plan and tree removal plan; restoration of the historic forest
- monitoring of visitor impacts on sensitive cultural resources and implementation of measures to reduce impacts

Archeology

Mitigating measures for archeological resources would be the same as under alternative A and would include

- preconstruction surveying in areas with high potential for archeological resources and implementation of mitigating measures, in consultation with the state historic preservation officer and Advisory Council on Historic Preservation, for any impacts that could not be avoided
- archeological monitoring during excavation and official recordation of findings
- distribution of final reports on preconstruction surveying and excavation monitoring to the state historic preservation officer and other interested parties
- implementation of a security program for the protection of any significant resources that were discovered; cataloging of all significant collections
- nomination to the National Register of any archeological resources determined to be significant

Wetlands and Stream Drainages

As in alternative A, native marsh species would be planted in the restored Crissy Field wetland within 120 days after grading. Visitor uses and numbers in the wetland area would be monitored, and actions taken as necessary to reduce impacts.

Native Plant Communities

The mitigating measures for native plant communities would be the same as under alternative A. Areas disturbed by construction or infrastructure repair would be immediately revegetated with native species, and site-specific revegetation plans would be prepared for each construction project. Wherever possible, seeds and plantings from the Presidio gene pool would be used. The Park Service would consult with the Soil Conservation Service and the California Native Plant Society on native plant propagation techniques.

Wildlife

A monitoring program would be established to identify and reduce any impacts on marine species related to visitor use and taxi service.

Threatened, Endangered, Rare, and Sensitive Species

The mitigating measures would be the same as under alternative A. A Presidiowide inventory and monitoring program for rare and endangered plant and animal species would be established, and management objectives would be developed to stipulate actions and specific techniques for protection, enhancement, and restoration of each species. When construction or infrastructure repair was to take place near threatened, endangered, or other species of special concern, a qualified biologist would be onsite to monitor the work and stop it if necessary.

Topography and Soils

As in alternative A, a program to reduce dust and soil loss would be instituted for all demolition, excavation, grading, construction, and other dust-generating and soil-disturbing activities. NPS project supervisors would monitor contractor activities to control dust.

Air Quality

All measures listed in the transportation mitigation section would contribute to improvement of air quality.

Noise

Mitigating measures would be the same as under alternative A and would involve actions to reduce both construction and vehicle noise. During construction, contractors and other equipment operators would be required to comply with the San Francisco noise ordinance and to erect barriers as necessary to reduce noise impacts. To reduce the noise from vehicle traffic, the Park Service would use and encourage other city and transit providers to select transit vehicles that make less noise. Energy-conserving government vehicles would be used by maintenance and other divisions. If possible, electric or other alternative vehicles would be used to reduce noise levels.

Human Health, Safety, and the Environment

The mitigating measures related to health, safety, and the environment would be the same as under alternative A and would include

- preparation of an emergency response plan in coordination with the city of San Francisco
- provision of adequate fire protection in all Presidio buildings by conforming to the *Uniform Fire Code*; restricting use of buildings that did not meet code
- monitoring by both Cal EPA and the Park Service of the Army's hazardous substances cleanup program, including underground storage tanks
- mitigation of potential exposure to asbestos, lead, mercury, nickel, and carcinogens by restricting public access and preventing landscaping and restoration of contaminated areas until the Army meets state regulatory standards
- control of toxic contaminants from storm sewers by trapping, removing, analyzing, and disposing of dislodged sediments on a regular basis
- monitoring by both the Cal EPA and the Park Service of the Army's remediation and removal of petroleum hydrocarbons and any other contaminants at Crissy Field; the Park Service would restrict public access, landscaping or restoration work until the Army meets state regulatory standards
- removal of pavement and landscaping to increase permeable surface area and groundwater recharge
- protection of drinking water quality by avoiding sources with high arsenic or benzene levels and by regularly testing Lobos Creek sources
- protection of Mountain Lake water quality

Alternative D: Partial Military Reuse – Public/Private Partnerships

Presidiowide Concepts

Under this alternative most of the Presidio would remain under National Park Service management, but the Department of Defense would have a significant presence on the site. Military personnel would reuse the entire Letterman complex (about 50 buildings; 1.3 million square feet), the child care center and main office buildings at the main post, and about 800 housing units in the east, Wherry, and Washington Boulevard housing areas. Cultural and natural resource preservation actions would be undertaken, and a variety of visitor programs and activities would be established in areas not occupied by the military. As in alternative A, park partners would be selected to develop and operate many of these programs. The Park Service would have primary responsibility for site management, but it would be assisted by a federally chartered institution in managing park partners in assigned areas. Legislation would be enacted to allow general leasing, revenue retention, and continued military activity within the Presidio and to include the Public Health Service hospital within the park.

Resource Management

Cultural resource management actions would be similar to those described in alternative A. Actions proposed in areas occupied by the military would be coordinated by the Park Service and the Department of Defense. The military would occupy and be responsible for maintaining about 200 buildings (2.2 million square feet) at the Letterman complex, the main post, and Wherry and Washington Boulevard housing areas (a total of about 190 acres of developed area). Thirty-seven historic and 115 nonhistoric buildings (687,000 square feet) would be removed, primarily at Crissy Field and in the east housing area, to increase open space and enhance natural, cultural, and recreational resources. Approximately 520 buildings would be rehabilitated for new uses by the Park Service and park partners.

Natural resource improvements would also be similar to those of alternative A. The historic forest would be revitalized, native habitat restoration projects would be undertaken, and open space and scenic vistas would be enhanced. The existing forest would be expanded by 4 acres, the acreage of native habitat would nearly double to 270 acres, and total open space would increase from 780 to 910 acres.

The military, park partners, and other tenants would be required to comply with all laws, regulations, and NPS policies related to cultural and natural resource preservation. The Park Service would be responsible for ensuring compliance with those laws, regulations, and policies. Agreements would be negotiated with the Department of Defense to stipulate resource management responsibilities for buildings, other historic features, archeological resources, and natural features.

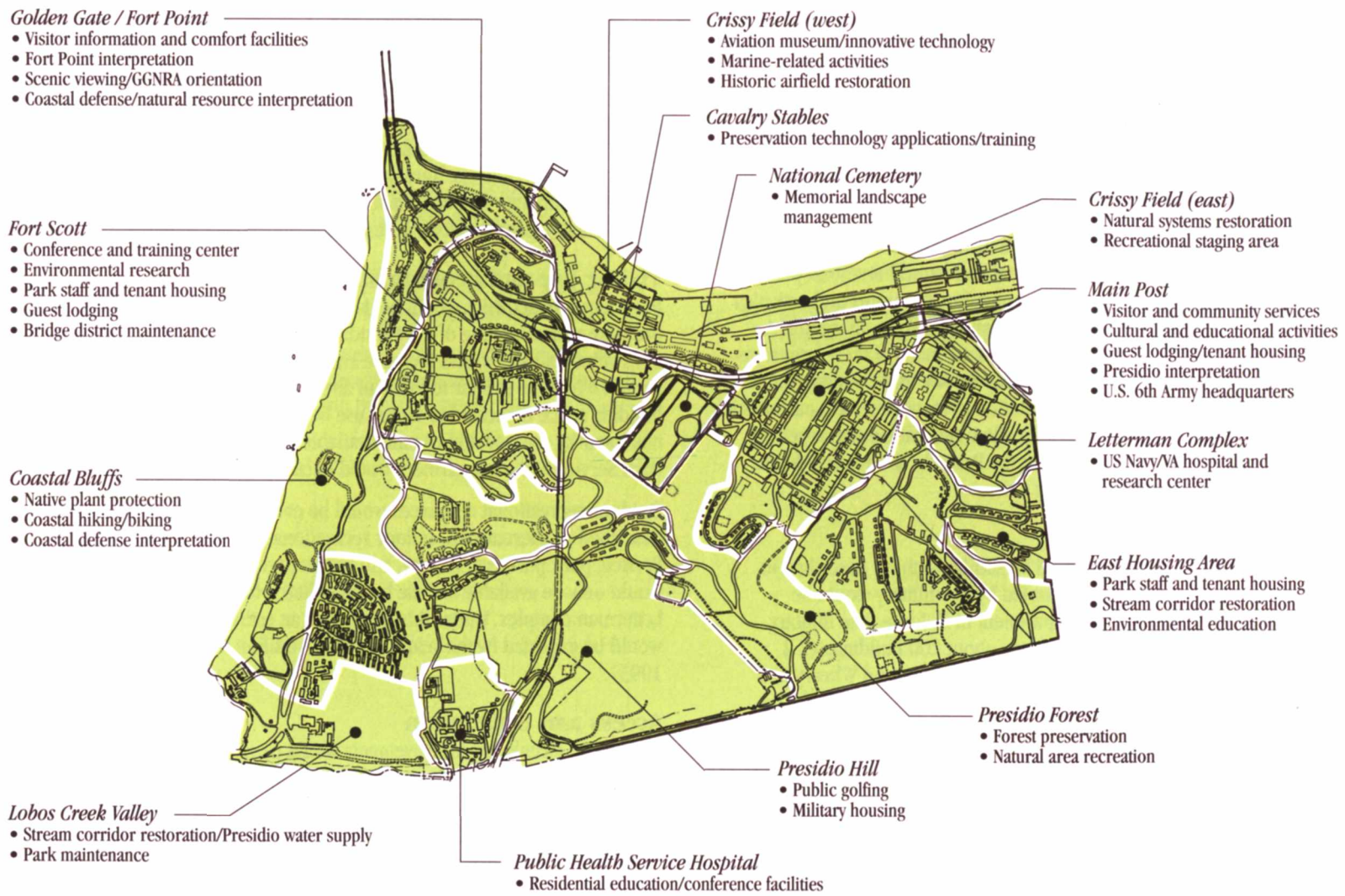
Visitor Use and Programming

Programs and activities would be developed by the Park Service and park partners to promote understanding of the Presidio's resources and history, address global environmental issues, and increase cultural awareness. In most of the planning areas, actions would be similar to those of alternative A. Although there would be less building space dedicated to visitor use because of military occupancy, most of the main activity areas would remain available for visitor programs and activities. The Park Service and park partners would occupy most buildings not used by the military.

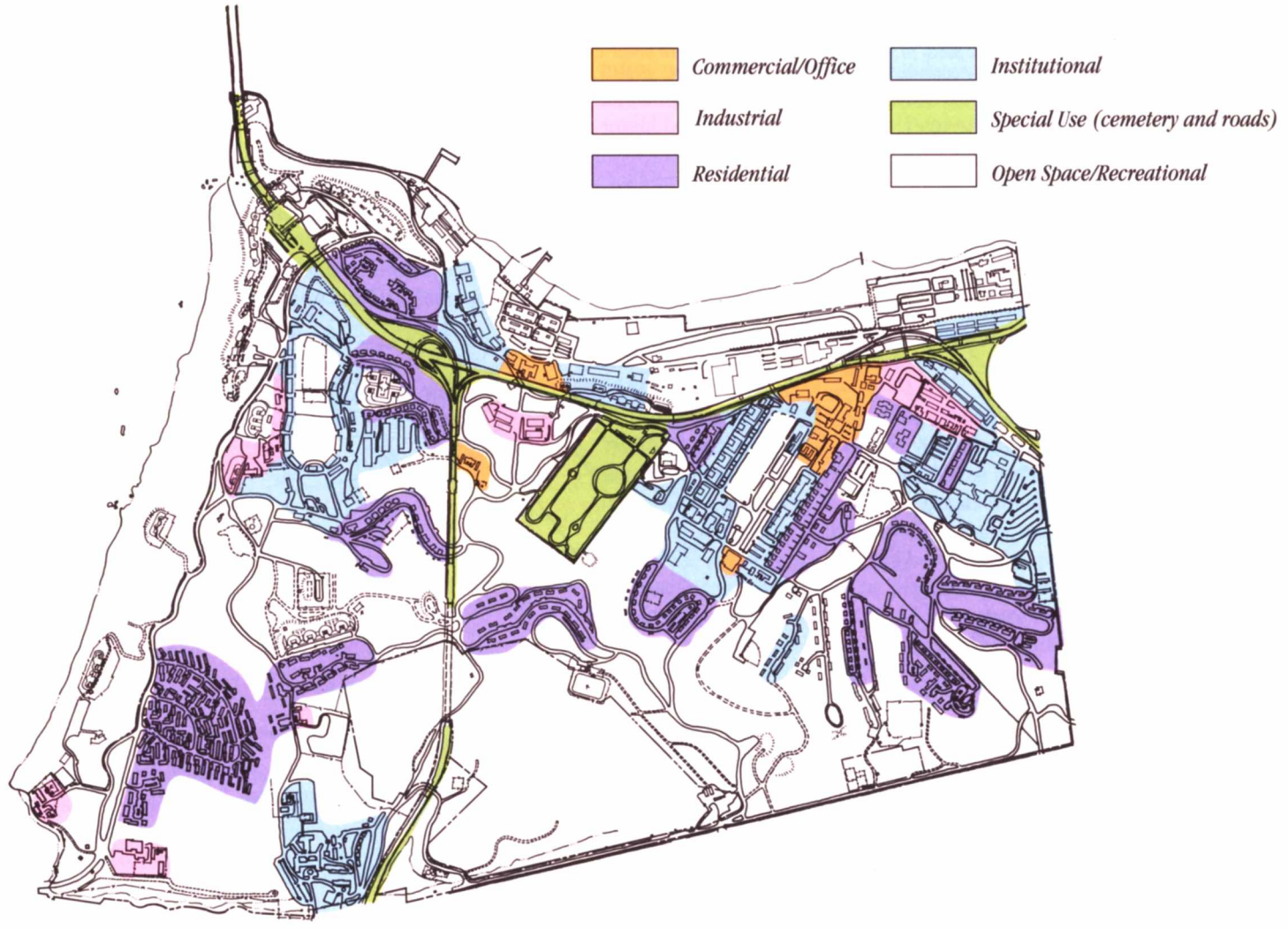
Outdoor recreational resources would be enhanced and opened for public use as described in alternative A. Indoor recreational facilities would be shared by the Park Service, park partners, visitors, and military residents. A limited number of facilities would only be available for use by the military, for example the pool and gym at the Letterman complex. Under this alternative an estimated 6.1 million recreational visits would be expected by the year 2000 and 8 million by 2010 (Peccia & Associates 1993).

Access and Circulation

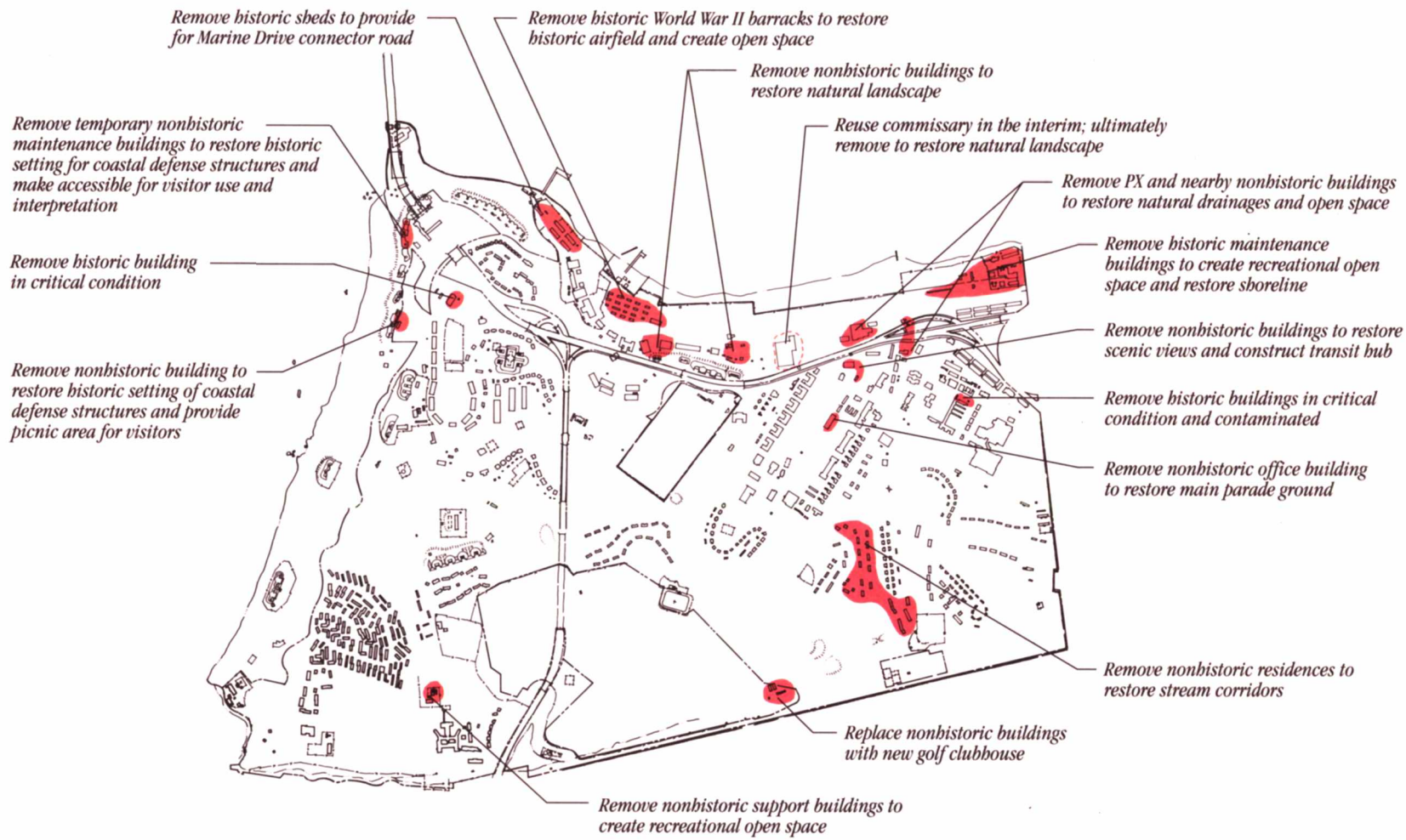
Access and circulation improvements would be similar to those of alternative A. In areas occupied by the military, the Department of Defense would be required to make those improvements. Actions would include roadway upgrading and some roadway closures, an expanded road and trail network for pedestrians and bicyclists, transit improvements, and parking reduction and management. Public access to reserved military areas would be restricted. Based on projected demands, the total number of parking spaces would be reduced from 13,000 to about 9,200 spaces (Peccia & Associates 1993). Alternative modes of travel would also be encouraged by establishing a shuttle system, extending city transit service, and developing a water taxi docking site. A transportation hub would be established at the main post, as described in alternative A.



Management Emphasis – Alternative D



General Land Use – Alternative D



Building Removal/Site Improvements – Alternative D

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Community

The Presidio community would include park and park partner staff, visiting program participants, and military residents. Of the 1,184 housing units (383 buildings), more than half would be occupied by military personnel working outside the Presidio. About a third of the units would be used for staff and park partner housing and for overnight visitor accommodations. A small number of units would be removed to provide open space and resource enhancement. Proposed uses of the units are shown below. The residential community under this alternative is projected to be 2,900 in 2000 and 2,800 in 2010 (Jones & Jones 1993a).

Proposed Uses	No. of Units/Buildings Year 2010	No. of Units/Buildings Year 2010
Visitor lodging/training and conference accommodations	85/56	85/56
Residential use - DOD	792/226	792/226
Residential use - park and partner staff	255/86	215/78
Removal	52/15	92/23

The levels and types of community services would be similar to those of alternative A. The Department of Defense would operate the child care center at the main post, which would support the park community. The day employee population would be about 7,200 in 2000 and 6,800 in 2010 (Jones & Jones 1993a).

Public Health and Safety

Law enforcement, fire prevention and protection, and emergency services would be provided, as described in alternative A. Emergency medical service to serve visitors and the entire Presidio community would be a required provision of hospital reuse by the Department of Defense.

Environmental Protection and Sustainable Design

Conservation techniques and practices would be implemented as described in alternative A. In addition, actions would be taken to upgrade the Presidio infrastructure. The upgrades would be the same as in alternative A, except that all future costs and demands on infrastructure in areas occupied by the military would be the responsibility of the Department of Defense.

Planning Area Concepts

Except for military occupation and management of the Letterman complex, the Wherry and Washington Boulevard housing areas, and the child care center at the main post, most of the planning areas concepts in this alternative would be the same as in alternative A. The concepts are summarized below.

Main Post

As in alternative A, the main post would become a focus of visitor activities. It would include the Presidio's main visitor/interpretive center and a transportation hub where visitors could transfer from external to internal public transportation. The Park Service and park partners would rehabilitate historic buildings to provide a variety of multicultural programs, workshops, and educational events. The parade ground would be restored to provide settings for interpretation and outdoor activities. The Tennessee Hollow riparian corridor would be reestablished, and scenic vistas and open space would be enhanced. A total of two historic and 26 nonhistoric buildings (207,500 square feet) would be removed. Access and circulation would be improved for pedestrians, bicyclists, and motorists.

The main post would also provide most of the support services for visitors and the Presidio community, including all public safety services. The Sixth Army would use the main office buildings on the east side of the complex for headquarters and administrative function. The child care center at the main post would be used by the military community and, if space was available, by park staff and the public.

Golden Gate/Fort Point

The Golden Gate Bridge plaza would be redesigned as described in alternative A to improve vistas, restore the historic setting, and upgrade existing access. The bridge district maintenance functions would be moved to the buildings south of the Battery Dynamite area, and the nonhistoric buildings that they now occupy, which block scenic views, would be removed. Several of the coastal defense structures would be preserved and interpreted, and their historic settings would be restored. The torpedo wharf visitor contact station at Fort Point would be

upgraded to include additional information and amenities. A new westbound roadway would be established from old Mason Street on Crissy Field to Marine Drive, and return eastbound access would be designated on Long Avenue and Crissy Field Avenue. Two-way bicycle access would be established along Long Avenue. The pedestrian/bicycle connection between Fort Point and the Golden Gate Bridge area would be improved as described in alternative A.

Fort Scott

The campuslike setting of Fort Scott would be used as described in alternative A. Space and facilities would be provided for research, training, and conferences, and about 300 lodging units would be available. Historic buildings would be preserved through rehabilitation and adaptive use. The parade ground would be restored, and one historic and 12 nonhistoric buildings (16,500 square feet) would be removed. Historic views would be reestablished, gardens restored, and historic landscape features preserved. Remnant natural systems at Fort Scott would be managed to restore their environmental integrity.

As in alternative A, an employee development center would be established for the training of NPS, other agency, and international park staff. The maintenance facility south of Battery Dynamite would be used by the Golden Gate Bridge District.

Letterman Complex

The Letterman hospital would continue to be used for acute health care for military staff, dependents, and retirees. The Department of Defense would operate the facility. Medical services at other military and Veterans Administration sites in the region would be transferred to the Presidio. The research center would be used to support military research. The historic buildings in the complex would also be used by the Department of Defense. Two historic and three nonhistoric buildings (20,500 square feet of space) would be removed because they are in poor or critical condition.

No visitor information would be available at the hospital and research center. Interpretation of Letterman's history would be provided at the main post visitor/interpretive center.

Cavalry Stables

As in alternative A, the cavalry stables would be used as workshop and program space to demonstrate environmental technologies and sustainable systems and for other educational programs. The stables and nearby barracks would be adapted to provide a hands-on working environment. One of the stables would be rehabilitated for the U.S. Park Police and for interpretation of the early Army cavalry. Three nonhistoric outbuildings (2,000 square feet) would be removed to enhance the historic setting. Nonnative vegetation would be removed, and remnant natural areas would be protected and enhanced as wildlife habitat.

Public Health Service Hospital

As in alternative A, the Public Health Service hospital complex would be adapted for in-depth conferences or educational activities. Residences and dormitories would be used to support activities, and dining and assembly spaces would be provided. The 1950s addition to the hospital would be retained, the building rehabilitated, and the site relandscaped. Five nonhistoric buildings (4,500 square feet of space) would be removed to enhance the historic setting. Remnant natural systems and rare and endangered species would be preserved.

East Housing Area

The east housing area would be maintained as a residential area for military, NPS, and park partner staff. The nonhistoric housing on Quarry Road would be converted for environmental education programming, with classrooms and lodging. The El Polin Spring area and adjacent valleys would be enhanced by removing 25 nonhistoric buildings (146,000 square feet) and restoring the riparian corridors. The natural and cultural values of the spring would be protected, as would archeological resources in the vicinity. The area would be interpreted, and opportunities for hiking and picnicking would be provided. Lovers Lane and other foot trails would be improved. New trail segments would provide more hiking opportunities and allow foot traffic to be rerouted away from fragile resource areas. The Pop Hicks ballfield would be maintained for public use.

Crissy Field

As in alternative A, Crissy Field would be managed to enhance the setting for recreational opportunities while preserving important cultural resources and restoring natural systems. The Golden Gate promenade along the water's edge would be renovated to provide opportunities for a variety of passive recreational pursuits — walking, jogging, running, biking, picnicking, and scenic viewing. Activities like sailboarding would take place offshore. Support facilities and services would be provided to meet the needs of a wide spectrum of users. Only

moderate-sized events would be possible when the areas now used for large events were restored to more natural conditions.

Many actions would be taken to enhance the area's scenic qualities and restore its natural setting. A total of 32 historic and 29 nonhistoric buildings with 272,000 square feet of space would be removed throughout the field. Paved areas would be substantially reduced (by 72 acres), and nonnative vegetation would be removed.

At the east end the historic maintenance buildings north of Mason Street would be demolished, and the entryway redesigned to provide a continuous public open space from Marina Green through Crissy Field. Based on the results of further study, 20-80 acres of the former wetlands along the bayshore at the east end would be restored and reconnected to the freshwater surface flows from the Tennessee Hollow drainage.

Other natural resource improvements would be made, including expanding the native dune system (30 acres) on the central shoreline, protecting shorebird habitat between the Fort Point and Coast Guard lifesaving station piers (about 15 acres), and restoring native plant communities in the serpentine outcrop at the west end (0.5 acre). Visitor uses would be restricted as necessary to protect native systems and species.

The historic airfield structures at the west end of the field would be the focus of preservation and interpretation. These structures would be rehabilitated for new uses, and the airfield itself would be restored to its historic (ca. 1920s) appearance. The temporary World War II barracks between the airfield and the lifesaving station would be removed because they do not date from the airfield's period of significance. An aviation museum would be established in the west end hangars where visitors could learn about the history of the airfield and past, present, and future transportation technology. The nearby lifesaving station would also be rehabilitated and would provide space for educational programs related to the maritime environment. Access between Crissy Field and the Fort Point torpedo wharf would be improved.

Presidio Hill

Rehabilitation of historic buildings and restoration of the cultural landscape would take place as described in alternative A, except in the Wherry and Washington Boulevard housing areas. Because the nonhistoric housing units would remain in this area, the historic forest would not be replanted and native habitat restoration would only occur in small areas as determined cooperatively by the Park Service and the military. To reduce the visual impacts of housing, some units might be removed and the areas relandscaped.

As in alternative A, the golf course would become a public facility operated by a concessioner. Mountain Lake Park would continue to be managed by the city of San Francisco.

National Cemetery

The national cemetery would remain a quiet place for remembrance and reflection. The size of visiting groups would be limited, and tours would be conducted in a respectful manner. The site would continue to be administered by the Veterans Administration. Consistent with the NPS *Management Policies*, it would not be expanded.

Presidio Forest

As in alternative A, the Presidio forest would be replanted using species selected for the original design. Areas outside the original boundary would be cleared and planted with native species. Remnant native plant communities would be protected and restored wherever possible. Historic batteries and other cultural resources would be preserved. A trail system would be developed to connect the area's natural and historic features. Interpretation would be provided at appropriate sites. The Rob Hill group camping area and Julius Kahn Playground would provide recreational opportunities; the playground would continue to be operated by the city of San Francisco. A 50-space parking area would be constructed at the playground to concentrate parked cars and reduce safety hazards in the vicinity.

Lobos Creek Valley

As described in alternative A, the lower Lobos Creek stream valley would be restored, and the upper stream corridor would be protected. Remnant natural systems would be protected, and trails rerouted to avoid sensitive native plants. Visitor use would be limited to environmental education and interpretation. The water treatment plant would be rehabilitated, and the residential duplex would be adapted as a resource management field station and demonstration site. The former Army Reserve center would be adapted as a park maintenance facility. Activities at the facility would be monitored to avoid any negative effects on water, wildlife, native plants, and other sensitive resources in the area.

Coastal Bluffs

Most actions would be similar to those of alternative A. Visitor access in the bluffs area would be confined to developed trails. No new interpretive facilities would be provided, except along the Coastal Trail. Native species and habitats would be protected and restored. The historic forest above the bluffs would be restored and replanted. Historic structures would be stabilized and preserved. Baker Beach would continue to be maintained for beachcombing, sunbathing, and fishing. A new intersection would be created by extending Gibson Road to Lincoln Boulevard, and Bowley Street would be closed and converted to parking. Twelve parking spaces would be paved and striped at the World War II memorial.

Implementation

Management and Governance

Under this alternative the Park Service would establish a management structure similar to that described in alternative A. The agency would retain primary responsibility for site management activities, but the military and a federally chartered partnership institution would be responsible for tenant management in assigned areas.

The Department of Defense would enter into an agreement with the Department of the Interior and National Park Service to use areas for military activities.

An estimated 345 NPS personnel would be required under this alternative. Development costs would be approximately $165 million for the Park Service, $401 million for tenants, including concessioners and park partners, and $454 million for the military. Annual operating costs would be about $44 million; $28 million would be recovered from tenant revenues.

Legislative Requirements

Under this alternative, legislation would be sought to create a federally chartered institution, to provide general leasing and revenue retention authorities, to include the Public Health Service Hospital within the boundary, and to allow continued military activity within the Presidio. Because the Department of Defense is unsure of its long-term reuse needs, there is a possibility that military requirements would decrease over time.

Legislation would be sought to allow the use of fees from parking, concessions, and/or tenants to subsidize or implement shuttle bus and ferry operations.

Mitigating Measures

The mitigating measures under alternative D are summarized below. The measures are identical to those under alternative A, and their details are described in that section. All measures would be regularly evaluated and monitored by Park Service staff to determine their effectiveness in reducing impacts.

City Services

A minimum amount of city of San Francisco water might be needed if uses at the LAMC and LAIR facilities required water of a purity that is not available from onsite sources. Under alternative D an estimated 50,000 gallons of city water per day would be needed for such special uses. During the design and replacement of the water treatment and distribution system, the Park Service would work with city officials to reduce this projected amount of water use or offset the loss of city water. Solutions might include providing Presidio water to San Francisco for any city water used or mixing city water with Presidio water to reduce the total amount of city water used.

Housing

As park uses were established, the Park Servicewould analyze the need to convert or adapt additional onsite housing for employee use. The analysis would be based on actual employment patterns and related housing demands.

Traffic and Transportation Systems

All of the mitigating measures related to traffic and transportation systems would be the same as under alternative A. They would include

- monitoring of alternative travel modes, expansion or modification of support facilities and services, and implementation of other measures to increase pedestrian, bicycle, and transit use
- transportation information services
- employee transit incentives (e.g., flexible hours, subsidized transit passes, van pool matching services)
- a transit brokerage/coordination operation to support conference and training activities
- parking fee support of transit services

- support for increased MUNI service on existing lines, new MUNI radial transit service, and MUNI light rail extension
- support for a Golden Gate Transit transfer facility near the main post transportation hub
- bicyclist and pedestrian amenities (e.g., shelters, benches, bike racks)
- monitoring and adjusting of parking to encourage transit use
- event coordination with the San Francisco Recreation and Park Department, Fort Mason Foundation, and Exploratorium
- intersection capacity improvements, particularly at Presidio entrances, and monitoring of intersections to determine if recommended traffic flow improvements were effective
- designation of a transportation coordinator for the Presidio

National Historic Landmark District

The mitigating measures dealing with the national historic landmark district would be the same as under alternative A and would include

- documentation of buildings to be removed according to HABS standards
- mitigation of effects on national historic landmark structures in consultation with the state historic preservation officer and Advisory Council on Historic Preservation
- inventory of historic buildings and preparation of rehabilitation guidelines
- upgrading of buildings to meet life/safety codes and establishment of a plan review and construction office to ensure compliance with codes and historic preservation guidelines
- preparation of maintenance plans for individual buildings or groups of buildings by tenants or, in the case of unoccupied structures, the National Park Service
- preparation of guidelines for treatment of vacant buildings; inspection, preservation, monitoring, and patrolling of vacant buildings
- preparation of guidelines for the treatment of the cultural landscape
- preparation of guidelines for compatible new construction
- preparation of a forest management plan and tree removal plan; restoration of the historic forest
- monitoring of visitor impacts on sensitive cultural resources and implementation of measures to reduce impacts

Archeology

Mitigating measures for archeological resources would be the same as under alternative A and would include

- preconstruction surveying in areas with high potential for archeological resources and implementation of mitigating measures, in consultation with the state historic preservation officer and Advisory Council on Historic Preservation, for any impacts that could not be avoided
- archeological monitoring during excavation and official recordation of findings
- distribution of final reports on preconstruction surveying and excavation monitoring to the state historic preservation officer and other interested parties
- implementation of a security program for the protection of any significant resources that were discovered; cataloging of all significant collections
- nomination to the National Register of any archeological resources determined to be significant

Wetlands and Stream Drainages

As in alternative A, native marsh species would be planted in the restored Crissy Field wetland within 120 days after grading. Visitor uses and numbers in the wetland area would be monitored, and actions taken as necessary to reduce impacts.

Native Plant Communities

The mitigating measures for native plant communities would be the same as under alternative A. Areas disturbed by construction or infrastructure repair would be immediately revegetated with native species, and site-specific revegetation plans would be prepared for each construction project. Wherever possible, seeds and plantings from the Presidio gene pool would be used. The Park Service would consult with the Soil Conservation Service and the California Native Plant Society on native plant propagation techniques.

Wildlife

A monitoring program would be established to identify and reduce any impacts on marine species related to visitor use and water taxi service.

Threatened, Endangered, Rare, and Sensitive Species

The mitigating measures would be the same as under alternative A. A Presidio-Wide inventory and monitoring program for rare and endangered plant and animal species would be established, and management objectives would be developed to stipulate actions and specific techniques for protection, enhancement, and restoration of each species. When construction or infrastructure repair was to take place near threatened, endangered, or other species of special concern, a qualified biologist would be onsite to monitor the work and stop it if necessary.

Topography and Soils

As in alternative A, a program to reduce dust and soil loss would be instituted for all demolition, excavation, grading, construction, and other dust-generating and soil-disturbing activities. NPS project supervisors would monitor contractor activities to control dust.

Air Quality

All measures listed in the transportation mitigation section would contribute to improvement of air quality.

Noise

Mitigating measures would be the same as under alternative A and would involve actions to reduce both construction and vehicle noise. During construction, contractors and other equipment operators would be required to comply with the San Francisco noise ordinance and to erect barriers as necessary to reduce noise impacts. To reduce the noise from vehicle traffic, the Park Service would use and encourage other city and transit providers to select transit vehicles that make less noise. Energy-conserving government vehicles would be used by maintenance and other divisions. If possible, electric or other alternative vehicles would be used to reduce noise levels.

Human Health, Safety, and the Environment

The mitigating measures related to health, safety, and the environment would be the same as under alternative A and would include

- preparation of an emergency response plan in coordination with the city of San Francisco
- provision of adequate fire protection in all Presidio buildings by conforming to the *Uniform Fire Code*; restricting use of buildings that did not meet code
- monitoring by both Cal EPA and the Park Service of the Army's hazardous substances cleanup program, including underground storage tanks
- mitigation of potential exposure to asbestos, lead, mercury, nickel, and carcinogens by restricting access and preventing landscaping and restoration of contaminated areas until the Army meets state regulatory standards
- control of toxic contaminants from storm sewers by trapping, removing, analyzing, and disposing of dislodged sediments on a regular basis
- monitoring by both the Cal EPA and the National Park Service of the Army's remediation and removal of petroleum hydrocarbons and any other contaminants at Crissy Field; the Park Service would restrict public access, landscaping or restoration work until the Army meets state regulatory standards
- removal of pavement and landscaping to increase permeable surface area and groundwater recharge
- protection of drinking water quality by avoiding sources with high arsenic or benzene levels and by regularly testing Lobos Creek sources
- protection of Mountain Lake water quality

Alternatives Considered but Rejected

During the Presidio planning process, three alternatives were considered but rejected as viable options.

University of the Presidio

The use of the entire Presidio as a university campus is incompatible with the mandated mission of the Park Service. However, a university could provide programs as a park partner under any of the alternatives.

Military Reuse of the Presidio

Military reuse of the entire Presidio is incompatible with the mandated mission of the Park Service and with the Base Closure Act of 1988. The idea of military reuse of large portions of the Presidio is analyzed in alternative D.

Deauthorization

Deauthorization or removal of the entire Presidio from NPS management was rejected as an alternative because of the significant resources at the site. The entire site is a national historic landmark district, and its natural resources, including threatened, endangered, rare, and sensitive plants species, are also considered important.

TABLE 1: SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

	Alternative A (Proposed Action): Diverse Programming/ Environmental Stewardship — Public/Private Partnerships	Alternative B (No Action/ Minimum Requirements): Public Sector Enclave	Alternative C: Expanded Open Space/Restoration/ Interpretation — Traditional NPS Management	Alternative D: Partial Military Reuse — Public/Private Partnerships
PRESIDIOWIDE CONCEPTS	The Presidio's resources would be preserved and enhanced, and major new programs would be established to provide understanding of those resources, encourage stewardship and cultural awareness, foster international exchange, and seek solutions to global problems. The National Park Service would be responsible for overall management and oversight. Park partners would be selected to lease buildings and develop and operate programs. A federally chartered institution would be created through congressional legislation to assist in managing park partners. The Letterman Army Medical Center (LAMC) would be demolished unless a suitable tenant could be found; the Letterman Army Institute of Research (LAIR) and historic hospital structures would be retained. The Public Health Service hospital would be included in the park boundary.	Only minimum action would be taken to protect and preserve the Presidio's resources. The Park Service would be responsible for overall management and oversight, but management of leases and uses of the majority of buildings, except housing units, would become the responsibility of the General Services Administration (GSA). Under GSA management, buildings would be used first for public agency needs and then for competitive lease to other tenants. The Public Health Service hospital would not be included in the park boundary. All of the Letterman facilities would remain in the park.	Open space would be expanded, and historic buildings, the cultural landscape, and natural systems would be restored. Most nonhistoric structures would be removed. Historic and natural features would be preserved and interpreted. The Park Service would have sole responsibility for administration, resource management, and public safety; buildings would be leased through existing authorities. The Public Health Service hospital would not be included in the park boundary. The LAMC and LAIR facilities would be deauthorized and excluded from the boundary.	Most of the Presidio would remain under NPS management, but the Letterman complex, the child care center, and the Wherry and Washington Boulevard housing areas would be used by the Department of Defense. Resource enhancement actions would be taken, and visitor programs established, in areas not occupied by the military. The Park Service would have primary responsibility for site management, with the assistance of a federally chartered institution. The Public Health Service hospital would be included in the park boundary, and all of the Letterman facilities would remain in the park.
Resource Management	Nearly 475 historic buildings would be rehabilitated, preserved, or restored and adapted for new uses; 301 buildings (2 million square feet of space), including 37 historic buildings, would be removed to enhance natural and historic settings. Open space would be expanded to about 985 acres. Wetland, native plant, and stream restoration would occur.	The Park Service would not have direct responsibility for most of the historic and nonhistoric buildings. GSA would be responsible for ensuring protection of historic structures, with NPS oversight. No buildings would be removed to enhance scenic and natural values, and no restoration projects would be carried out. Open space would remain at about 780 acres.	More than 455 historic buildings would be rehabilitated, preserved, or restored and adapted for new uses; 356 buildings (1.8 million square feet of space), including 37 historic buildings, would be removed, expanding open space to about 1,010 acres. Historic settings would be restored in many areas. Native plant and habitat restoration would be a major focus of management. Wetland and stream restoration would also take place.	Resource management actions would be similar to those under alternative A. The military would occupy and maintain about 200 buildings; 152 buildings (690,000 square feet of space), including 37 historic buildings, would be removed. Other buildings would be rehabilitated by the Park Service and park partners. Open space would increase from 780 to 890 acres.

TABLE 1: SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

	Alternative A (Proposed Action): Diverse Programming/ Environmental Stewardship — Public/Private Partnerships	**Alternative B (No Action/ Minimum Requirements): Public Sector Enclave**	**Alternative C: Expanded Open Space/Restoration/ Interpretation — Traditional NPS Management**	**Alternative D: Partial Military Reuse — Public/Private Partnerships**
Visitor Use and Programming	Park partners would join the Park Service in offering a wide variety of programming. Improvements would be made to open the site to public use, and interpretive and recreational opportunities would be greatly expanded. Annual visits to the park are estimated to reach 5.9 million by 2000 and 7.9 million by 2010.	Few actions would be taken to expand visitor opportunities. Existing facilities would continue to operate at the same level. New programs and services would generally be concentrated in the open space areas. Annual visits are estimated to reach 4.5 million in the year 2000 and 6.9 million in 2010.	Visitor experiences would be more like those in a traditional park. The main park facilities would be the visitor/interpretive center at the main post, visitor contact stations throughout the site, and an environmental center at the cavalry stables. Park partners would join the Park Service in providing a wide variety of programming. Annual visits to the park are estimated to reach 5.2 million in 2000 and 7.3 million 2010.	Although less space would be dedicated to visitor use because of military occupancy, most of the main activity areas would be available for visitor programs and activities, and most of the actions taken would be the same as under alternative A. Annual visits are estimated to reach 6.1 million by 2000 and 8.0 million by 2010.
Access and Circulation	Access and circulation improvements would be made, including simplifying the roadway network, defining visitor routes, establishing a transit hub, improving bicycle and pedestrian routes, adding signs, reducing traffic, and closing some roads to through traffic. Some large parking lots would be removed, and smaller peripheral parking areas would be established. Shuttle, trolley, and water taxi service would be provided.	No major road system modifications would be implemented, but actions would be taken to correct safety hazards, and minor improvements would be made to support bicycle and pedestrian use. Shuttle and water taxi service would not be provided. MUNI service improvements would not be sought.	Improvements to the road system would be the same as under alternative A except that more secondary roads would be removed.	Improvements would be the same as under alternative A.
Community	The Presidio would support an active community of NPS employees, program staff, military personnel, and short-term residents. The residential population is estimated to be 3,600 in 2000, dropping to 1,400 in 2010 because of the housing removed to enhance open space. Employees are estimated at 5,900 in 2000, dropping to 5,480 because of proposed building removals. Basic community services would be provided to residents and employees.	Most housing units would be used by non-NPS employees and tenants. They would be leased by a property management firm under NPS and GSA direction. Some units would be used for visitor lodging and park staff residences. The residential population is projected to be about 3,500 in both 2000 and 2010. The employee population is estimated at about 7,400.	The number of housing units would be reduced by more than half, resulting in a smaller Presidio community and reducing the need for support services. Residential population is estimated to reach 3,700 in 2000 and drop to 1,000 in 2010. Employees are estimated at 4,500 in 2000 and 4,100 in 2010.	The Presidio community would include park and park partner staff, visiting program participants, and military residents. More than half of the housing units would be used by military personnel working outside of the Presidio. The residential community is projected to be 2,900 in the year 2000 and 2,800 in 2010. The employee population is estimated at about 7,200 in 2000 and 6,800 in 2010.

TABLE 1: SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

	Alternative A (Proposed Action): Diverse Programming/ Environmental Stewardship — Public/Private Partnerships	Alternative B (No Action/ Minimum Requirements): Public Sector Enclave	Alternative C: Expanded Open Space/Restoration/ Interpretation — Traditional NPS Management	Alternative D: Partial Military Reuse — Public/Private Partnerships
Public Health and Safety	The Presidio would be staffed by full-time law enforcement personnel to provide traffic control and enforcement, criminal investigation, crowd control, roadway and parking enforcement, and routine uniformed patrol. About 70 officers would be needed to carry out major security functions. A Presidio fire department of up to 35 employees would provide fire prevention and fighting. The fire department would also provide emergency medical services. There would be one emergency medical technician and one paramedic per shift. No health and safety services would be provided at LAMC.	Law enforcement, fire prevention and protection, and emergency services would be the same as under alternative A except that no services would be provided at the Public Health Service hospital.	Law enforcement, fire prevention and protection, and emergency services would be the same as under alternative A except that no services would be provided at the Public Health Service hospital, LAMC, or LAIR.	Law enforcement, fire prevention and protection, and emergency services would be the same as under alternative A except that health and safety services would be provided at LAMC.
Environmental Protection and Sustainable Design	The Presidio would become a model of sustainable design. Park facilities would be designed, constructed, retrofitted, and operated to minimize adverse effects on natural and cultural resources. The water treatment and distribution, storm drainage, wastewater, and electrical systems would be upgraded to meet applicable codes, regulations, and guidelines.	As in alternative A, the Park Service would promote environmental protection and sustainable design and would upgrade the park's infrastructure to meet applicable codes, regulations, and guidelines. There would be no infrastructure upgrading at the Public Health Service hospital.	As in alternative A, the Park Service would promote environmental protection and sustainable design and would upgrade the park's infrastructure to meet applicable codes, regulations, and guidelines. There would be no infrastructure upgrading at the Public Health Service hospital, LAMC, or LAIR.	As in alternative A, the Park Service would promote environmental protection and sustainable design and would upgrade the park's infrastructure to meet applicable codes, regulations, and guidelines. The infrastructure costs for the Wherry and Washington Boulevard housing areas and the Letterman complex would be the Department of Defense's responsibility.

TABLE 1: SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

	Alternative A (Proposed Action): Diverse Programming/ Environmental Stewardship — Public/Private Partnerships	**Alternative B (No Action/ Minimum Requirements): Public Sector Enclave**	**Alternative C: Expanded Open Space/Restoration/ Interpretation — Traditional NPS Management**	**Alternative D: Partial Military Reuse — Public/Private Partnerships**
PLANNING AREA CONCEPTS				
Main Post	The main post would be the center of visitor activities. Its buildings and grounds, including the parade grounds, would be adaptively rehabilitated to support programs and activities involving social, environmental, cultural, and educational concerns. A central visitor/interpretive center in one of the Montgomery Street barracks would provide orientation and interpretation, and a transportation hub near the north end of the site would connect the Presidio shuttle system with public transportation. Most of the paving would be removed from the main parade ground, and it would be returned to its historic appearance. A variety of concessioner-operated services would be provided for visitors, staff, and residents. Most operational and community services would be located here.	Most of the buildings on the main post would be leased by GSA and the property management firm for public and private uses. The parade grounds would not be restored. A visitor center/ administrative complex would be established in the former commissary and post exchange buildings north of Doyle Drive. Concessioner-operated support services would be housed in some of the buildings. A transit hub would be constructed at the north end of the post.	Actions would be similar to those under alternative A. Educational, cultural, and interpretive programs would be the focus of activities, with tenants occupying historic buildings through lease and permit arrangements with the Park Service. A central visitor/interpretive center would be established on Montgomery Street, and the main transit hub would be constructed at the north end of the site.	Same as alternative A except that the military would manage the child care center.
Golden Gate/Fort Point	The Golden Gate Bridge plaza would be redesigned to improve scenic vistas, enhance the historic setting, and provide additional access to the site. The bridge district maintenance facilities would be relocated to a new site at Fort Scott, and the existing temporary buildings removed. The Fort Point visitor contact station would be rehabilitated. Access and circulation would be improved between Crissy Field, Fort Point, and the bridge plaza.	Information kiosks would be provided at the Golden Gate Bridge plaza. The maintenance facility for the bridge district would remain in its present location. The Fort Point visitor contact station would be rehabilitated, and access and circulation improvements would be made.	Same as alternative A.	Same as alternative A

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Fort Scott	A campuslike setting would be established at Fort Scott for conferences, training, and applied research. The buildings and parade ground would be rehabilitated to support these uses. An NPS employee training and development center would be located at Fort Scott. The bridge district maintenance functions would be relocated south of Battery Dynamite.	Fort Scott buildings would be leased by GSA and the property management firm for public and private uses. The parade ground would not be restored. Park maintenance would be located at the Fort Scott maintenance area near Battery Dynamite.	Most actions would be similar to those under alternative A. The Fort Scott maintenance area would be used to support maintenance and warehouse needs at the fort. The bridge district maintenance function would be located in the current Armistead Road housing area.	Same as alternative A
Letterman Complex	The LAMC facility would be removed unless a suitable tenant could be found to rehabilitate it. The remaining buildings in the Letterman complex would support programs in health, life, and earth sciences. Park partners here would be required to include public education as part of their activities. Historic structures would be adaptively rehabilitated to support programs. Significant streetscapes and landscape features would be preserved, and site improvements would be made.	GSA would determine the uses of the Letterman complex; those uses would not necessarily relate to the park purpose. No site improvements would be made.	The LAMC and LAIR buildings would be deauthorized and excluded from the Presidio boundary. Historic buildings would remain inside the boundary and be adaptively rehabilitated to support park programs. Significant streetscapes and landscape features would be preserved, and site improvements would be made.	The Department of Defense would operate the Letterman hospital, which would continue to be used for acute health care for military staff, dependents, and retirees. The research institute would continue to support military research.
Cavalry Stables	The cavalry stables and former barracks would be used for workshops in conservation and environmental technologies and for other educational programs. One of the stables would be rehabilitated for use by the U.S. Park Police and for interpretation of the early cavalry.	The cavalry stables would be leased by GSA. One stable would be used by the U.S. Park Police.	Same as alternative A except that the former cavalry barracks would be the site of an environmental education center.	Same as alternative A

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Public Health Service Hospital	The former hospital complex is proposed for adaptive use as an educational and conference facility, possibly an international school or a youth job training center. The nonhistoric 1950s addition to the hospital would be removed, and the original hospital rehabilitated; if a suitable tenant could not be found to rehabilitate the hospital, the entire building would be removed.	The Public Health Service hospital would not be included in the park. The Park Service would not have responsibility for protection of its cultural and natural resources.	Same as alternative B	Same as alternative A except that the 1950s hospital addition would not be removed and the entire hospital would be used for educational and conference activities.
East Housing Area	This housing area would continue to be used primarily as a residential area for NPS and park partner staff. The nonhistoric housing on Quarry Road would be converted for use as an environmental education center. The El Polin Spring area would be restored.	Most of the housing would be leased to tenants. The El Polin Spring area would not be restored.	Actions would be similar to those under alternative A except that the nonhistoric housing on Quarry Road would be removed and no residential environmental center would be established here.	Same as alternative A
Crissy Field	Crissy Field would continue to provide opportunities for a variety of outdoor recreational activities. The Golden Gate promenade would be renovated, and support facilities and services would be provided. A portion of the former wetlands at the east end of the field would be restored, and other resource enhancement measures would be taken. Some buildings would be removed to increase open space. The historic airfield structures at the west end would be preserved and interpreted and the former airfield restored.	Crissy Field would continue to provide outdoor recreational opportunities, but no changes would be made to expand open space, interpret the airfield's history, or provide recreational amenities. No wetlands or native plant communities would be restored.	Same as alternative A	Same as alternative A

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Presidio Hill	Presidio Hill would continue to provide for a variety of outdoor recreational activities, including hiking and golf. The Wherry housing area would eventually be removed to restore native plant habitat, reestablish the historic forest, and increase open space.	No housing would be removed in the Wherry and Washington Boulevard areas, and no native plant restoration would take place. Other actions would be the same as under alternative A.	Same as alternative A	Same as alternative B
National Cemetery	The national cemetery would continue to be administered by the Veterans Administration and remain a place for quiet reflection.	Same as alternative A	Same as alternative A	Same as alternative A
Presidio Forest	The forest would be rehabilitated and restored within its historic boundaries, using species selected for the original design. Areas with remnant native plant communities would be protected and restored.	The historic forest would be preserved and hazardous trees removed. No native plant restoration would occur.	Same as alternative A	Same as alternative A
Lobos Creek Valley	The Lobos Creek valley would be managed to restore and enhance the natural stream corridor. Other remnant natural systems would be evaluated and protected. The NPS maintenance facility would be located at the former Army Reserve center. The water treatment plant would be rehabilitated to continue to serve the Presidio.	There would be no stream or native plant restoration in the valley. The Army Reserve center would be occupied by a tenant. The water treatment plant would be rehabilitated.	Same as alternative A	Same as alternative A
Coastal Bluffs	The coastal bluffs would be preserved as the wildest and most natural part of the Presidio, and their natural resources would be protected and restored. Baker Beach would continue to be maintained as a recreational destination.	The natural and recreational qualities of the area would be protected, but no native plant restoration would take place.	Same as alternative A	Same as alternative A

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MANAGEMENT AND GOVERNANCE	The Park Service would provide management and oversight. A federally chartered partnership institution would be established to assist with building management and leasing in assigned areas. The institution would be empowered to retain revenues, accept donations, and enter into leases for assigned areas.	The Park Service would provide management and oversight, concentrating actions in open space areas. GSA and a private property management firm would be responsible for administering most of the tenant leases for historic and nonhistoric buildings not needed for park purposes. Historic leasing authorities would be used to lease buildings, but additional authorities, such as general leasing legislation, would be required.	The Park Service would be responsible for all management and oversight, including staffing, managing the leasing and tenant activities, and all park operations.	Same as alternative A except that the Department of Defense would enter into an agreement with the Department of the Interior and National Park Service to use designated areas for military use.
LEGISLATIVE AUTHORITIES	Specific legislation would be required to create a federally chartered institution to assist with NPS management of the Presidio and future partners. Other legislation would be required to provide authority for general leasing and revenue retention. Legislation would be needed to include the Public Health Service hospital in the boundary.	Legislative authority might be required for GSA to manage buildings for nonpark purposes. No legislation would be needed for boundary adjustments.	No new legislation would be required for general leasing authority, revenue retention capability, or creation of a federally chartered institution to assist in management. Legislation would be needed to exclude the LAMC and LAIR buildings from the boundary.	Same as alternative A except that legislation would be needed to allow continued military activity within the Presidio.

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A (Proposed Action)	Alternative B (No Action/ Minimum Requirements)	Alternative C	Alternative D
REGIONAL ECONOMY AND EMPLOYMENT	Total employment would be about 5,900 in 2000 and 5,480 in 2010. Payroll would reach $136 million in 2000 and $127 million in 2010. State sales taxes would be $2.0 million in 2000 and $1.8 million in 2010. Service and overnight lodging revenues would be about $30 million in 2000 and $35 million in 2010.	Total employment would be about 7,400 in both 2000 and 2010; payroll would reach $175 million in both years. State sales taxes would reach $2.4 million in 2000 and 2010. Service and overnight lodging revenues would be $21 million and $28 million, respectively.	Total employment would be about 4,500 in 2000 and 4,100 in 2010. Payroll would reach $91 million and $82 million in those years. State sales taxes would be $2.3 million in 2000 and $2 million in 2010. Service and overnight lodging revenues would be about $23 million and $28 million, respectively.	Total employment would be approximately 7,200 in 2000 and 6,800 in 2010. Payroll would reach $176 million in 2000 and $168 million in 2010. State sales taxes would be about $2.6 million in 2000 and $2.4 million in 2010. Service and overnight lodging revenues would be $33.5 million and $40 million, respectively.
CITY SERVICES	In the year 2000 the city of San Francisco could benefit from as much as $4.3 million in revenues and taxes, if all taxes are applicable. In the year 2010, because of decreased Presidio building area, the city would receive $3.6 million in revenues and taxes. Transportation-related improvements (primarily MUNI service extension) would have one-time capital costs of $4.2 million and annual operating costs of $110,000, which would be recovered through taxes and fares. There would be no impacts on city public safety services. The city would be reimbursed through sewage charges for the minor increase in sewage disposal requirements.	The city could benefit from up to $5 million in revenues and taxes in the years 2000 and 2010. No transportation related improvements are anticipated. There would be no impacts on city public safety services. The city would be reimbursed through sewage charges for the minor increase in sewage disposal requirements.	The city could benefit from up to $4.3 million in revenues and taxes in the year 2000 and $3.1 million in the year 2010. Transportation-related improvements would have one-time capital costs of $4.1 million and annual operating costs of $110,000. There would be no impacts on city public safety services. The city would be reimbursed through sewage charges for the minor increase in sewage disposal requirements.	The city could benefit from up to $4.3 million in revenues and taxes in the year 2000 and $4 million in the year 2010. Transportation-related improvements would have one-time capital costs of $4.3 million and annual operating costs of $110,000. There would be no impacts on city public safety services. The city would be reimbursed through sewage charges for the minor increase in sewage disposal requirements.

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A (Proposed Action)	Alternative B (No Action/ Minimum Requirements)	Alternative C	Alternative D
HOUSING				
Housing Supply	A total of 52 housing units would be removed by the year 2000; 686 additional units would be removed by 2010.	No housing would be removed. Housing would be used primarily by park tenants.	A total of 102 housing units would be removed by the year 2000; 766 additional units would be removed by 2010.	A total of 52 housing units would be removed by the year 2000; 40 additional units would be removed by 2010.
Housing Demand	Presidio housing is expected to satisfy 38% of Presidio employee housing demand in the year 2000 and 35% in the year 2010. The Presidio is expected to attract new Bay Area residents who would generate a new regional demand for 428 housing units in 2000 and 438 units in 2010. Some of this demand would replace existing military demand.	Presidio housing is expected to satisfy 74% of Presidio employee housing demand in 2000 and 2010. The Presidio is not expected to generate a new regional demand for housing units.	Presidio housing is expected to satisfy 83% of Presidio employee housing demand in 2000 and 33% in 2010. The Presidio is not expected to generate demand for additional housing units in the year 2000, but is expected to attract new Bay Area residents who would generate a new regional demand for 359 housing units in the year 2010.	Presidio housing is expected to satisfy 29% of Presidio employee housing demand in 2000 and 2010. The Presidio is expected to attract new Bay Area residents who would generate a new regional demand for 728 housing units in 2000 and 688 units in 2010.
HEALTH CARE AND MEDICAL RESEARCH	This alternative would have a positive effect on health care research by providing needed space at LAIR. The use of LAMC and the Public Health Service hospital as health care facilities would be precluded; this would have a negligible effect on acute hospital care in the region. However, the closure of LAMC, combined with other recent closures in the Bay Area, could have an adverse cumulative effect on health care for military retirees.	If LAMC was used as an acute care hospital, it could negatively affect other acute care providers by adding to the oversupply of beds. If it was used as a chronic care facility, it would provide needed chronic care beds in the region. The Public Health Service hospital would not be under Park Service jurisdiction; the impacts of its reuse would be determined when redevelopment plans were submitted for public review.	The LAMC and Public Health Service hospital facilities would not be under Park Service jurisdiction. The impacts of reuse would be determined when redevelopment plans were submitted for public review.	The use of the LAMC facilities by the Department of Defense to provide medical care would benefit military staff, retirees, and dependents.
MEDICAL AID INCIDENTS	Medical incidents at the Presidio that would require hospitalization are not expected to increase significantly.	Same as alternative A	Same as alternative A	Same as alternative A

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A (Proposed Action)	Alternative B (No Action/ Minimum Requirements)	Alternative C	Alternative D
TRAFFIC AND TRANSPORTATION SYSTEMS				
Presidio Traffic and Roadways				
Alternative Transportation Use	The projected share of travel by autos would be about 79% on weekdays and 72% on weekends in the year 2000; by 2010 the auto share drop to 74% and 66% respectively on weekdays and weekends because of transportation system improvements. By 2010, transit use would increase by 114% on weekdays and 212% on weekend days, and pedestrian and bicycle use would increase by 92% on both weekdays and weekend days.	The share of travel by autos would be about 79% on weekdays and 73% on weekends in 2000. Since no major transit improvements are planned, the share of travel by autos is not expected to change significantly by 2010. By 2010, transit use would increase by 43% on weekdays and 34% on weekend days, and pedestrian and bicycle use would increase by 55% on weekdays and 55% on weekend days.	The share of travel by autos would be 79% on weekdays and 71% on weekends in 2000. By 2010 the auto share is expected to drop to 74% on weekdays and 65% on weekends due to transportation system improvements. By 2010 transit use would increase by 106% on weekdays and 208% on weekend days, and pedestrian and bicycle use would increase by 68% on weekdays and 90% on weekend days.	The share of travel by autos would be 78% on weekdays and 72% on weekends in 2000. By 2010 the auto share is expected to drop to 74% on weekdays and 66% on weekends due to transportation system improvements. By 2010 transit use would increase by 148% on weekdays and 231% on weekend days, and pedestrian and bicycle use would increase by 93% on weekdays and 92% on weekend days.
Traffic Volumes	By the year 2000 regional and Presidio weekday gateway average daily traffic (ADT) would increase by 26.5% to 63,800 vehicles per day (vpd) over existing conditions; weekend gateway ADT would increase by 34% to 62,500 vpd during the same period. By 2010 regional traffic increases would reflect increases in gateway ADTs of 47% over existing weekday conditions and 54% over existing weekend conditions; 24% and 29% respectively of the projected growth would be attributable to the Presidio. Traffic volumes on Lincoln Boulevard, old Mason Street, and Presidio Boulevard are expected to cause congestion that would require minor roadway improvements. Road and intersection improvements would correct safety and congestion problems.	By the year 2000 regional and Presidio gateway ADT would increase by 28% over existing conditions to 64,700 vpd on weekdays and 59,900 vpd on weekends. By the year 2010 traffic volumes would increase 49% over existing conditions; 25% of this would be Presidio-related. Roadway capacity problems would be similar to those under alternative A, except that traffic volumes would be slightly higher near the Wherry and Washington Boulevard housing areas, around Fort Point access routes, and on Crissy Field. Road and intersection improvements would only correct safety problems.	Alternative C would generate less traffic than the other alternatives, delaying the need for capacity improvements. In the year 2010 the Presidio's gateway traffic volumes would reflect an increase of 47% over existing weekday and 49% over existing weekend volumes. Park-related uses would be responsible for 23% of projected growth on weekdays and 25% on weekends. Road and intersection improvements would correct safety and congestion problems.	Alternative D would generate the most traffic of the four alternatives. Traffic at the 15th Avenue entrance would increase by more than 20% over alternative A because of greater use of the Public Health Service Hospital facilities. In 2000 traffic volumes would reflect increases of about 33% over existing conditions on weekdays and 36% on weekends. In 2010 traffic volumes would reflect an increase of 56% over existing weekday and 59% over existing weekend conditions; 32%-35% of this would be Presidio-related. Road and intersection improvements would correct safety and congestion problems.

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A (Proposed Action)	Alternative B (No Action/ Minimum Requirements)	Alternative C	Alternative D
Parking Changes	Parking supply within the Presidio would be reduced from about 13,000 spaces to 7,650 spaces (a 40% reduction) to meet average projected demand. Parking would be reconfigured to increase safety, simplify access, encourage use of alternative travel modes, and enhance resource values. Parking around the Presidio's perimeter is not expected to be significantly affected by Presidio parking demand. Temporary special event parking would be accommodated on Crissy Field.	Parking supply would be reduced from 13,000 to 11,335 spaces, a 13% reduction, which would constitute an oversupply of parking. Limited parking system changes would reduce the number of accidents related to parking but would not provide incentives for use of alternative travel modes.	Changes to the Presidio's parking system would reduce the number of spaces to 7,820 (a 40% reduction) to meet average projected demand. Parking areas would be simplified and better defined.	The impacts would be similar to those of alternative A, except that the total number of parking spaces available would be 8,710 (33% of existing supply) to meet average projected demand.
Doyle Drive Reconstruction	Short-term impacts on the Presidio related to Doyle Drive reconstruction would include traffic congestion, air and noise pollution, and construction-related disturbances. Significant long-term impacts might include the irretrievable commitment of land for the right-of-way, removal of historic structures, disturbance of archeological resources, and continuing air and noise pollution.	Same as alternative A	Same as alternative A	Same as alternative A

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A (Proposed Action)	Alternative B (No Action/ Minimum Requirements)	Alternative C	Alternative D
TRAFFIC AND TRANSPORTATION SYSTEMS **Local and Regional Transportation Network**	The operational characteristics of Doyle Drive should not be adversely affected by increases of about 3,000 vehicles per day in Presidio-bound traffic. Intersections around the Presidio's perimeter would be adversely affected by increased city, regional, and Presidio traffic. Intersections at Mason Street/Marina Boulevard/Doyle Drive and Lombard Street/Richardson Boulevard would fall to unacceptably low levels of service by the year 2010, primarily due to high volumes of through traffic on Highway 101. On regional routes about 5% of vehicles on the Golden Gate Bridge, 10-17% of vehicles on Doyle Drive, and 2% of vehicles on Highway 1 would be traveling to or from the Presidio.	Traffic increases would be similar to those under alternative A. However, since only safety improvements are proposed, many of the expected intersection capacity problems would not be addressed. On regional routes about 5% of vehicles on the Golden Gate Bridge, 10-17% of vehicles on Doyle Drive, and about 2% of vehicles on Highway 1 would be traveling to or from the Presidio.	Traffic levels would be similar to, but generally lower than, those in alternative A. Improvements to intersections surrounding the Presidio would have effects similar to those of alternative A. On regional routes about 5% of vehicles on the Golden Gate Bridge, 10-17% of vehicles on Doyle Drive, and about 2% of vehicles on Highway 1, would be traveling to or from the Presidio.	Traffic levels would be similar to, but generally higher than, those of alternative A. The effects of intersection improvements would be similar to those of alternative A. On regional routes about 5% of vehicles on the Golden Gate Bridge, 10-17% of vehicles on Doyle Drive, and about 2% of vehicles on Highway 1, would be traveling to or from the Presidio.
LAND USE, THE PRESIDIO COMMUNITY, AND SURROUNDING NEIGHBORHOODS	Recreation/open space and institutional land use would increase in land area; industrial and residential use would decrease. Total building square footage would decrease 2.0 million square feet to 4.3 million. Recreation/open space acreage would increase by about 200 acres. There would be about 1,400 residents and 755 daily guests by 2010. No significant impacts on surrounding neighborhoods are anticipated.	This alternative reflects minimal change: no increase in open space, a decrease in institutional use, and a small increase in commercial/office use. Because the Public Health Service hospital would not be included within the boundary, total Presidio land area would be reduced by 37 acres, and building square footage reduced by 400,000 square feet to 5.9 million. There would be about 3,500 residents and 230 daily guests by 2010. No significant impacts on surrounding neighborhoods are anticipated.	This alternative would involve the greatest increase in recreation/open space; residential and industrial uses would decrease. Total building square footage would be reduced 3 million square feet to 3.3 million, and total land area to 1,420 acres. There would be about 980 residents and 575 daily guests by 2010. No significant impacts on surrounding neighborhoods are anticipated.	Institutional and recreation/open space land uses would increase slightly; commercial/office space would decrease. The military would manage 2.2 million square feet of building space. Total building square footage would be reduced by 0.6 million square feet to 5.7 million. There would be about 2,800 residents and 850 guests by 2010. No significant impacts on surrounding neighborhoods are anticipated.

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A (Proposed Action)	Alternative B (No Action/ Minimum Requirements)	Alternative C	Alternative D
NATIONAL HISTORIC LANDMARK DISTRICT				
Historic Buildings	Thirty-seven historic buildings would be removed.	No historic buildings would be removed or adversely affected under this alternative.	Same as alternative A	Same as alternative A
Cultural Landscape	Alternative A would enhance and protect the cultural landscape by removing and/or minimizing modern intrusions.	The cultural landscape would receive limited treatment, and beneficial impacts would be minor.	Same as alternative A	Same as alternative A
ARCHEOLOGY	Direct impacts cannot be fully analyzed because site surveys have not been completed. No significant impacts are anticipated.	Same as alternative A except that the potential for disturbance would be less because there would be fewer actions that would disturb soils and sites.	Same as alternative A	Same as alternative A
WETLANDS AND STREAM DRAINAGES	About 20 to 80 acres of wetlands would be reestablished at Crissy Field; 33 acres of riparian habitat would be restored in Tennessee Hollow and Lobos Creek.	Alternative B would not have positive or negative effects on wetlands and stream drainages. No restoration would occur.	Same as alternative A	Same as alternative A
NATIVE PLANT COMMUNITIES	About 140 acres of native plant communities would be restored.	No additional native plant communities would be established.	About 155 acres of native plant communities would be restored.	About 125 acres of native plant communities would be restored.
WILDLIFE				
Marine Species	Some negative impacts on marine species could result from establishment of water taxi service. The designation of a 15-acre bird sanctuary and the creation of 20-80 acres of wetlands would benefit marine species.	There would be no negative or positive impacts on marine species under this alternative.	Same as alternative A	Same as alternative A
Migratory Species	Migratory bird species would benefit from native plant enhancement, the creation of 20-80 acres of wetlands, and the establishment of a 15-acre bird sanctuary.	There would be no negative or positive impacts on migratory species under this alternative.	Same as alternative A	Same as alternative A

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A (Proposed Action)	Alternative B (No Action/ Minimum Requirements)	Alternative C	Alternative D
WILDLIFE				
Native Terrestrial and Aquatic Species	The increase of 140 acres of native plant habitat and 205 acres of open space would benefit wildlife.	No additional native plant habitat or open space would be created.	Same as alternative A except that native plant habitat would increase by 155 acres and open space by 230 acres.	Same as alternative A except that native plant habitat would increase by 125 acres and open space by 110 acres.
THREATENED, ENDANGERED, RARE, AND SENSITIVE SPECIES				
Threatened, Endangered, Rare, and Sensitive Plant Species	About 15 acres of special status plant species would be protected and enhanced; no adverse effects are expected. Additional management programs would enhance special status species.	Special status plant species would be protected as required by law; no adverse impacts are anticipated.	Same as alternative A	Same as alternative A
Threatened, Endangered, Rare, and Sensitive Animal Species	No negative impacts on any special status animal species are anticipated. Restoration, enhancement, and protection programs would benefit special status bird species that migrate and winter in the area.	There would be no negative or positive impacts on special status animal species.	Same as alternative A	Same as alternative A
TOPOGRAPHY AND SOILS	About 350 acres of soils would be disturbed. There would be short-term negative impacts during development; long-term impacts would be positive.	Same as alternative A except that only 39 acres of soils would be disturbed.	Same as alternative A except that 365 acres of soil would be disturbed.	Same as alternative A except that about 300 acres of soils would be disturbed.
AIR QUALITY	Computer modeling indicates that emission levels for all mobile-source contaminants, except carbon monoxide, would have significant adverse effects.	Same as alternative A	Same as alternative A	Same as alternative A
NOISE	Noise levels would increase temporarily during periods of construction. Traffic noise would increase, especially on Highways 1 and 101. Some residential areas along these two highways might require noise mitigation measures.	Same as alternative A	Same as alternative A	Same as alternative A

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

	Alternative A (Proposed Action)	Alternative B (No Action/ Minimum Requirements)	Alternative C	Alternative D
INTERPRETATION AND EDUCATION	Alternative A would provide significant additional interpretive and educational and opportunities. Major new programs and visitor activities would be established.	Alternative B would provide only minimal expansion of interpretive and educational opportunities.	Alternative C would provide significant interpretive and educational opportunities; however, available building space for programs would be less than under alternative A. The Public Health Service hospital and Letterman complex would not available for programs.	Impacts would be similar to those under alternative A; the Letterman complex would be reserved for use by the military.
RECREATION	Alternative A would expand recreational opportunities and provide a number of amenities to support recreational uses. Most existing facilities would be opened to the general public. One ballfield would be removed, and another would have restricted use.	Under alternative B there would be minimal expansion of recreational opportunities and services; most actions would be taken in open space areas. No negative impacts are anticipated.	Same as alternative A	Same as alternative A
SCENIC VIEWING	Alternative A would have a positive effect on scenic viewing. Removal of buildings, historic vista clearing, and marsh restoration would all enhance scenic viewing opportunities.	No major positive or negative impacts are anticipated. Some improvements, such as those at the Golden Gate Bridge plaza, would improve scenic views.	Same as alternative A except that more buildings would be removed to enhance open space and scenic views.	Same as alternatives A and C except that only 152 buildings would be removed.

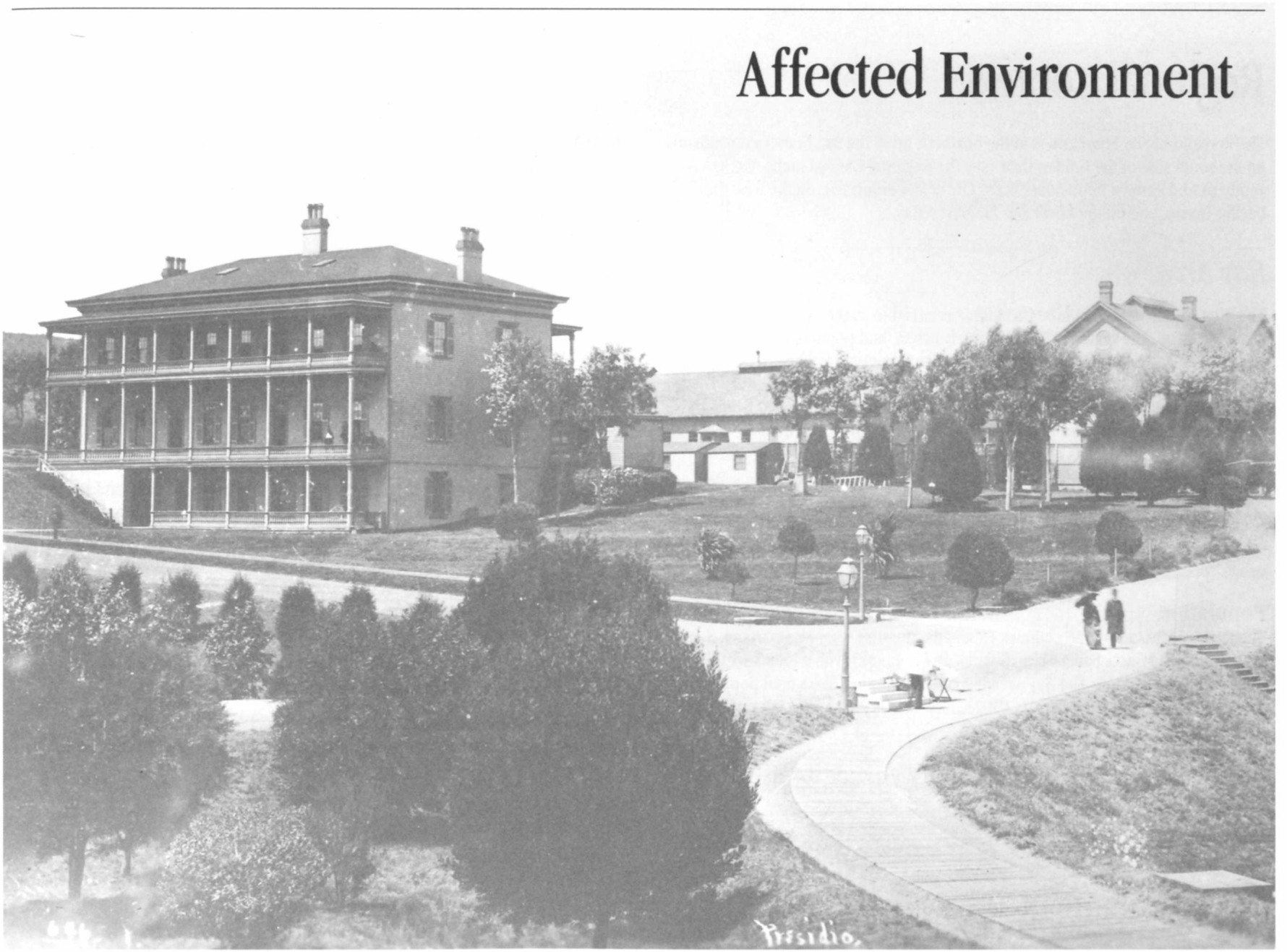
TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

HUMAN HEALTH, SAFETY, AND THE ENVIRONMENT	The presence of toxic materials in buildings, soils, and water could potentially affect human health and safety. The presence of lead-based paint and asbestos in buildings could have impacts on human health, safety, and the environment. Implementation of mitigation measures would reduce these risks to an acceptable state regulatory level. Remediation of contamination might delay development of portions of the Presidio and temporarily preclude public use of some buildings.	The effects would be similar to those of alternative A except that there would be greater potential impacts from lead-based paint and asbestos on people living and working in the Presidio because no buildings would be removed. However, the lack of building removal and minimal ground disturbance would greatly reduce the potential for worker-related exposure to lead-based paint and asbestos.	The effects would be similar to those of alternative A except that the potential for short-term health impacts would increase because more buildings would be demolished.	The effects would be similar to those of alternative A except that other agencies would develop and implement their own mitigation plans for lead-based paint and asbestos in buildings under their jurisdiction.
ENERGY CONSUMPTION	Because of the number of buildings to be removed, the use of reclaimed water, and the increased efficiency of reused buildings, energy consumption would be expected to decrease.	Increased efficiency would result in a net reduction in energy consumption at the Presidio.	Same as alternative A	Same as alternative A
MANAGEMENT AND OPERATIONS				
Site Development	Approximately $777 million would be needed for full implementation of this alternative, of which $470 million would be borne by future tenants, $111 million by the military, and $196 million by the Park Service.	Approximately $898 million would be needed for full implementation of this alternative, of which $730 million would be borne by future tenants, $88 million by the Park Service, and $80 million by the military.	Approximately $628 million would be needed for full implementation of this alternative, of which $322 million would be borne by future tenants, $193 million by the Park Service, and $113 million by the military.	Approximately $1 billion would be needed for full implementation of this alternative, of which $400 million would be borne by future tenants, $454 million by the military, and $165 million by the Park Service.
Infrastructure	Water supply and distribution, sanitary sewage, and storm drain and electric systems would be repaired; no significant impacts are anticipated. Transportation services (internal shuttle bus and water ferry services) would be funded by concessions, parking, and/or tenant fees.	The impacts would be similar to those of alternative A except that there would be no infrastructure improvements at the Public Health Service hospital and no transportation service improvements.	The impacts would be similar to those of alternative A except that there would be no infrastructure improvements at LAMC, LAIR, or the Public Health Service hospital. Transportation services (internal shuttle bus and water ferry services) would be funded by concession, parking, and/or tenant fees.	Same as alternative A

TABLE 2: SUMMARY OF ENVIRONMENTAL CONSEQUENCES

MANAGEMENT AND OPERATIONS				
Operations	Implementation of alternative A would require a staff of 347 and an annual operating budget of $38 million, of which $24 million could be recovered from tenants.	Alternative B would require a staff of 288 and an annual operating budget of $43 million, of which $22 million could be recovered from tenants.	Alternative C would require a staff of 388 and an annual operating budget of $32 million, of which $17 million could be recovered from tenants.	Alternative D would require a staff of 345 and an annual operating budget of $44 million, of which $28 million could be recovered from tenants.

Affected Environment



Regional Context

The Presidio of San Francisco is at the northern tip of the San Francisco peninsula on the south side of the Golden Gate (see the Regional Context map). On its southern and eastern boundaries is the city of San Francisco, on the west the Pacific Ocean, and on the north San Francisco Bay.

Bay Area

The area within 50 miles of the Presidio is referred to as the greater San Francisco Bay Area. The region is predominately urban, and population densities are high. The inland side of the peninsula, from San Francisco southward to San Jose at the south end of the bay, is dominated by large and small municipalities. Similarly, continuous development stretches northward from San Jose along the eastern side of the bay to Vallejo across from San Francisco. North of the Presidio, Marin County has residential and commercial development concentrated along the Highway 101 corridor and a large amount of permanent open space, a substantial portion of which is under Golden Gate National Recreation Area management. The region is an amalgam of heavily urbanized areas with smaller urban and suburban communities scattered in the valleys around the urban core.

Population

The Bay Area includes nine counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma) with a total 1990 population of 6 million. The Bay Area has one-fifth of the state's total population of 29.8 million (Bureau of Census 1991).

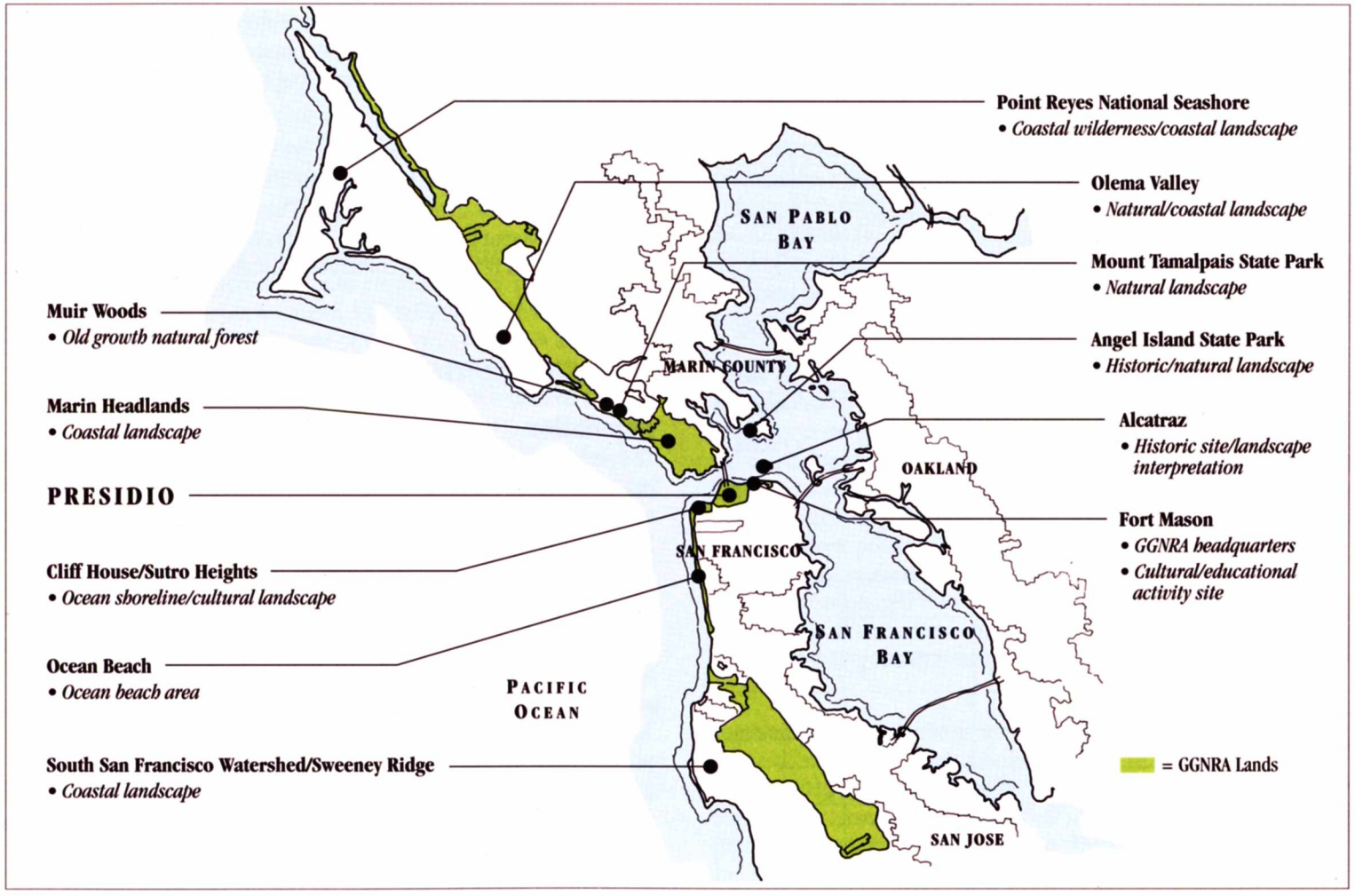
In 1940 two-thirds of the people in the Bay Area lived in San Francisco and Alameda counties. By 1990 only one-third lived in those two counties. There are five primary metropolitan statistical areas in the region: Oakland, San Francisco, San Jose, Santa Rosa-Petaluma, and Vallejo-Fairfield-Napa (USACE 1991). Between 1990 and 2010 the Bay Area population is expected to increase by 1.5 million, a 25% increase and somewhat less than the 30% increase over the past 20 years (Association of Bay Area Governments [ABAG] 1992).

Employment

Employment in the Bay Area has also become dispersed over the years. In 1940 two-thirds of the jobs were in San Francisco and Alameda counties; in 1990 only 39% were there. The area has a diverse economic base. It is a center for high technology companies supporting the computer, electronic, medical, biotechnology, and defense industries. About 250,000 manufacturing jobs are in high technology. Other manufacturing includes food processing, steel fabricating, printing and publishing, and warehousing. San Francisco, Oakland, and Richmond have important deepwater ports. The area is one of the major banking and finance centers of the western United States. There are nationally and internationally recognized medical and educational institutions (USACE 1991).

The Bay Area's total number of full- and part-time jobs was about 3,100,000 in 1990. Regional employment is forecast by the Association of Bay Area Governments to increase to 3,600,000 by 2000 and to 4,100,000 by 2010, a one-third increase for the region in the 20-year period. This compares to an 83% increase for the 20-year period from 1970 to 1990 (ABAG 1992).

In the next 20 years, employment by industry is expected to continue to be concentrated in services, wholesale and retail trade, and manufacturing, as shown in table 3.



N

Regional Context

TABLE 3: BAY AREA EMPLOYMENT PROJECTIONS, 1990–2010
(NUMBER OF EMPLOYEES)

Industry	1990	2000	2010
Agriculture, mining	34,640	33,520	31,570
Construction	168,120	200,930	210,000
Manufacturing	503,930	570,790	632,910
Transportation, commerce, utilities	190,590	225,810	260,470
Wholesale trade	190,530	221,290	254,250
Retail trade	525,540	604,710	688,260
Finance, insurance, real estate	231,280	246,970	260,480
Services	1,010,990	1,258,900	1,511,850
Government	258,820	268,210	278,290
Totals	**3,114,440**	**3,631,130**	**4,128,080**

BAY AREA EMPLOYMENT PROJECTIONS, 1990–2010
(PERCENT OF TOTAL EMPLOYMENT)

Industry	1990	2000	2010
Agriculture, mining	1	1	1
Construction	5	6	5
Manufacturing	16	16	15
Transportation, commerce, utilities	6	6	6
Wholesale trade	6	6	6
Retail trade	17	17	17
Finance, insurance, real estate	7	7	6
Services	33	35	37
Government	8	7	7
Totals	**100%**	**100%**	**100%**

SOURCE: Association of Bay Area Governments, *Economic Multipliers for the San Francisco Bay Area*, 1992

Housing

The Bay Area has some of the highest housing costs in the nation. Land, construction, and living costs are also above the national average. New housing construction grew markedly in the east, south, and north bay suburban counties over the last decade.

Low-density housing and employment growth at the fringes of the Bay Area, where land costs are lower, have helped create a dispersed land use pattern that increases the need for automobile travel. These conditions may intensify as the Bay Area's employment base grows and competition increases for the limited supply of housing within a reasonable commuting distance (U.S. Army Corps of Engineers [USACE] 1991).

City and County of San Francisco

Population

The population of San Francisco decreased 13% from 1950 to 1980 as people moved to the suburbs and decentralization took place in the Bay Area. From 1980 to 1990 the population increased by 7% to approximately 724,000. From 1990 to 2010 the city's population is forecast to increase by 8% to 779,000 (ABAG 1992). San Francisco is one of the most densely populated areas in the United States. The city has a land area of about 46 square miles and an average population density of 24.2 people per acre.

San Francisco has historically had a diverse population. The 1990 census reported an ethnic breakdown of approximately 47% white, 29% Asian, 14% Hispanic, and 11% black. During the census period Asian, Pacific Islander, and Hispanic origin populations grew while other ethnic populations declined. San Francisco has a particularly high proportion of relatively recent immigrants from Asia and South America (San Francisco Department of City Planning 1991a).

Employment

San Francisco is an office, retail, and service center. Many corporate headquarters as well as the regional offices of several federal departments and agencies are in downtown San Francisco. The major employment center, the financial district, is about 2 miles east of the Presidio in the downtown area. Services — including business and finance, accounting, travel, advertising, personnel, legal, engineering, private educational, medical professional, and nonprofit organizations — were the

largest industry sector in 1990, accounting for 38% of the employment. Employment in this sector is expected to increase to 46% by 2010 (ABAG 1992).

Job growth was stagnant between 1980 and 1985. Since then jobs have increased in business and legal services, health, education, social services, retail trade, and hotels. Job losses have continued in finance, communications, construction, wholesale trade, and manufacturing. Between 1990 and 2010 employment in San Francisco is expected to increase by about 5,000 jobs annually (ABAG 1992).

Tourism

Tourist, convention, and trade show activities contribute substantially to the San Francisco economy. Despite an increase in hotel room inventory, room occupancy still exceeds the national average. An estimated 13.2 million people visited the city in 1991, spending roughly $3.9 billion (some of which was subject to an 8.5% sales tax), or $10 million per day; out-of-area visitors spent three-fourths of this total. An 11% transient occupancy tax provides the city with an estimated $76.6 million annually. Approximately 66,400 jobs are directly related to tourism and visitor spending; 87% of visitors stop at Fisherman's Wharf, 68% visit the Golden Gate Bridge, and 29% visit Alcatraz (San Francisco Convention and Visitor Services 1992).

Housing

Housing in the city is in limited supply, and ownership is out of reach for many residents. Approximately one-third of the housing units in San Francisco are owner-occupied; two-thirds are rented. The median price of a home in 1992 was $275,000; the average rent for a two-bedroom apartment was $990, compared to $780 in the rest of the Bay Area. San Francisco had an estimated 328,500 housing units in 1990, and relatively low vacancy rates. There is a shortage of housing for low- and moderate-income groups, and as a result, the city is trying to develop or rehabilitate affordable housing for rent or purchase (San Francisco Mayor's Office of Housing and Community Development 1992).

Health Care

There are 47 acute care hospitals in the nine-county Bay Area, eight of which are in San Francisco. The acute care hospitals in San Francisco have a total of 4,840 beds, or 38% of the 12,760 beds in the Bay Area. There are teaching and research hospitals at the University of California, San Francisco, and at Stanford University. The health care industry is a major employer and contributor to the economy. In San Francisco, hospitals employ over 30,000 people (San Francisco Planning and Urban Research Association [SPUR] 1991).

Surrounding Neighborhoods

Population

The Presidio is bordered by the Marina planning district on the east and the Richmond planning district on the south. The total population of these districts is about 127,300. The population density in the Marina district is about 36 people per acre; the Richmond district has about 17 people per acre. In many of the census tracts directly bordering the Presidio, more than 81% of the population is white (San Francisco Department of City Planning 1991b).

Land Use and Community Services

The neighborhoods surrounding the Presidio are primarily residential, although land uses in the Richmond district and the Marina district tend to become more commercial toward the city center. Neighborhood shopping districts, including commercial strips with hotels, retail stores, and restaurants, line streets like Lombard Street and Geary Boulevard. California, Sacramento, Clement, Union, and Chestnut streets provide neighborhood retail and restaurant services. A full range of commercial support services can be found in each of the neighborhood shopping districts near the Presidio. However, most of these districts are not within easy walking distance. City zoning policies support convenient retail support services in major activity centers to discourage auto travel to accomplish daily errands.

Community facilities in the adjacent neighborhoods are provided by private, nonprofit, and public organizations. Branches of the San Francisco public library are located in the Marina, Presidio Heights, and Richmond districts. San Francisco City College classes are offered in local schools and churches, including the Marina Middle School and Fort Mason. The Jewish Community Center at Masonic and California streets provides recreational activities and child care. As in most city neighborhoods, facilities for active recreation are fairly limited, particularly for organized sports; the closest public swimming pools are nearly a mile from the Presidio. Community services citywide have been cut back in recent years due to continuing budget shortfalls. As a result, branch library hours, school programs, and other public services are limited.

There is a nearly continuous band of waterfront open space along the bay and ocean within and on either side of the Presidio. On the west and extending south are the coastal bluffs, Baker Beach, Land's End, Ocean Beach (connecting to Golden Gate Park), and Fort Funston; extending east along the northern bayfront are Crissy Field, Marina Green, Fort Mason, and Aquatic Park. This open space is a major tourist attraction and recreational resource in the Bay Area. Presidio land along the bay and ocean has been irrevocably permitted to the Department of the Interior.

Housing

The Presidio is bordered by some of the most expensive housing in San Francisco. Adjacent to the post are Presidio Terrace, Presidio Heights, Seacliff, and the Marina and Richmond districts, which have housing vacancy rates of less than 11%. As in most San Francisco neighborhoods, narrow lots are densely developed with single-family houses, flats, or apartment buildings. In the Marina district, half of the residential buildings have 10 or more units; in the Richmond district 17% of the residential buildings have 10 or more units, and 28% are single family homes. There are about 64,000 housing units in the Marina and Richmond planning districts (San Francisco Department of City Planning 1991b).

The Presidio

Cultural Environment

Historical Overview

Pre-Colonial, Pre-1776. The original inhabitants of the Presidio area were the Ohlone Indians. Their numbers exceeded 10,000 in the coastal area between Point Sur and the San Francisco Bay. They traded freely, moved about the hills and lower marshes, made seasonal camps, and were dependent on the land and sea for food. The landscape at that time consisted of mostly barren sandy hills with low shrubs and grasses, some scrub oaks, and pockets of laurel trees. Saltwater marshes thrived along the bay shore (National Park Service [NPS] 1992d).

Spanish/Mexican Occupation, 1776-1846. In 1776, as part of their northern frontier expansion, the Spanish established a strategic military outpost on the barren landscape of the Golden Gate. The three significant components of their settlement were the Castillo de San Joaquin, the "presidio," and the mission. The castillo, sited on the bluff where today's Fort Point stands, was built in 1793-94 to guard the entry to the bay; the presidio, was in a more protected area close to safe anchorage by the bay; the mission, sited further inland, was protected by the presidio and supplied the garrison with fresh crops. In 1846, after brief Mexican rule (1822-1846), the U.S. Army took over the land. At that time only ruins of the predominantly adobe Spanish settlement remained. From the first U.S. occupation to the outbreak of the Civil War, the Presidio underwent a slow transition from a Spanish-Mexican outpost to a small U.S. military reserve.

Early U.S. Occupation, 1846-1890. During the Civil War, the Presidio experienced a spurt of growth in response to threats posed by Southern sympathizers in California, Confederate commerce raiders, and increased Indian warfare throughout the west. Fort Point was built on the site of the former castillo and, together with the fortress on Alcatraz and minor batteries at Fort Mason and Angel Island, defended the Golden Gate. The Civil War reshaped the Presidio into a conventional U.S. Army post with a central parade ground surrounded by barracks and a distinctive officers' row.

By the 1870s and 1880s aesthetic concerns and a response to the encroaching city of San Francisco influenced the post's development. Plans were initiated to transform the barren landscape into a parklike, forested reserve. The forestation plan of 1883 was designed to "crown the ridges, border the boundary fences, and cover areas of sand and marsh with a forest." It was initiated to reinforce the idea of the Presidio as a separate place from the increasingly dense city.

For a brief period during the Indian Wars, and again after the great earthquake, the Presidio housed the divisional headquarters for the west coast. Also established were the national cemetery near the main post and a hospital just west of Mountain Lake.

Nationalist Expansion, 1890-1910. By the turn of the century, with the end of the Indian Wars, a major building campaign took place at the Presidio. Permanent brick buildings replaced wooden quarters, barracks, storehouses, and stables; a new water plant was constructed at the mouth of Lobos Creek. New coast defense batteries of the Endicott period ringed the Presidio, and a Coast Artillery subpost known as Fort Winfield Scott was established. By 1912 Fort Scott was fully developed as a post, with a collection of Mission Revival-style buildings and a horseshoe-shaped parade ground. Transportation links between the Presidio and the city were established.

The Army's first permanent general hospital was established at the turn of the century. Now known as Letterman Army Medical Center, the hospital served 1906 earthquake victims as well as troops returning from war in the Philippines.

Following the Spanish American War, as a result of continued American involvement in the Pacific and an increase in recruits at the Presidio, new wood-frame complexes (the east and west cantonments) were built east of the main post.

World War I, 1910-1918. In 1915 San Francisco hosted the Panama Pacific International Exposition — a world's fair to celebrate the completion of the Panama Canal and San Francisco's post-earthquake reconstruction — and the Presidio marshland along the bay was filled in to provide space for pavilions and a racetrack. In 1917, in response to the outbreak of World War I, a large camp of temporary buildings, including warehouses and barracks, replaced the exposition buildings along the bayfront. Presidio soldiers played an important role in World War I and in the Siberian expedition during the Russian Revolution.

Between the Wars, 1919-1940. Following World War I, new construction focused on the establishment of Crissy Army Airfield along the bay. The 1920s Mission Revival-style airfield structures were sited at the west end of the field.

Building flourished throughout the reservation — at the main post, Letterman hospital, the east and west cantonments, the national cemetery, Fort Winfield Scott, and the Marine hospital. New officers' housing was built along Infantry Terrace in the Georgian Revival style. The Presidio's seacoast defenses remained relatively unchanged during this period.

The Depression and the construction of the Golden Gate Bridge in 1937 greatly affected the Presidio. Unemployment resulted in an increase in military enlistments as well as the creation of the Works Progress Administration for public works. WPA projects included two large concrete barracks along the eastern flank of the main parade ground. The enormous growth of the Bay Area resulted in the erection of the Golden Gate Bridge; its approach roads, viaducts, abutments, and toll plaza were all built on Presidio land. Many buildings were demolished, but others were constructed, including maintenance shops, gas stations, drainage and sewage systems, and several fire control stations for the seacoast defenses. Crissy Field was abandoned in 1936 as a primary aviation facility.

World War II, 1941-1946. During World War II the Presidio served as headquarters for the Western Defense Command, which was responsible for protecting the entire Pacific Coast from attack by Japan. The harbor defense command post for the reinforced defenses of San Francisco Bay was located here. The Army constructed several complexes of wooden temporary structures, mostly barracks, at Crissy Field, the main parade ground, and the Letterman hospital. The Letterman hospital, unlike the remainder of the base, was very active during the war. It became the largest debarkation hospital in the country.

Up to the Present, 1947-1993. Activity in the Presidio declined sharply after the war, and building programs were primarily residential. In 1947 new family housing was constructed above Infantry Terrace. The Wherry housing area was built in 1953 on the southwest corner of the base. Remaining portions of Crissy Field continued to be actively used through 1974; only a helipad now remains. A new Letterman hospital, which played an important role in the return of Vietnam veterans, was built adjacent to the historic complex in 1969. It was complemented in 1976 by construction of the 350,000-square-foot Letterman Army Institute of Research. The Presidio still houses numerous commands, including that of the Sixth U.S. Army.

In 1972 Congress established the Golden Gate National Recreation Area (Public Law 92-589), which included the Presidio within its formal boundaries. Although NPS jurisdiction of the Presidio was not to be effective until military ownership and use of the reservation ended, management of Fort Point and the coastal areas was granted to the National Park Service/Golden Gate National Recreation Area through an irrevocable permit. Restrictions on new construction were imposed on the property remaining under Army ownership to preserve the unique character and history of the site as well as valuable open space.

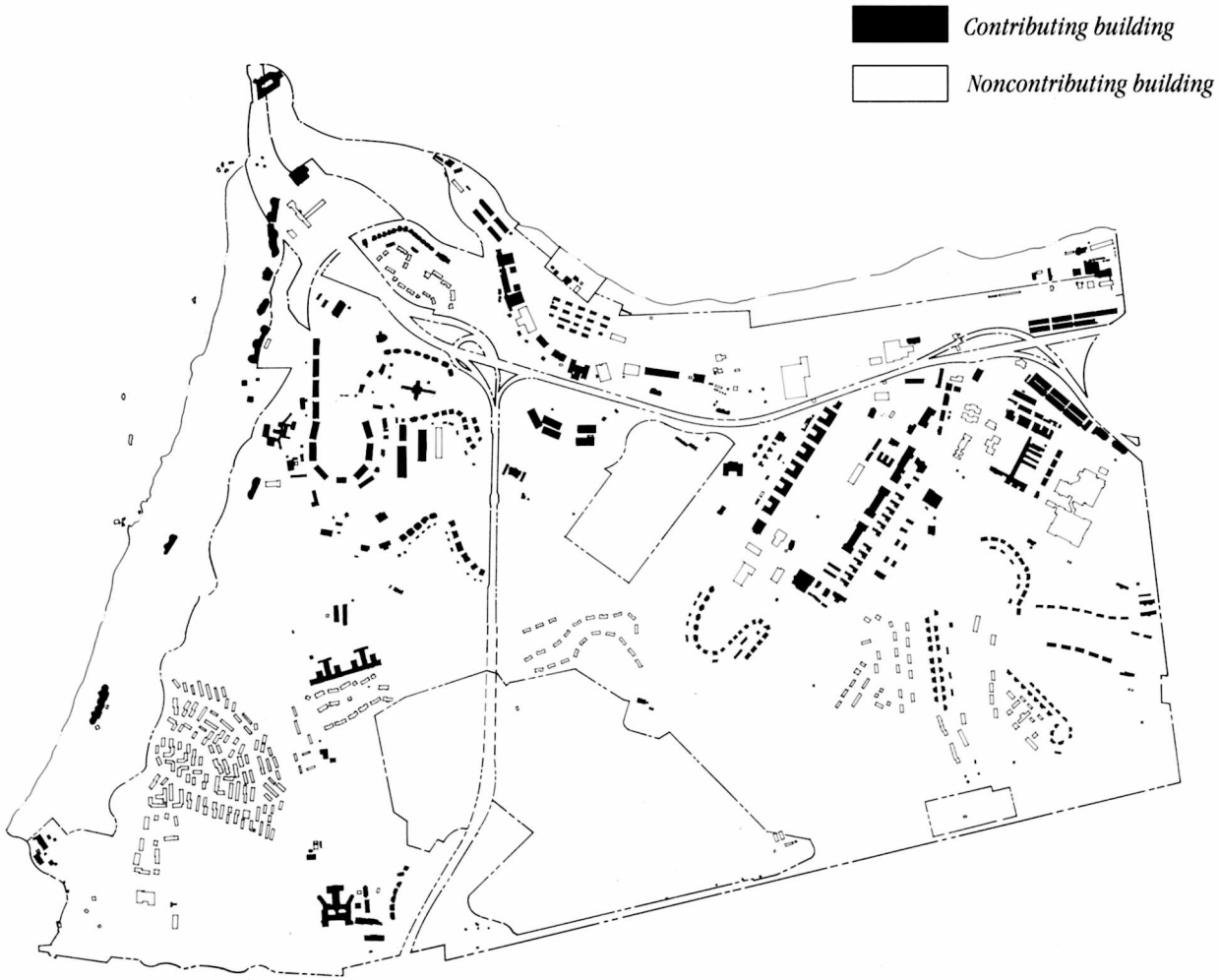
National Historic Landmark District

The Presidio of San Francisco was designated a national historic landmark in 1962 (NPS 1992d). It was recognized as a significant Spanish colonial military settlement and as a major U.S. Army post from 1846 to the present. The only historic property identified at that time was the officers' club (building 50); no inventory of contributing properties was prepared. In 1970 the Sixth Army and the National Park Service agreed that the entire military reservation was within the landmark boundary. The Presidio was seen as a district of sites, buildings, structures, and objects.

In 1989 an update of the initial 1962 landmark form was begun by the National Park Service. The updated form establishes the boundaries of the landmark district as coinciding with the boundaries of the Presidio of San Francisco. It also defines 662 buildings, sites, structures, and objects related to the full spectrum (Spanish, Mexican, and American) of military history at the Presidio as contributing to the landmark district (NPS 1992d).

The themes of national significance include military, exploration and settlement, Spanish settlement, and historic archeology. The period of historical significance for the district in the draft national historic landmark district update runs from 1776 to 1945. The noncommissioned officers' and enlisted men's club (building 135) was constructed in 1949, outside the period of significance; however, it has been identified as a contributing structure because of its association with historical events of international importance.

Fort Point, already part of the Presidio of San Francisco National Historic Landmark, was individually designated as a national historic site on October 16, 1970. Also listed on the national register is the six-inch rifled gun no. 9, entered February 7, 1979. The seacoast defenses within the Presidio will be included in a separate national landmark nomination for all of the seacoast fortifications in San Francisco Bay; that nomination is partially completed (NPS 1992d).



Historic Buildings

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

641 | 20148 | DSC | July 1993

An operations and maintenance programmatic agreement was signed in June 1992 by the California historic preservation officer, the Advisory Council on Historic Preservation, the Western Regional Office of the National Park Service, and Golden Gate National Recreation Area. The agreement addresses the Presidio of San Francisco and states that most operations and maintenance undertakings there can be certified by the historic preservation staff of Golden Gate. The staff will produce an annual report outlining the actions certified in the previous year through the agreement and will provide copies to the state historic preservation officer, the Advisory Council on Historic Preservation, and the National Park Service Western Regional Office.

The programmatic agreement outlines a procedure for certifying projects that may have greater effects than those outlined in the agreement stipulations. The procedure includes inviting review by the Western Regional Office and the state historic preservation officer. It also includes measures and procedures for guiding repair and stabilization projects in emergency situations.

Historic Buildings. The Presidio contains 870 buildings that represent a variety of military architectural styles dating from the Civil War to the present. The facilities include two hospitals, a major research institute, 1,200 housing units, airfield structures, harbor and coastal defense structures, a Mission Revival-style coastal artillery subpost, a former U.S. Coast Guard station, former cavalry stables, a commissary, a post exchange, a gas station, and many other support facilities that are critical to the operation of the Presidio as a community (see "Presidio Land Uses and Community Services" section). Of the 870 structures, 510 have been identified as contributing to the national historic landmark district, including buildings constructed through World War II (NPS 1992d).

The National Park Service conducted an initial survey and condition assessment of all Presidio buildings in 1990 and 1991 to identify the number of buildings, their general condition, and major deficiencies. Based on a 1991 survey by a contractor, Architectural Resources Group (ARG), the buildings are, for the most part, in good to fair condition (NPS 1992c). The most noticeable deficiencies are related to compliance with national, state, and local life/safety codes, in particular fire egress and accessibility. Individual building components or features, such as roofs, are generally in fair condition. The condition of historic fabric, both exterior and interior, varies from building to building. Overall, the historic buildings retain a high degree of integrity and contribute to the national historic landmark status. Interiors were not surveyed for the national historic landmark update; however, recent investigations indicate varying levels of effect. Some buildings have been completely gutted; others, particularly housing, retain much of their original interior building fabric. A few buildings, particularly pre-1933 unreinforced masonry structures, have been seismically retrofitted, though not always to current standards. Most buildings are inaccessible to people with disabilities.



Former U.S. Coast Guard station is one of 510 historic structures within the Presidio.

Additional building studies completed or underway include an analysis of about 45 historic buildings for their adaptive use potential (ARG 1992); a review of the Army's asbestos survey (Ace Pacific Co. 1991); a limited feasibility study of the Public Health Service hospital complex (ARG 1991); a physical history survey to determine building chronologies and identify character-defining features worthy of preservation; more in-depth condition assessments and cost estimates for remediating major deficiencies; a seismic analysis Presidiowide; and rehabilitation design guidelines.

The extensive system of coastal defense emplacements represents one of the best single collections of mid-19th and early-20th century defense works in the nation. These buildings are generally in poor or critical condition due to earthquake damage, exposure and weathering, and lack of use/occupancy.

Smaller infrastructure-related buildings and utilities that support the operation of the reservation are also important to the historic district. Included is an array of buildings, structures, and related features that trace the evolution of the post's transportation, water, and power systems through successive periods of development. These systems help define the function and identity of the post as a separate and autonomous urban entity that was largely self-sustaining through its early history.

Cultural Landscape. The interaction of people and place over time creates a cultural landscape, which is made up of components such as topography, vegeta-

tion, structures, circulation networks, land use patterns, building clusters, and small-scale features such as signs and flagpoles. Cultural values are reflected through development. The Presidio's cultural landscape provides a means for understanding individual features, such as buildings and roads, within a larger context or setting. The Presidio's cultural landscape retains a high degree of integrity and is important to the national historic landmark district.

A cultural landscape inventory, evaluation, and analysis were prepared in 1991 by Land and Community Associates. This project examined the evolution of the built environment of the Presidio from pre-European settlement to the present and analyzed historic and existing landscape components to determine significant, character-defining landscape features. A cultural landscape management plan is being prepared to provide treatment recommendations and guide changes to the Presidio's landscape as it becomes a park.

The Presidio is made up of many distinct areas such as Crissy Field, the main post, and Fort Point. Each of these areas is more than a place name or collection of buildings and roads; each has specific historical associations, an architectural character, vegetation patterns, and a function. Based on the cultural landscape analysis, 28 major areas and 323 subareas were identified and mapped. This information was then used to define the 13 planning areas. Each of the 28 areas was inventoried and analyzed to identify character-defining landscape features and determine a level of sensitivity to change for that area. The following is a summary of the Presidio's landscape components (Land and Community Associates 1992).

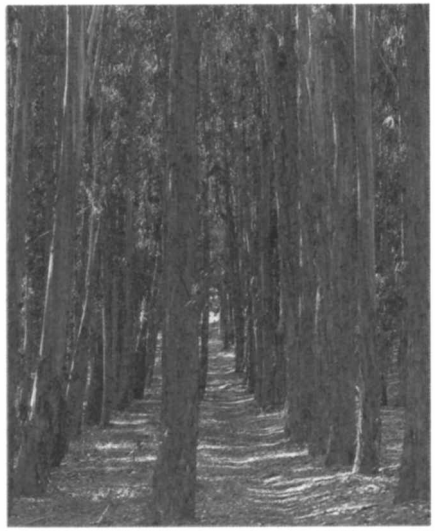
Topography — In some locations the topography creates a sense of enclosure. Particularly noteworthy are the swale east of the main post known as Tennessee Hollow and the small valley that contains the cavalry stables. El Polin Spring is an intimate topographic amphitheater that has been compromised by the encroaching nonhistoric housing complex.

Development at the Presidio has, in most cases, been in harmony with the natural features of the site. This has resulted in areas of development well suited to the gentle slopes that are buffered by dense backdrops of vegetation and the more steeply sloping terrain.

Historic Forest — The historic forest is one of the most noteworthy features of the cultural landscape. Conceived in the 1880s, the forestation effort was an attempt to ameliorate harsh environmental conditions and stabilize the migrating dunes. It was also a reflection of the Army's relationship with the neighboring city and was a product of turn-of-the-century landscape philosophy. The forest was to "crown the ridges, border the boundary fences, and cover major areas of sand and marsh with a forest" that was to "seem continuous and thus appear larger than it really was" (NPS 1992b). Today the forest is a treasured green swath in an urban context. Composed largely of Monterey pine, Monterey cypress, acacia, eucalyptus, and redwood, the Presidio forest has matured, is in critical condition, and will require extensive management and replanting to survive. Rampant growth, irregular pruning, and uncontrolled expansion of volunteer species has resulted in blurred boundaries of the historic forest and has obscured historic vistas and viewsheds.

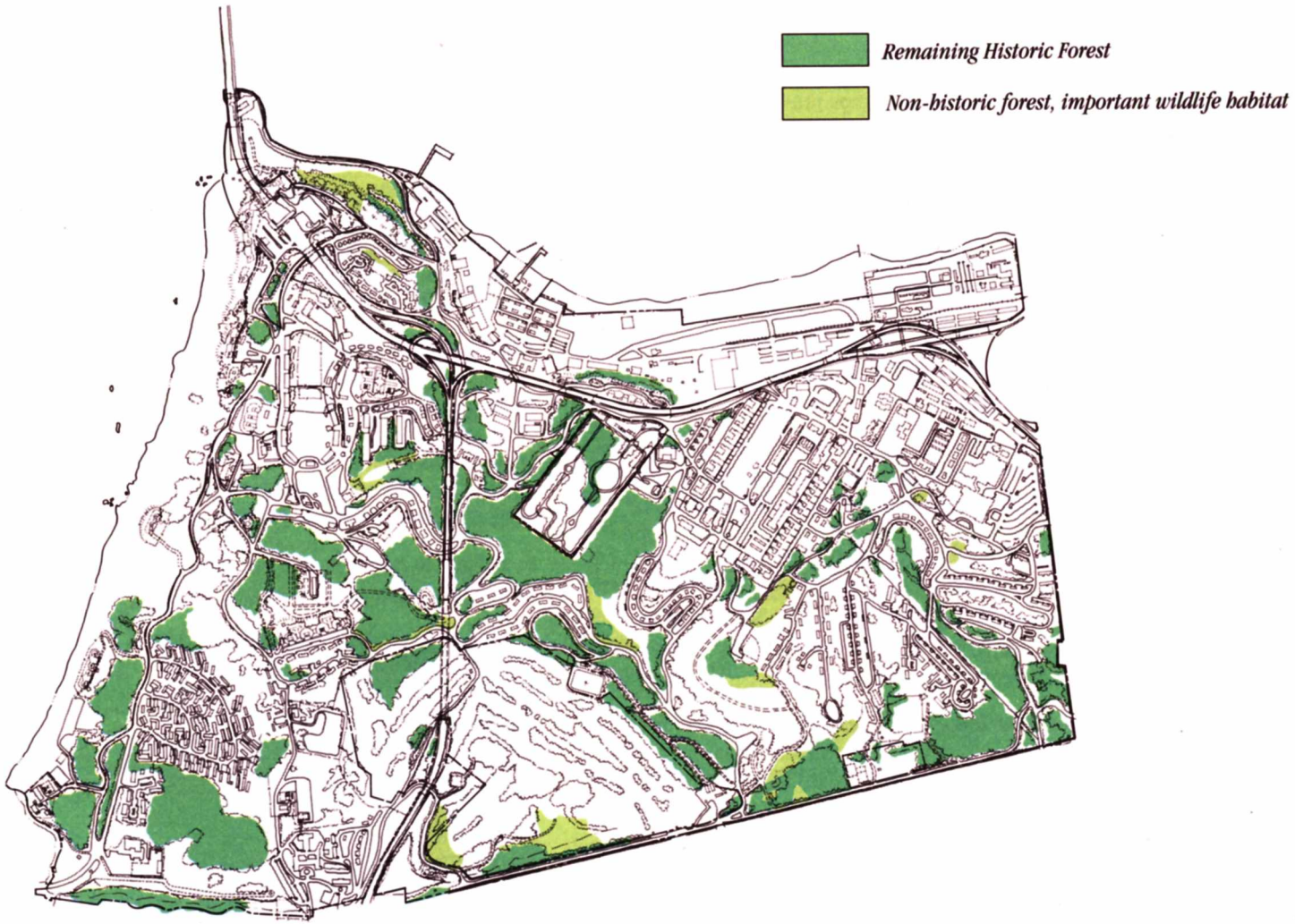
Strategic Views — One of the factors that affected site selection and orientation of building clusters was strategic views. Development capitalized on waterfront views, primarily for defense of the Golden Gate. In addition to views out of the Presidio, there were also visual links between different areas and building clusters. Examples are the views between the main parade ground and Crissy Field and between the officers' quarters on Infantry Terrace and the main parade ground. Today many of these significant vistas have been obscured by vegetation and new construction.

In addition to strategic vistas and view corridors, several buildings, structures, and landscape elements were designed and built as focal points. Examples include building 1201, the headquarters at Fort Scott, and entry gates. Significant streetscapes and designed landscapes and lawns remain scattered throughout the post. Many view corridors to the focal points have been interrupted by vegetation and new construction.



Eucalyptus grove was planted as part of the forestation effort in the 1880s.

Historic Land Use — Most of the historic land use designations around the Presidio have persisted. Examples include continued medical uses at both the Letterman complex and the Public Health Service hospital and the administrative role of the main post.



Historic Forest

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Within built areas, most of which contain mixed uses, there occasionally is an inconsistent pattern to the development, such as the variance in mass and height of adjacent buildings and type of building materials and colors seen at the Letterman complex. This is usually the result of nonhistoric interventions. In cases where the historic use has changed, some poor land use relationships have resulted. For example, at Fort Scott, industrial activities are sited adjacent to well-defined family housing areas.

Structures and Building Clusters — The overall architectural style of the Presidio is historically significant and displays a rich variety of designs, materials, and periods of construction. The dominant theme is Spanish/Mediterranean, exemplified by red pitched roofs and off-white exteriors. This theme is complemented by related styles and materials such as red brick and painted wooden buildings. The architectural character of some of some of the newer buildings is often not in keeping with these historic patterns.

Most groupings of historic buildings have a residential character with a comfortable human scale. Buildings typically range from one to three stories; taller structures typically were integrated into the landscape to fit in with adjacent structures and appear smaller. Opposed to these clusters are highly individual monolithic newer structures such as the Letterman hospital and Letterman Army Institute of Research.

Over the years, changes in building cluster sites and settings have affected their historic character. In many cases pavement and parking literally surround structures, dominating the built environment. There is often no definition of circulation systems such as roads, walkways, and parking areas within building groups. Insensitive treatment of utility features has created clutter on otherwise very attractive and expressive facades.

Several clusters of repetitive historic buildings are noteworthy: the Montgomery Street barracks, O'Reilly Avenue housing, Funston Avenue officers' housing, Riley Avenue housing, Fort Scott barracks, and Kobbe Avenue housing. In addition to these clusters, several unique buildings that serve as focal points and have important settings are also found at the Presidio. These include the fire station, the officers' club, the 1930s chapel, the Sixth Army headquarters, and garrison headquarters.

Small-Scale Features — The historic landscape had many small-scale features, including cannon balls for curbing. Though many stone retaining walls and ditches remain, most of the small-scale site elements have been replaced with contemporary materials. Landscape and site system details such as signs, lighting, plantings, fencing, curbing, and street furniture are usually varied and uncoordinated from site to site. Directional signs are haphazard and create visual clutter. Lighting is coordinated in most neighborhoods, although limited along some critical roads and paths.

Circulation Networks — Most roads and paths that exist today were constructed before 1918. These corridors were sensitively built on the hilly terrain and help to define area boundaries. They show how the land was used and how areas were connected to one another. Most have retained their original alignment and width.

The Presidio roads were not designed for the contemporary automobile. They are narrow, curvilinear, indirect, and have a parklike quality. Portions of historic circulation corridors were lost during the construction of the road approaches to the Golden Gate Bridge and the Letterman complex. In some cases, original grades and road traces for former trolley lines are evident, as are the rail lines at Crissy Field.

Archeology

Both prehistoric and historic resources are known to exist within the Presidio. In the draft national historic landmark update, the Presidio has been defined as a single historic archeological site with numerous contributing features that are functional components of a single long-term military occupation. Archeological properties described represent a variety of types ranging in complexity from individual subfeatures to functional groupings of subfeatures.

Prehistoric sites within the Presidio are not specifically identified as contributing to the national historic landmark; they are not associated with the military history that forms the basis of landmark designation. However, prehistoric properties would be eligible for nomination to the national register at a local or regional level of significance.

Prehistoric Resources. Discoveries of prehistoric remains have been made at the Presidio, and seasonally occupied and perhaps permanent prehistoric sites are likely. As early as 1872 a cremation burial with associated mica ornaments was found at a 6- to 10-foot depth in an unknown location near the Presidio. In 1912 the Crissy Field shell mound was recorded. This was one of the first prehistoric sites listed in the California archeological inventory and was reexposed in 1972 when a burial was discovered beneath concrete and fill in the motor pool area. Carbon



Highly Sensitive

Areas containing archeological resources identified as contributing in the National Historic Landmark Update

Sensitive

Areas not identified in the National Historic Landmark Update, where structural traces are visible or archeological remains of structures are probable

Less Sensitive

Areas are not identified in the National Historic Landmark Update, where structural traces are not visible or archeological remains of structures are not probable

0 1500' 3000'

N

Potential Archeological Resources

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dating has placed this feature at about a.d. 740. The find was turned over to the California Native Heritage Commission for reburial (NPS 1992d).

Based on archeological discoveries within San Francisco, it is possible that significant subsurface sites are present within the Presidio. The sites would probably be shell middens with demonstrated potential to contain human burials and related materials; archeological features representing (but not limited to) house floors, cooking areas, and specialized work areas; and random and various artifacts of stone, bone, and shell. As a result of development and early relic collecting, there are few if any surficial indicators of American Indian archeological sites. Previous archeological work is biased toward the coastal environment; sites would most likely be near the former littoral, where aquatic foods were available, or near freshwater springs. However, it is possible that sites other than shell middens are present in areas away from the shoreline. Consultation is underway with Native American groups to identify traditional cultural properties.

Historic Archeological Resources. A comprehensive historic archeological survey has not been conducted at the Presidio, although minor surveys have taken place. Several archeological assessments have been developed based on historical research and limited surveys. More than 40 archeological clearance inspections for projects within the Presidio have been completed, but no intact historic archeological artifacts or materials have been located. Potential sites and artifacts include remains from the 1906 refugee camps, troop encampments, and structural buried features. A Predicted Archeological Features map, prepared for the national historic landmark update, indicates zones of highest probability for suspected historic archeological resources. Specific features have been mapped, with some spatial allowance for error among historic maps and for the expected subfeatures associated with a structure or building (privies, trash scatter, etc.) that would yield significant information but that would not have been noted on most historic maps (NPS 1976). Recent testing, conducted as part of the Army's toxic waste study for the Presidio, demonstrated that construction has resulted in substantial alterations in original landforms, which have probably preserved as well as destroyed archeological resources.

Research suggests that historic archeological remains from the period 1776 to 1890 would provide the most significant contribution to knowledge of the Presidio (NPS 1992d). By 1890 the Presidio was beginning to change substantially, and documentation of design and construction was more complete. The archeological features dating from about 1890 and into the present century, although they might contribute to information about military, social, and technological history, would often be ancillary to other sources, including documents, remains, and possibly oral history.

As part of the cultural landscape analysis conducted in 1990, areas where structural traces were visible and areas that probably contained archeological remains were mapped. Each of these areas was then given a preliminary rating for sensitivity to change. An archeological resources management plan is underway to guide future management. Native American consultations conducted to date indicate that there are no known properties of sacred or religious significance on the Presidio.

Submerged Archeological Resources. Many ships are known to have been wrecked along the Presidio coast. A 1986 survey of submerged cultural resources for the waters under the jurisdiction of the Gulf of the Farallones National Marine Sanctuary, Golden Gate National Recreation Area (including the Presidio), and Point Reyes National Seashore describes the particulars of presumed "total loss" shipwrecks within the three areas. Published in 1989, this *Submerged Cultural Resources Assessment* identifies eight vessels that are known to have wrecked off the coast of the Presidio: *Aberdeen* (1853), *Golden Fleece* (1854), *Chateau Palmer* (1856), *General Cushing* (1858), *Granada* (1860), *Isaac Jones* (1876), *Frank Jones* (1877), and *City of Chester* (1886). Most of these are west and south of Fort Point. Recent research has also identified the location of the sunken supply vessel *San Carlos*, which sank with much of its cargo at the Presidio anchorage in 1797. No underwater archeology has been carried out, and the locations mapped in the national historic landmark update are approximate. Additional submerged cultural resources and shipwrecks not inventoried may exist within the underwater sections of the Presidio (Delgado and Haller 1989).

Golden Gate National Recreation Area has an agreement with the state lands commission for managing marine resources. Submerged land within legislated areas of the recreation area is leased from the California Lands Commission (Delgado and Haller 1989).

Natural Environment

Climate

The Presidio has a temperate maritime climate characterized by cool wet winters and foggy summers. Extreme temperatures are rare due to the marine influence.

Annual maximum and minimum temperatures are seldom above 80°F or below 40°F. The annual average high temperature is 66°F. Areas with a marine exposure are considerably cooler. Mean annual precipitation is around 21 inches, 19 of which fall during the rainy season from November to April. Topography shelters the north shore of the bay and Crissy Field from the cool marine air. In spring and summer the Presidio can experience strong prevailing winds that blow out of the west/northwest through the Golden Gate, usually in the afternoon and in excess of 17 knots.

There are many microclimates within the Presidio and surrounding area. The Bay Area is a meeting place of continental and oceanic air masses, with the Golden Gate and much of the Presidio land mass acting as a funnel for a constant "give and take" of differing barometric pressures. The waters of San Francisco Bay influence the normal and expected seasonal temperatures by cooling shoreline air masses during the summer and warming them in winter. Climate in the Bay Area from March through May is influenced by the heated air masses of the Central Valley of California, which pull the cooler Pacific air into warmer interior valleys in the form of strong onshore flows. These flows can be further intensified by a Pacific high centered a thousand miles offshore. As westerly winds rush inland during the summer, they absorb great quantities of moisture from the ocean surface. As these moist air masses are cooled by contact with the cold water along the Pacific Coast, they condense into moisture or fog. The Presidio and entire Bay Area is often blanketed with fog during late spring and summer. Occasionally, the Central Valley cools sufficiently to stop pulling in the cool Pacific air. This results in fog-free days and an offshore flow.

Topography

The topography of the Presidio has resulted from erosion of a complex terrain and deposition of sand dunes. Bedrock hills are surrounded by broad valleys underlain by dune sands and other unconsolidated deposits. Major alterations to the natural topography were caused by filling Crissy Field salt marshes and tidal lagoons and by leveling construction sites.

The topographic relief of the Presidio ranges from sea level to 1,300 feet above mean sea level, sloping mostly in a northeastern aspect. Topography changes from the flat sea-level marshes along the bayshore to the flat ridgetops inland. The spectacular scenery of the Presidio is shaped by the geology of the area. The Golden Gate channel and much of San Francisco Bay are the drowned valleys of 16 rivers that have combined into the Sacramento-San Joaquin system and are seen clearly from many parts of the Presidio.

Documentary evidence indicates that although most of the topographic conditions remain intact, including drainage patterns, ridgelines, and high points of the presettlement landscape, most of the land has been altered significantly over time by introduced vegetation and construction.

Geology

The Presidio is blanketed by loose unconsolidated sediments with scattered, protruding patches of bedrock. Franciscan formation bedrock (Cretaceous, 100 million years old) is hilly where exposed, such as the Baker Beach cliffs. Younger unconsolidated sediments (Pleistocene/Holocene, 2 million years or less) include the Colma formation (dune sands) and landslide debris, alluvium, and artificial fill. The dune sands, which cover more than half of San Francisco, originate from a favorable combination of wind, sand supply, coastal topography, and limited plant cover. The most recent dune field was formed 15,000 to 7,000 years ago. It covers the Lobos Creek valley west of Mountain Lake, and much of the west side of the main ridge (from Fort Scott in the northwest corner to Presidio Gate in the southeast corner), and then spills into the valleys around the national cemetery and southeast of Fort Scott into the valley containing Julius Kahn Playground. The most extensive exposures of the Colma formation in the San Francisco area are on the southwest and northeast slopes of the ridge occupied by the Presidio Golf Course and main water reservoir (Schlocker 1974).

Sand deposits on today's beaches depend on the nature of the waves and the supply of sediments, which varies in amount from hour to hour and season to season. Beaches generally build upward and seaward during summer and autumn and erode during winter and spring.

Seismic Hazard Zones. The San Andreas fault extends for 600 miles northwest from the Gulf of California to Point Arena. The fault, in the ocean, is about 6.5 miles west of the Golden Gate Bridge. The center of the Presidio is about 9 miles from the closest on-land segment of the fault at Mussel Rock to the south. The Hayward fault, about 10 miles to the east, is another prominent active fault.

Strong earthquakes in the San Francisco area were centered on the San Andreas fault in 1838, 1865, 1906, and 1989 and along the Hayward fault in 1836 and 1868. There are few reports of damage from the early quakes, probably because

the population was smaller and fewer structures existed at the time. Structural damage is influenced by the geologic and soil conditions underlying structural foundations. The least damage usually occurs in hilly areas where buildings have been built on bedrock. Bedrock outcrops at the Presidio are evident in a diagonal from northwest to southeast. The greatest risk of earthquake damage is to structures built on differentiated superficial deposits along the northern edge of the Presidio. This includes both Crissy Field and the main post. Most family housing areas were constructed on bedrock and are less at risk. Fort Scott facilities are generally on dune sands and ravine fill and are at moderate risk compared to the artificial fill at Crissy Field and the main post (Nakata Planning Group, Inc. 1987).

Liquefaction Zone. The Crissy Field area is also a potential liquefaction zone. The soils are composed of loose, well-sorted sands and silts within and below permanently saturated bay muds. Ground-shaking during an earthquake could cause saturated soils to liquefy. Heavy structures subside rapidly and unevenly on liquefied soils. Crissy Field contains areas filled with dune sands, riverine spoil from excavations and quarries, bay mud, and debris from the 1906 quake. Filled areas are also subject to liquefaction during earthquakes. The Army reported that water pipes in the Crissy Field area were broken following the 1989 earthquake (U.S. Army 1991).

Coastal High Hazard Zone. The location of the Presidio on the eastern edge of the Pacific Ocean places it at risk from future tsunami (tidal waves) created by earthquakes along the coast. Tsunamis can reach much farther inland than normal high waves.

Nineteen tsunamis were reported at the Golden Gate between 1868 and 1968. The maximum tsunami was reported to be 7.4 feet. A tsunami of 7 feet occurs about once every 50 years, one of 7.9 feet about every 100 years, and one of 15.3 feet about every 500 years. The low-lying areas between Fort Point and Fort Mason, which include the Crissy Field helipad and the Coast Guard station, could be flooded by a 20-foot wave every 1,000 years (Nakata Planning Group, Inc. 1987).

Landslide Hazard Zones. Local geology affects other aspects of the natural and cultural environment at the Presidio. Serpentine, a green mineral that is slippery and breaks readily into flakes, is seen in hard massive bedrock outcrops in several places (approximately 15% of the total land mass) in the Presidio. When the proportion of slippery serpentine exceeds 50%, landslides may occur. Serpentine yields to strong and consistent erosion caused by waves at the base of the Presidio cliffs. Most of the serpentine cliffs south of Fort Point are sliding. Bedrock outcrops of serpentine make good foundation material and have a lower potential for damage during strong earthquakes. Much of the high area of Fort Scott is underlain by block serpentine.

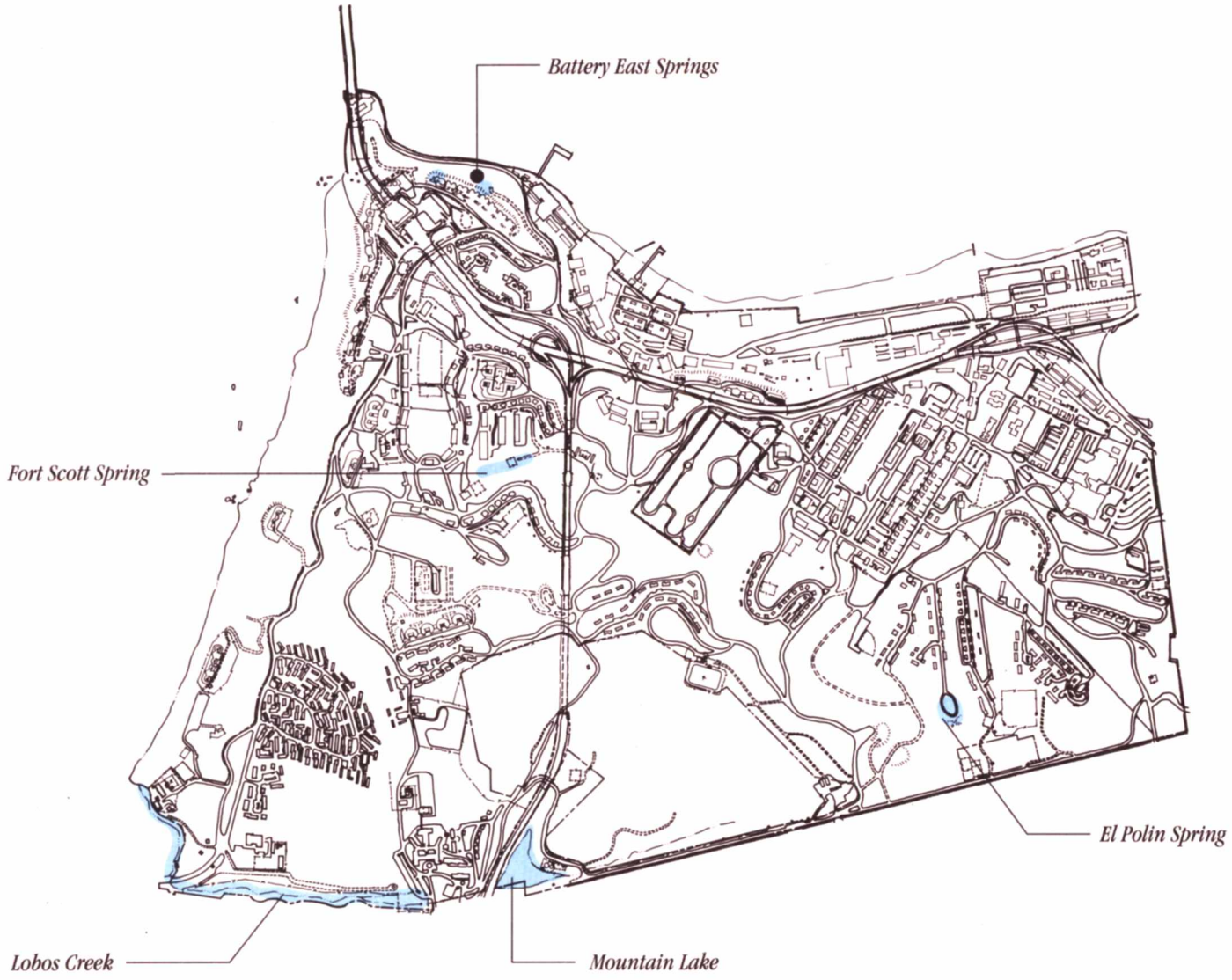
Landslides are the major topographic hazard of the Presidio. Sliding is usually the result of several factors acting in concert rather than a single cause. Slides can be precipitated by irregular hilly terrain with slopes underlain by unconsolidated or shattered sediments; a high relative abundance of plastic and swelling clay; occasional periods of prolonged rainfall; occasional earthquakes; and continuous disturbance and alteration of original terrain. Schlocker (1974) has listed four major landslides that occurred within the Presidio. One small slide was in the slope debris between the Battery East road and Marine Drive at Fort Point. Three larger ones happened on the sheared serpentine cliffs between Fort Point and Baker Beach. One was caused by the road cut in the area; the other two are the result of past surface erosion and removal of ground support by wave action. The slide at Fort Point west of the World War II memorial moves several feet each winter and is an immediate hazard to the road and occupied structures in the area.

Soils

The U.S. Soil Conservation Service has assigned the general soil classification of Urban Land-Sirdrak to the major soil type found in the Presidio (Soil Conservation Service [SCS] 1991). These soils comprise approximately 70% of Presidio lands and are found predominately in excessively drained areas, such as on top of stabilized dunes. The low water and soil nutrient capacities of Sirdrak soils accommodate only the most hardy and drought-resistant plants. Barren areas are subject to soil erosion.

Urban Land refers to soils that have been covered with asphalt, concrete, buildings, and other structures. Underlying soils have usually been graded and mixed or covered with fill material.

Also present in the Presidio in the filled area of Crissy Field are soils classified as Urban Land-Orthents, Reclaimed (SCS 1991). Reclaimed orthents consist of fill material. Construction on these soils is limited by the susceptibility of these soils to subsidence, a permanent high water table, and the highly variable texture of the orthent soils.



Water Resources

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Water Resources

Natural Drainages. There are three main drainages defined by the ridge and valley topography of the Presidio and numerous lesser drainages that drain directly into the ocean or bay. These drainages have been altered through past construction by the Army and now drain directly into the bay via the Presidio storm drain system.

The El Polin drainage captures runoff in the southern part of the Presidio, the golf course, and other channels to the north. The El Polin drainage formerly drained the Presidio Heights neighborhood and now drains the eastern half of the Presidio. El Polin Spring, near the head of the drainage, was the first water source for the Spanish presidio. Neither of the other two drainages is as well defined as the El Polin drainage. The Rob Hill drainage drains Fort Scott and the northwest Presidio. The Presidio Hill drainages are part of the watershed that feeds the Lobos Creek drainage basin. Some of the golf course is included in this basin. None of the these drainages is large enough to produce a floodplain or a flood hazard area in the Presidio.

Presidio wetlands have been greatly reduced from their original extent. A 100-acre marsh known as "the swamp" existed at Crissy Field as the end of the El Polin drainage. The southern end of the marsh consisted of fresh water, which became brackish from the tidal influence and met the bay in a seasonal lagoon that varied in size with the amount of rainfall and seasonal wave action. A sand barrier up to 12 feet high at low tide was formed, and breaches in this barrier allowed saltwater to enter (NPS 1992c). The Panama-Pacific Exposition Company filled the lagoon in 1914. Approximately 114 acres were eventually filled with dredge material from the bay.

There were probably smaller wetlands associated with other stream or spring areas. A wetland area exists today in the southeast corner of Fort Scott near the youth center/tennis courts.

Riparian areas may also meet the definition of wetlands in the *Federal Manual for Identifying and Delineating Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). Riparian areas exist along the El Polin drainage, at Lobos Creek, Mountain Lake, and Tennessee Hollow, and in the Fort Scott youth center area.

Lobos Creek is fed by an aquifer south of the Presidio and receives some recharge from the golf course. The bed of the creek contains seeps and springs that feed the water from the underlying aquifer.

Once thought to be connected to Lobos Creek, Mountain Lake is one of a series of ponds formed when drifting sands blocked drainage channels. Lake Merced and Laguna Honda were formed by the same process (Howell et al. 1958). Other surface waters of the Presidio are El Polin and the Fort Point springs.

Wetlands. The Crissy Field area is under consideration for restoration as a wetlands area. The existing shoreline is primarily open sandy beach without marsh plants or associated wetland animal species. Crissy Field was originally a saltwater marsh behind sand dunes and a sandy beach; it was gradually filled starting in the 1800s and ending in 1914 when additional land was created for the 1915 Exposition. Crissy Field served as an Army airfield from 1921 to 1936. It is believed that the original shoreline was not substantially altered by the construction of the runway early in the 1900s (Kondolf and Williams 1986). In 1975 the Army irrevocably permitted 45 acres of Crissy Field to Golden Gate National Recreation Area. The existing environment and potential sources of contamination at Crissy Field are described below.

Crissy Field Existing Conditions — Crissy Field is a relatively flat area about 10 feet above mean sea level. Landfill 7, a 200- to 400-foot-wide area along the shore, is fill that probably includes debris from the 1906 earthquake. Waste oils and solvents from seaplane maintenance and subsequent vehicle servicing may have been deposited along the shore. There is a helipad in the middle of the landfill. Between the landfill and the bay there are an open field, a strip of dunes, and a jogging path (the Golden Gate promenade) next to the beach. The jogging path is subject to wave action in the winter and to blowing sand from the dunes year-round (NPS 1988b).

The 2- to 8-foot-thick surface fill consists of dune sand, clay, sediment, rock waste, concrete rubble, road materials, old copper tubing, and other manmade materials (Stollar and Associates, Inc. et al. 1991). Unconsolidated, discontinuous layers of sands, silts, peat, and clays underlie the fill. The bedrock is sandstone, serpentine, and other rocks of the Franciscan formation.

The area inland from the landfill and south of Mason Street is largely built up or paved, with a steep, rocky cliff as its southern boundary. Development includes the Presidio commissary; building 611, believed to have been a transformer storage vault, and an adjacent high-voltage equipment area; a motor pool warehouse used to store paint, paint thinner, sulfuric acid, chlorine, insecticides, and other hazardous materials; a fuel control building built over an area historically stained

by leakage from aboveground storage tanks (adjacent paved areas also cover stained areas); a flammable material storage building with adjacent waste oil drum storage area; a former maintenance hangar now used for vehicle maintenance, with adjacent paving over stained soil; and a historic structure originally used as an aircraft hanger, now used as an electronic equipment maintenance shop where solvents have been routinely used (Stollar and Associates, Inc., et al. 1991).

Crissy Field Groundwater and Other Chemical Contamination — Groundwater at Crissy Field is generally 4 to 65 feet below the surface. In recent sampling studies, conductivity ranged from 953 to 1,300 µmhos/cm, thus exceeding the secondary California drinking water maximum contaminant level of 900 µmhos/cm (Stollar and Associates, Inc., et al. 1991; California Department of Health Services 1993). In four out of 10 samples, iron was less than the maximum contaminant level (MCL) of 50 micrograms per liter (µg/l). Other values ranged from 319 µg/l to over 20 times the standard (7,300 µg/l). Manganese levels ranged from four times the MCL of 50 µg/l to over 1,000 times the MCL (86,300 µg/l). The highest iron level was found in the sample with the highest total dissolved solids, possibly due to the presence of rust. The highest level of manganese is not correlated to high iron levels or high total dissolved solids (Stollar and Associates, Inc., et al. 1991).

Gasoline concentrations of up to 130 parts per million (ppm), diesel concentrations of up to 9.4 ppm, and total petroleum hydrocarbon concentrations of up to 4,600 ppm are found in the soil. The highest total petroleum hydrocarbon concentrations are found in the area near buildings 637 and 638. One soil sample in this area had 100 ppm of naphthalene and 67 ppm of 2-methyl naphthalene. Another sample in this area had elevated levels of the carcinogen chromium (1,340 ppm, compared to a maximum natural level of 1,000 ppm and a local background level of less than 100 ppm), cobalt (70.3 ppm, compared to a maximum natural soil level of 70 ppm and a local background level of less than 15 ppm), and nickel (1,390 ppm, compared to a local background level of less than 100 ppm). Benzene, presumably from gasoline, was detected at up to 2.5 parts per billion (ppb) (Stollar and Associates, Inc. et al. 1991). Traces (up to 9 ppb) of the pesticides dieldrin, endrin, isodrin, and pp'DDE were also found in the soil.

At landfill 7, 62 ppb of the pesticide methoxychlor, 3 ppm of the pesticide degradation product endrin aldehyde, and up to 8 ppm of various individual polyaromatic hydrocarbons were found. Most landfill 7 samples were below the 50 ppb mercury detection limit; one test pit sample had 274 ppb of mercury (compared to a maximum natural level of 300 ppb and a local background level of less than 50 ppb), suggesting possible low-level mercury contamination. It is also possible that this sample was at the edge of a localized mercury-contaminated area.

The risk assessment (Stollar and Associates, Inc., et al. 1991) concluded that there was a future risk of human exposure to toxic chemicals in soil during recreational activities at landfill 7 and near all Crissy Field buildings. An excess cancer risk of 1 in 10,000, primarily from ingestion of polyaromatic hydrocarbons in the soil, was estimated. The excess cancer risk from arsenic in drinking water from buildings 609, 640, and 643 was 1 in 100,000. The maximum acceptable excess cancer risk is generally held to be 1 in a 1,000,000. The risk assessment concluded that visitors and workers are unlikely to develop noncancerous adverse health effects as a result of long-term exposure to soil via ingestion and dermal contact or via ingestion of drinking water (the latter assessed for workers only).

Water Quality. Lobos Creek emanates from a sandy aquifer beneath heavily urbanized areas of western San Francisco and flows through residential neighborhoods. It is susceptible to many sources of contamination. The Lobos Creek basin aquifer, relying to some degree on recharge from the creek, is similarly susceptible to contamination. Therefore, both sources of water from the Presidio's system are considered to be of lower quality than the water from the city of San Francisco and do not meet the state water quality drinking standards. To meet state standards, a sanitary survey of the watershed must be completed, abandoned wells must be properly closed, and the water treatment process must be upgraded. Presidio wells have occasionally been shut down in response to suspected groundwater contamination. The Presidio groundwater is known to be significantly higher than city water in turbidity, nitrate concentrations, and mineral content (Nolte and Associates 1992b). Sources of both surface and groundwater contamination are related to the following.

Wastewater Treatment and Disposal — The Presidio relies on the city of San Francisco to receive and treat all wastewater generated on the post. Periodic episodes of stormwater infiltration have overloaded the system and caused backup and overflow into the basements of various buildings on the base. The possibility exists for cross connections between the sanitary and storm drain systems. Water quality monitoring conducted by the city of San Francisco near water discharges at Crissy Field has disclosed periodic high levels of coliform bacteria in summer months (USACE 1991). In addition, there are known cases of sewage lift pump failure near Crissy Field. Untreated wastewater has been discharged through emergency overflows into the storm drain system and into the bay. It is suspected

that Lobos Creek may be degraded by seepage from sewage lines and an occasional failure of the wastewater pump station (Nolte and Associates 1992b, U.S. Army Corps of Engineers 1991).

Pesticides/Herbicides/Fertilizers — Herbicides, fungicides, and insecticides including chloropyrifos, 2-4-D, Roundup, diazinon, malathion, thiram, bromoxynil, and ethylene bisdithiocarbamate have been used extensively by the Army throughout the Presidio (USACE 1991). Additionally, pesticides and fertilizers applied to landscaped areas such as the golf course may have leeched into bodies of water such as Lobos Creek or Mountain Lake, although samples collected in 1988 showed no pesticides above detection limits in Lobos Creek and wells. At least six buildings on the Presidio have been used by the Army for pesticide mixing and storage.

Underground Storage Tanks — A survey has found approximately 228 underground storage tanks within the Presidio, 17 of which are known to be in use. Most of these tanks contain or once contained heating fuel oil, gasoline diesel fuel, waste oil, or solvents. The condition of many of these tanks is unknown, and major leaks of petroleum hydrocarbons from these tanks and other fuel lines have already been documented (USACE 1991). The underground storage tanks present the greatest potential threat to groundwater at the Presidio, particularly along Crissy Field where the shallow groundwater and brackish water conditions are probably accelerating underground storage tank deterioration. Ninety of the underground storage tanks are due for removal in FY93 under a contract carried out by the U.S. Army Corps of Engineers (Swanson 1993).

Other Sources outside the Presidio — Groundwater flow and conditions in the Crissy Field area are influenced by tidal conditions in San Francisco Bay.

Water Rights. California recognizes water rights based upon the Doctrine of Prior Appropriation and the Riparian Doctrine. In addition, the Federal Reserved Rights Doctrine applies to federal reservations. The United States has the following water rights for the Presidio (Hill 1993):

1. The Presidio of San Francisco has a reserved right to at least 2,618 acre feet/year with a priority date of November 6, 1850, for municipal and industrial uses, including irrigation, for operation of the post and the facilities located thereon. The water may be diverted from Lobos Creek, Mountain Lake, or groundwater sources underlying the Presidio.
2. The Presidio of San Francisco has a reserved right to the amount of water necessary to preserve the natural features and for any additional recreational development from any source on, under, or touching the reservation with a priority date of October 27, 1972.
3. The Presidio of San Francisco also has riparian rights in Mountain Lake, Lobos Creek, and other drainages to preserve their natural features. There are no apparent existing or recent surface diversions from Lobos Creek or Mountain Lake by others. Any appropriative rights not beneficially used for more than five years would have been forfeited, abandoned, or lost by prescription. Even if there were any rights in Lobos Creek or Mountain Lake surviving forfeiture, abandonment, or prescription, they would, in any event, very likely have lower priority than the United States' 1850 reserved rights (Hill 1993).

Vegetation

The vegetation of the Presidio can be divided into native and nonnative. The native vegetation has been modified by human action. Direct intervention through the planting of landscaped areas, removal of native vegetation for food, firewood gathering, livestock grazing, and draining and filling the coastal marshes are the most noticeable modifications. Native vegetation has been indirectly affected through the spread of introduced vegetation, the largest component being the Presidio forest. The remaining native vegetation is greatly affected by the foggy, windy climate, the combination of sandy and serpentine soils, and the isolation from other lands by water on three sides. Native plant communities currently occupy only 10% of the Presidio land area.

The terms "vegetation associations" or "plant communities" are used in this text to describe Presidio vegetation. Often, not all species listed for a given plant community are present but the majority of the components are. A community may have lost a rare or vital species within the habitat described, but conditions still exist for the reintroduction of the species as indicated by the presence of the community described. The following plant communities are known to exist or have existed within the Presidio (Holland 1986).

Foredune Community. The northern foredune community is found at Crissy Field and Baker Beach. It is dominated by perennial grasses, low, often succulent, perennial herbs, and low shrubs that are tolerant of desiccating, salt-bearing winds. The dunes at Crissy Field are active (sand is actively being deposited or removed by the action of wind and tides), but are not recognized as such because conditions



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Native Plant Communities and Rare Plants

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

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favor plants that have reduced the amount of blowing sand and have partially stabilized the dunes. The most diverse native plant community in this area is near the Coast Guard station.

Northern Dune Scrub Community. The northern dune scrub community, also called northern or Franciscan coastal scrub, is found on the sand terrace slopes above Baker Beach. It is characterized by densely packed shrubs less than 6 feet tall interspersed with scattered grassy openings. This scrub community is found on windy, exposed sites with shallow rocky soils. Most growth and flowering takes place in late spring and early summer. Typical species include California sagebrush, bush lupine, coyote bush, bush monkeyflower, and poison oak. The federal candidate species San Francisco campion (*Silene verecunda*) is part of this community.

Northern Coastal Bluff Scrub. Northern coastal bluff scrub is present on the serpentine outcrops at Fort Point and above Baker Beach. The community is characterized by dwarf shrubs and low, often prostrate, herbaceous species and annuals up to 2 feet tall that may be scattered or form continuous mats. Plants exhibit varying degrees of succulence. Most growth and flowering happens in late spring and early summer but can take place almost year-round. Because of the serpentine substrate, this community contains many special status plants including coast rock cress (*Arabis blepharophylla*), San Francisco wallflower (*Erysimum franciscanum*), San Francisco gumplant (*Grindelia maritima*), Marin dwarf flax (*Hesperolinum congestum*), Raven's or Presidio manzanita (*Arctostaphylos hookeri* var. *ravenii*), and San Francisco owl clover (*Orthocarpus floribundus*).

Coastal Terrace Prairie Community. The California Native Plant Society refers to this community as the sand terrace community. It is found in the sand flats above Lobos Creek and north of the former Public Health Service hospital, in the Rob Hill area, and in the vicinity of the fourth green at the Presidio Golf Course. It consists of dense grasslands dominated by both sod and tall (up to 3 feet), tussock-forming perennial grasses. Most stands are quite patchy and variable in composition, reflecting local differences in soil moisture. The endangered San Francisco lessingia (*Lessingia germanorum*) inhabits this community. The coastal prairie community is now rare. It was formerly the most common vegetation type in the Presidio, but it was replaced by the introduced forest.

Serpentine Bunchgrass. Another rare community is serpentine bunchgrass, which is typified by the habitat at Inspiration Point. This open grassland is restricted to serpentine soils and is dominated by perennial bunchgrasses. The total cover is typically low and dominated by native species. The serpentine grasslands are a unique environment. Soil development on serpentine is very slight. The soils contain large amounts of magnesium and iron and minute amounts of calcium, sodium, and potassium, a combination usually toxic to plants. Windborne sand and silt supply soil nutrients to serpentine areas. Few species are able to tolerate these soils, which has led to the evolution of an endemic flora. The serpentine-adapted Presidio clarkia (*Clarkia franciscana*) is a state-listed endangered species in this community.

Central Coast Live Oak Riparian Forest. The central coast live oak riparian forest grows along Lobos Creek, between Lobos Creek and Mountain Lake, and in the vicinity of El Polin Spring. The state considers this a rare community. It is a low evergreen sclerophyllous riparian forest, usually with an open appearance, dominated by coast live oak (*Quercus agrifolia*). Grasses usually form a fairly extensive ground layer. This community lives on drier outer floodplains along perennial streams. It is transitional between more mesic willow-dominated streams and more xeric chaparrals. In addition to coast live oak, coyote bush and several willows are typical, with an understory of grass, forbs, and shrubs. Because streams are rare in San Francisco, this community is locally significant and contains important wildlife habitat.

Freshwater Seep Community. A freshwater seep community is present north of the Public Health Service hospital tennis courts. It consists mostly of perennial herbs, especially sedges and grasses, that usually form a complete cover. They are generally low-growing herbs that grow throughout the year due to the mild winters in San Francisco. The permanently moist or wet soils around freshwater seeps are most often dominated by grasslands; within the Presidio such grasslands are classified as coastal terrace prairie.

Historical Plant Communities. Other communities no longer present in the Presidio are known to have existed there at one time. According to historical records, a northern coastal salt marsh was present at Crissy Field before the lagoon was drained and filled. Such communities are highly productive and consist of herbaceous, salt-tolerant hydrophytes forming moderate to dense cover up to 3 feet tall. Most species are active in summer and dormant in winter.

Another extinct community is the coastal and valley freshwater marsh, which is dominated by perennial, emergent monocots that can grow to 15 feet tall. Marshes

are quiet sites without significant water current that are permanently flooded by fresh water rather than brackish or variable water. The Crissy Field wetland probably graded from freshwater marsh on the upland edge to salt marsh near the bay.

The Army (Jones & Stokes Associates, Inc. 1990b) has stated that large stands of mixed evergreen forest were present on most upland sites of the Presidio in prehistoric times but that today this community is restricted to a single stand of approximately 2 acres east of Lincoln Boulevard and north of Lobos Creek. Other authors disagree that this community type was present recently enough to be considered part of the native vegetation, although there is no disagreement that individual tree species were or are present. This community is dominated by broadleaf trees, 30- to 100-feet tall, often interspersed with taller conifers, which form a closed forest. Species typical of mixed evergreen forest are coast live oak, tan oak, California bay, madrone, California buckeye, and Douglas-fir (Howell et al. 1958). Each dominant species, except madrone, is well represented in one or more other habitat types. The community is transitional, both geographically and biologically, between the dense coniferous forests of northwestern California and the open woodlands and savannas of the interior.

Threatened, Endangered, Rare, Unique, and Sensitive Plant Species. Threatened, endangered, and sensitive plant species listed by the U.S. Fish and Wildlife Service (1989, 1991, 1992), the state of California (California Department of Fish and Game [CDFG] 1987), and/or the California Native Plant Society (1988) that are known to exist within the Presidio are listed in appendix A. One species, the Raven's or Presidio manzanita (*Archostaphylos hookeri* var. *ravenii*) is listed as a federal endangered species. Fifteen other plant species are candidates for federal threatened or endangered status. Six plants have been listed as endangered by the state of California (CDFG 1991; Jones & Stokes Associates, Inc. 1990a). Although the general locations of these species have been documented by the Army (Jones & Stokes Associates, Inc. 1990a) and the National Park Service, the information can only be obtained through a request to the office of the superintendent of Golden Gate National Recreation Area. Because of their vulnerability, the species' specific locations are not provided to the public.

Invasive Nonnative Species. Many nonnative plants are growing within the Presidio boundaries as a result of past human use. A comprehensive list of these nonnative plants has not yet been compiled, and it may not be practical to do so because the Presidio today is primarily a cultural landscape. The proliferation of these nonnative species is affecting what remains of the biological diversity of native communities (estimated to be approximately 10% of Presidio) by displacing rare plant species, changing the ecology and the natural successional patterns of the area, and affecting the integrity of the historical cultural landscapes. Among the more invasive nonnative species known within the Presidio are pampas grass, gorse, Scotch and French broom, radish, ice plant, English ivy, and European dune grass.

Wildlife

Amphibians, Reptiles, Birds, and Terrestrial Mammals. Although the Presidio provides remnant wildlife habitat within the urban environment, a systematic field survey of known fauna has yet to be conducted. The scarcity of native habitat magnifies the importance of the introduced wildland habitat, which is mostly nonnative forest. The surviving native wildlife within the Presidio must generally be tolerant of human activity because few areas are undisturbed. The native riparian woodland along Lobos Creek and other stream channels as well as other native plant communities provide relatively undisturbed habitat and would be expected to support diverse native fauna.

The predominately monotypic composition of the cultivated forest is not conducive to wildlife diversity; however, many individual stands interspersed with grassland, scrub, landscaped, and other areas serve to promote species diversity. For example, over 160 species of birds use the area at various times of the year. Deer and other large mammals are not known to live within the Presidio, but foxes, raccoons, opossums, squirrels, rabbits, skunks, shrews, mice, gophers, moles, and bats are present (American Society of Landscape Architects 1986).

Migratory Species. A number of migratory species are suspected or are known to seasonally occupy areas of the Presidio. Many bird species use the Presidio during migration or enter the Presidio to hunt. Hunters include the southern bald eagle, peregrine falcon, ferruginous hawk, osprey, and California least tern. There are many butterflies, moths, and small mammals such as bats that frequent the Presidio during various times of the year but do not necessarily use the area to breed.

Marine Species. Many fish species inhabit the ocean and bay waters surrounding the Presidio, although no formal surveys specific to nearby waters have been performed. Intertidal and subtidal areas along the Presidio provide spawning habitat for fish such as herring. Marine life in the intertidal zones includes perch, surf fish, cabezones, blennies, rock fish, abalone, eels, mussels, sea urchins, and starfish. An unusually high and significant number of the starfish species can be found along the

north seawall adjacent to Fort Point. The state-protected Dungeness crab (*Cancer magister*) almost certainly exists in these waters. Marine mammals such as the California sea lion are seen regularly in the bay adjacent to Crissy Field and from Fort Point to Fort Mason.

Threatened and Endangered, Rare, Unique, and Sensitive Animal Species. Federal- and state-listed species that occur or may occur within the Presidio are listed in appendix A. These include transient species such as the endangered bald eagle (*Haliaeetus leucocephalus*) and peregrine falcon (*Falco peregrinus*). Endangered brown pelicans (*Pelecanus occidentalis*) are also seen along coastal areas but do not nest in the area. The state endangered and federal candidate willow flycatcher (*Empidonax trailii*) and federal candidate species California red-legged frog (*Rana aurora draytoni*) have been recorded int he area; current status of these species in the Presidio is unknown. No critical habitat for these species is known to exist within the park.

Air Quality

Legislation and Regulation. The Clean Air Act (42 USC 7401 et seq.) and the California Clean Air Act mandate the establishment of national and state ambient air quality standards. These acts establish maximum allowable increments beyond baseline concentrations of sulfur dioxide, nitrogen dioxide, and particulate matter. Areas in which the standards are not met are known as nonattainment areas. The county of San Francisco has been designated a federal nonattainment area for ozone and carbon monoxide and a state nonattainment area for ozone, carbon monoxide, and suspended particulate material.

When the Presidio becomes a part of Golden Gate National Recreation Area, its air quality designation will change to a class II clean air area as defined by the federal Clean Air Act and amendments. Class II designation allows for small amounts of degradation of existing air quality within limits based on the standards.

The Clean Air Act requires federal land managers to protect a park's air quality values from adverse impacts. Section 118 of the act requires that federal facilities comply with existing federal, state, and local air pollution control laws and regulations. Golden Gate National Recreation Area managers must ensure that all in-park activities meet existing laws and regulations and that external sources of air pollution are controlled to the extent possible to protect the air quality and resource values of the Presidio.

Presidio Baseline. The Presidio's location allows for excellent air circulation because of the prevailing west and northwest winds. Because there are no pollution sources west of the Presidio, the air moving into the area is of a very high quality.

Air pollution sources at the Presidio include motor vehicles and stationary sources. Motor vehicles are the major source of pollution. When traffic congestion coincides with stagnant air, localized carbon monoxide levels may exceed state and federal standards. Localized violation of the carbon monoxide standard would be expected on heavily used streets and intersections such as the Lincoln-Halleck intersection.

The Bay Area Air Quality Management District in which the Presidio lies requires facilities that emit more than 2.5 tons of nitrogen oxides annually to obtain operating permits. The Letterman Army Medical Center natural-gas-fired steam-heating plant exceeds the standard and operates under permit. Additional stationary air pollution sources that have operated in the Presidio include maintenance facilities such as painting operations and operating facilities such as heating facilities, fuel oil storage tanks, and the Letterman Army Institute of Research pathological waste incinerator. Small stationary pollution sources do not exceed the permitted standards but may exceed the standard cumulatively.

Air Quality Monitoring. The Bay Area Air Quality Management District operates a regional air quality monitoring network for the Bay Area basin. They have 29 sites in the greater Bay Area, including two in San Francisco, and one in San Rafael. The closest monitoring data available from the district is from the downtown San Francisco station, which is downwind of the Presidio and is not representative of the expected superior air quality at the Presidio. The National Park Service is not conducting any additional air quality monitoring within Golden Gate National Recreation Area at this time.

Noise

Automobile, bus, and truck traffic on the roadway system are the major sources of noise at the Presidio. Two major regional thoroughfares, U.S. Highway 1 and U.S. Highway 101, pass directly through the Presidio and connect San Francisco and Marin counties. Highway 1 (Park Presidio Boulevard) carries more than 60,000 vehicles on the average weekday. The Doyle Drive portion of Highway 101 carries about 92,000 vehicles on the average weekday.

Aircraft were once a notable source of noise at the Presidio. Crissy Field was used by aircraft, and the helipad is still used occasionally by helicopters. When the Presidio is transferred to the National Park Service, the helipad will be used only for emergencies.

The Presidio is generally quieter than the surrounding urban environment. Managing ambient urban noise is difficult because of the unpredictability of the sources and the dispersal throughout the landscape. Elimination or significant reduction of noise not related to traffic might not be possible and is probably not expected by park users.

Sound level measurements are established according to a logarithmic scale of decibels (dB). Separate measurements can be made for different sound frequency ranges, the most common being the A-weighted decibel scale, which approximates the way the human ear responds to noise levels. Measurements on the A-weighted scale are expressed as dBA.

Noise descriptors commonly used in impact assessments and environmental documents include L_{10}, L_{eq}, and L_{dn}:

TABLE 4: PRESIDIO NOISE MEASUREMENTS (DBA)

Monitoring Location	Time P.M.	Background Noise - dBA	Peak Noise	Peak Noise Source
Public Health Service hospital, 1810 series	5:15	58	70	Car and wind
Toll plaza, visitor center	5:25	73	82	Cars and diesel buses
Storey Road, 1290 series	5:40	57	63	Car
Lincoln and Battery East	5:55	60	68	Loudspeaker and motorcycle
Hwy 101/Hwy 1 interchange, bldg. 650	6:05	64	77	Diesel bus moving uphill
Mason near helipad	6:15	56	68	Motorcycle and small plane
Arguello and Moraga, officers' club	6:30	51	79	Diesel truck accelerating
Lincoln and Montgomery, bldg. 106	6:40	59	80	Jet plane
Richardson/Lyon, Presidio entrance	6:50	54	76	Auto traffic
Marina Gate, 1188 warehouse	7:00	56	70	Auto traffic

SOURCE: Bendix Environmental Research, Inc., San Francisco, California, noise measurements on June 11, 1992.

Visitor Experiences

Current Opportunities

Although the Presidio's mission has not focused on visitor experiences, the Army has recognized its role in providing open space within a growing city. Operated as an open base, the Presidio has traditionally been used by its neighbors for many leisure activities. Julius Kahn Playground was set aside for the children of San Francisco in 1922. Visitors from all parts of the world travel the roads, hike the trails, and picnic in the outdoors. Organized groups of children use Rob Hill, the post's highest point, for camping.

Other Presidio resources have also been set aside for public use. For nearly 100 years, civilians and military personnel have enjoyed the Presidio Golf Course. The Golden Gate Bridge has attracted national and international sightseers for over 50 years.

Fort Point was designated a national historic site in 1970. More than 1 million people visit the site annually (NPS 1992e). Since 1972 Golden Gate National Recreation Area has administered the entire coastal rim of the Presidio for public use, and more than 2 million people a year visit these NPS areas. Use is primarily recreational (see the "Recreational Use" section for additional information).

The current experience of visiting the Presidio is significantly affected by its character as an active military post. Visitor information and orientation is nearly nonexistent. The network of roads is confusing; directional signs are scarce. Visitors are often not sure where they are free to go and where they are not. Visitor amenities and support services are insufficient. There are few public restrooms and drinking fountains. Few food service facilities are open to the public.

Visitor information services improved somewhat with the establishment of the Presidio Resource Center in late 1990. Adjacent to the Golden Gate promenade and the Fort Point fishing pier, the center is staffed by NPS personnel who provide information about the Presidio, Golden Gate National Recreation Area, and other nearby facilities. However, few visitors are aware that these services are available.

Interpretation/Education. For the past 20 years interpretive activities on the Presidio have been primarily based at Fort Point National Historic Site. Over 200,000 people tour the fort annually. The staff offers self-guided and ranger-led tours, costumed interpretation, and extensive programs for schoolchildren.

The Presidio army museum on the main post is managed by the Army. Open since 1974, the museum contains artifacts, models, dioramas, artwork, and photographs in exhibits that depict the military occupation of the Presidio and the roles of its troops. In recent years, City Guides, a group sponsored by the San Francisco Public Library, has led tours through the museum and occasional tours of the post at the request of the Army. Two other groups, the Sierra Club and San Francisco Architectural Heritage, offer occasional tours of the base.

The National Park Service began a Presidio tour program in December 1989. Guided walking, bus, and car tours; living history programs; and evening campfires are offered on a variety of subjects throughout the post. Free programs are offered every weekend. Examples include the main post historical walk, Mountain Lake hike, story of the Golden Gate, old Presidio walk, over hill/over dale (natural history), coastal defense hike, Presidio architecture and landscape, a walk down Funston Avenue in 1878, and Crissy Army Airfield history walk, to name a few. Bus and van tours and special walks are given by prior arrangement. Attendance at interpretive programs has risen steadily. From December 1989 to September 1990, only 449 people were served; in the period between October 1990 and September 1991, that number increased to 3,357; another increase was reported for the October 1991 to June 1992 period when 4,295 visitors participated.

Brochures and self-guiding booklets are available, as is the Presidio planning newsletter *Reveille*, site bulletins on military history, a videotape about Presidio planning, a historic trails map, and *The Official Map & Guide to the Presidio of San Francisco*, which is a color brochure for sale by the Golden Gate National Park Association.

Recreation. On an annual basis, 3.5 million people visit the Presidio for recreational, educational, and business purposes (Peccia & Associates 1993). The Presidio contains many of San Francisco's finest recreation and large open space areas. Even as an active military base, it has provided recreational opportunities for large numbers of people.

The recreation areas within and adjacent to the Presidio are under the jurisdiction of several different agencies — primarily the U.S. Army, the National Park Service (Golden Gate National Recreation Area), and the city of San Francisco. The built recreation facilities include athletic fields, tennis courts, three gyms, a bowling

center, a swimming pool, and several playgrounds (see table 5 and the Recreational Facilities map). Small playground and athletic fields throughout the housing areas are maintained by the Army for use by military residents. Trails used for recreational purposes include the Coastal Trail, the Golden Gate promenade, and the Ecology Trail. Scenic drives are the Historic Drive and the 49-Mile Scenic Drive. Other pathways and roads throughout the Presidio are used for walking, jogging, and bicycling (see the "Bicycle and Pedestrian Traffic" section for more information on these uses).

TABLE 5: PRESIDIO RECREATIONAL FACILITIES

Facility	No.	Location
Gymnasiums	3	Letterman complex, Main post, Fort Scott
Indoor swimming pool	1	Letterman complex
Bowling alley	1	Main post
Indoor shooting range	1	Fort Scott
Playgrounds/parks	2	Mountain Lake Park, Julius Kahn Playground
Golf course	1	Presidio Golf Course
Tennis courts	14	Main post (4), Letterman complex (2) Public Health Service hospital (1), Fort Scott (2), East housing area (1), Julius Kahn Playground (4)
Outdoor multi-use courts	3	Fort Scott, Public Health Service hospital (parking lot), Letterman (parking lot)
Athletic fields	4	Fort Scott, East housing area, Julius Kahn Playground, Army Reserve center
Fishing pier	1	Torpedo wharf

Other recreation uses include surfing, boardsailing, swimming, sailing, and fishing. Crissy Field provides access to a world-class boardsailing area because of a unique combination of high winds, beach access, and scenic beauty.

Scenic Viewing. The Presidio is a regional scenic resource that can be appreciated from both near and distant viewpoints. The dominant visual impression of the Presidio is its parklike appearance — in striking contrast to the high density urban setting of San Francisco. From the Marin headlands, the Presidio provides a backdrop to the Golden Gate Bridge and the popular vistas at the north end of the bridge. The Presidio is also visible from Alcatraz and Angel islands, from along the north waterfront of San Francisco and from high-rise buildings and rooftops in the business district. Spectacular views of the Presidio are provided from elevated points such as Twin Peaks and Mount Tamalpais.

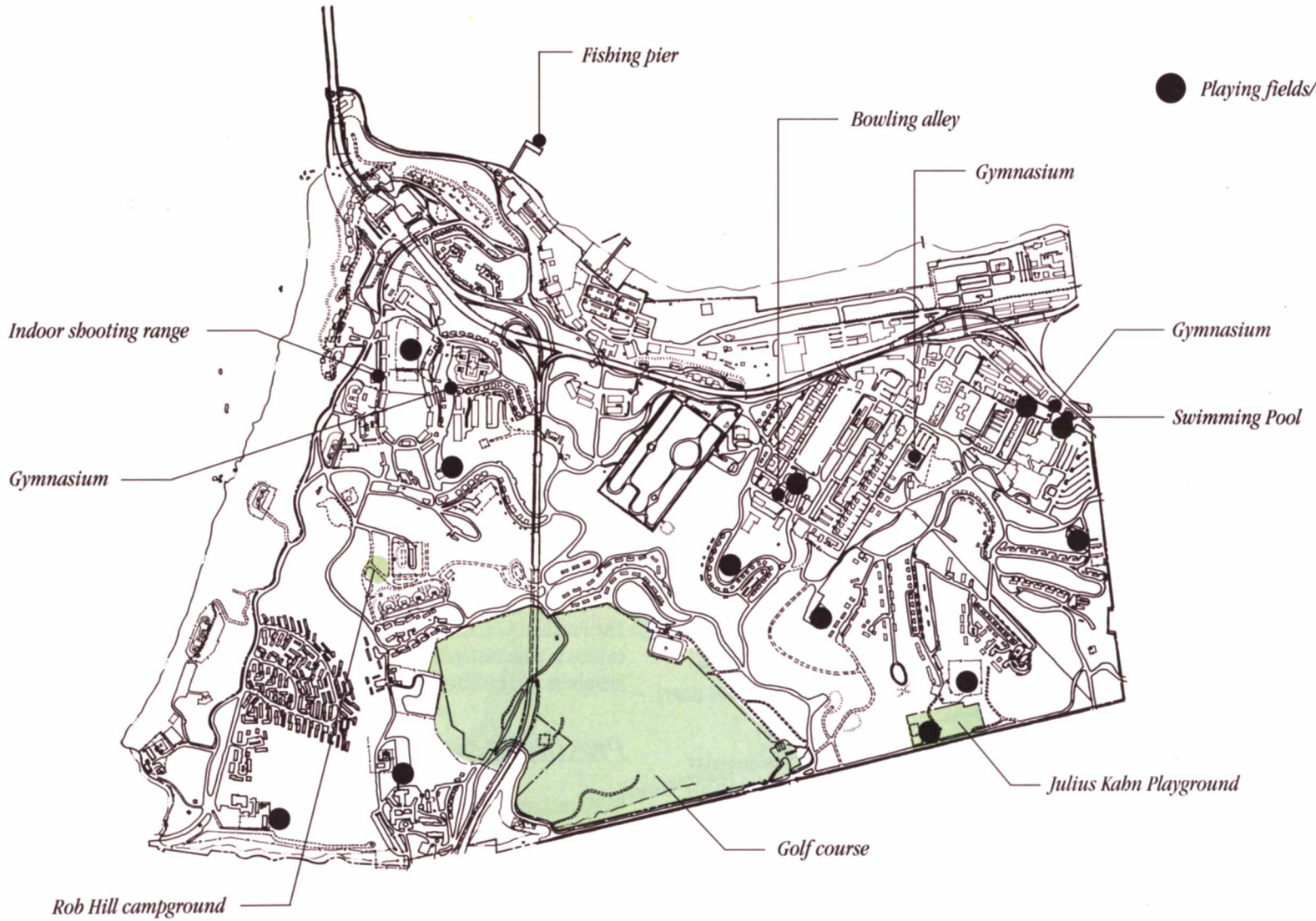
Views into the Presidio from locations along the boundary are limited in the south and east by the dense tree stands that define the boundary line. Along the western (Baker Beach, Pacific Cliffs) and the northern (Crissy Field, Fort Point) boundaries, views into the post are limited by the high cliffs or the edge of the hillside trees.

Within the Presidio many sites provide views of features that are of local, regional, national, and international prominence. Many of these sites are along Lincoln Boulevard, which is also part of the designated 49-Mile Scenic Drive that runs along the west side of the city. From this route there are elevated vantage points providing a continuous view, particularly outward toward San Francisco Bay, the Golden Gate Bridge, and Pacific Ocean. The entire route provides both open and wooded views to the water.

The elevated portion of Highway 101 (Doyle Drive) provides fairly limited views for the hundreds of thousands of motorists who pass each day because of high speeds, heavy traffic, and roadside trees. Some open views over Crissy Field to San Francisco Bay are possible where openings in the forest permit.



The Presidio is a scenic resource enjoyed by all visitors.



Recreational Resources

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Vistas of the ocean and bay, the Golden Gate Bridge, the San Francisco skyline, and the Palace of Fine Arts have been preserved despite the construction and changes that have occurred over time. Some individual buildings, clusters of buildings, and landscape features such as fencing intrude on significant historic vistas as well as open space areas.

User Groups and Classifications

Presidio users can be classified into four main groups: (1) neighborhood, (2) city, (3) regional, and (4) tourist. The places they go, the length of their stays, and the frequency of their visits vary.

Neighborhood users live in or immediately around the Presidio and visit routinely. These people most frequently use the parks and playgrounds, especially Mountain Lake and Julius Kahn Playground. The Army playgrounds and playing fields are used mainly by Presidio residents. Neighborhood users also frequent large open space areas such as Crissy Field and Baker Beach.

City users are people who live or work in the city not far from the Presidio. Many of these users walk, bicycle, or jog to the Presidio; others drive or ride the bus. Many people use the Golden Gate promenade along Crissy Field on weekends. Also popular for weekend use are Baker Beach and, to a lesser extent, the Coastal Trail. Many residents prefer using the main Presidio roads as a pleasant and scenic route through the city.

Regional users come from throughout the Bay Area to the Presidio and the rest of the Golden Gate National Recreation Area. Their use is limited primarily to weekends and is less frequent than city or neighborhood users'. Mountain Lake has many regional users.

Tourists from all over the country and the world visit San Francisco. The popular 49-Mile Scenic Drive leads many of these visitors along the northern and western edges of the Presidio; two popular stops along the route are Fort Point National Historic Site and Baker Beach. Tourists also frequent the Golden Gate Bridge plaza viewing area. Many people stop for a short time, and their focus is the Golden Gate Bridge and the bay, not the Presidio. These are usually one-time visitors traveling by automobile or chartered bus; many are escorted by friends or relatives from the area.

Three classifications of use were identified in the 1986 American Society of Landscape Architects study of the Presidio: (1) unspecified, (2) defined, and (3) private. Generally, the uses occur in different areas.

Unspecified uses include activities such as hiking, running, reading, and eating. They take place in many different settings and do not have special space or equipment requirements. They are most popular along the Baker Beach and Crissy Field waterfront areas. The Fort Point area attracts many people because of its historical significance, but it is also frequently used for recreation. The fort is part of the Golden Gate promenade, and the open space, trails, and seating areas encourage various uses.



Neighborhood children visit the Presidio playgrounds and parks.

Defined use areas are planned and constructed with a particular function in mind. The ballfields and tennis courts within the Presidio are good examples. Other areas are not so well defined in their design or use. The two city parks, Julius Kahn and Mountain Lake, have been described as "defined use." Large portions of these two parks are designated for specific uses, such as baseball, tennis, and children's play areas. Portions of these parks, however, are open and used for many different activities.

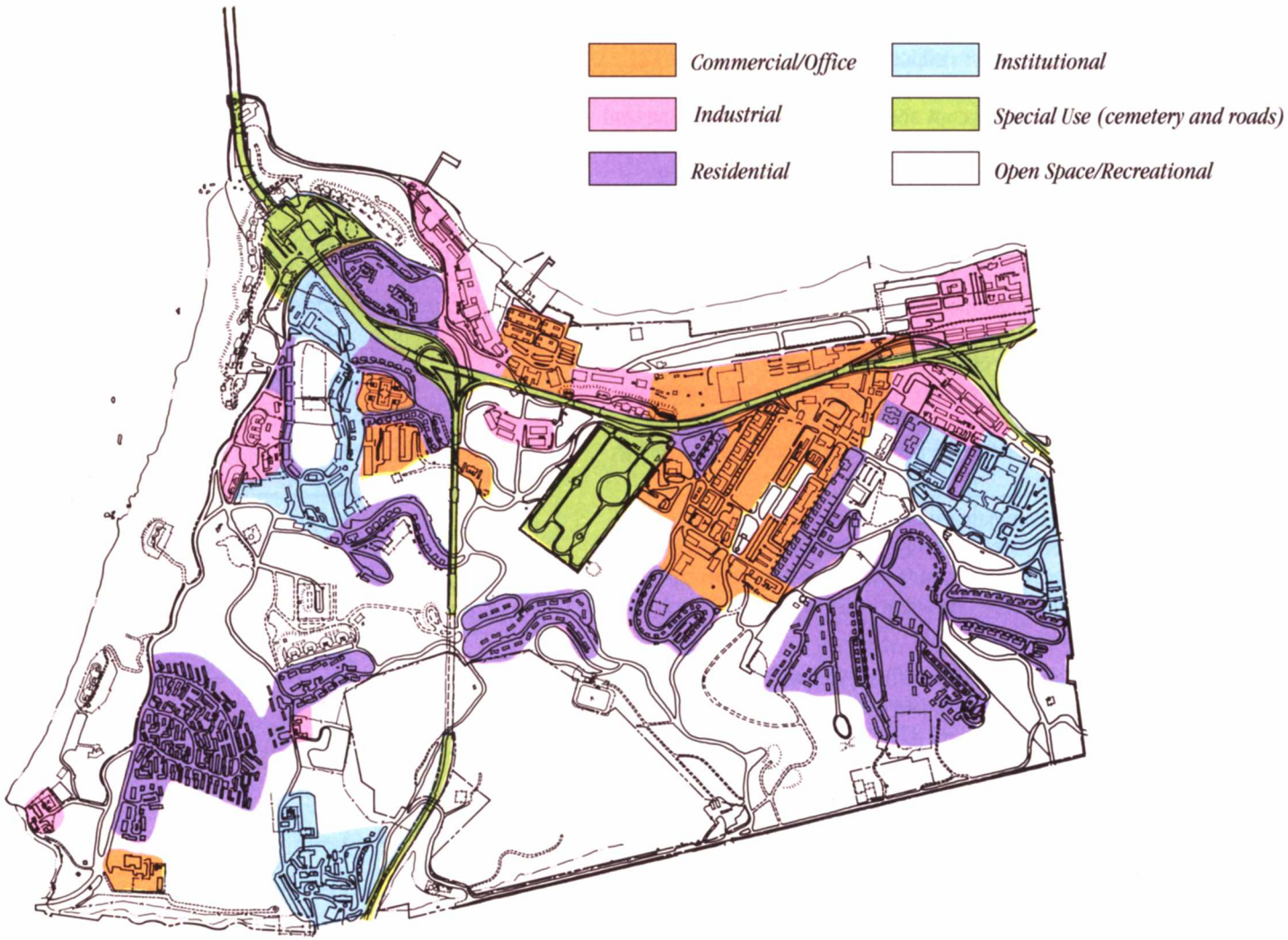
The Presidio Golf Course is the only strictly private use area at the Presidio. The golf course is administered by the Presidio Golf Club, and use is restricted to private members and military personnel.

Presidio Land Uses and Community Resources

Major Land and Building Uses

The total land area of the Presidio is about 1,480 acres. It is a diverse landscape comprised of 13 distinct planning areas. The existing land use pattern is mostly suburban, in contrast to the site's dense urban surroundings. Acreage and building information by planning area is included in table 6.

Of the 1,480 acres, approximately 700 acres, or 48%, are developed and 780 acres, or 52%, are open space (see the Current Land Use map). The forested area extends over 288 acres. Roughly 160 acres are devoted to the golf course. Of the developed



Current Land Uses

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

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areas, about 290 acres (20%) are used for residential purposes, and about 121 acres (8%) are in commercial/office use. Institutional (hospital and research facilities) and industrial land uses each occupy about 100 acres, or 7% of the land area. Special uses, including the national cemetery and highway rights-of-way, take up about 80 acres, or 6% of the land. For additional information on land use categories, see table 20.

The Presidio's 870 buildings, which total 6.36 million square feet of floor area, are used for a variety of purposes. Table 7 provides the following building use breakdown: single- and multi-family residential (33%), office (22%), medical (13%), warehouse (9%), dormitory (7%), industrial (6%), retail (4%), institutional (2%), military (2%), and infrastructure (2%). There are 1,184 family housing units in 383 buildings, of which 178 are historic. Family housing ranges from two- to five-bedroom apartments to large duplexes and single-family homes, as detailed in table 8. In addition, about 1,415 beds are provided in barracks for unaccompanied military personnel.

The Presidio contains 18 military commands and 54 tenant organizations, including the headquarters for the Sixth U.S. Army and the Letterman Army Medical Center. There are also three Army reserve training centers serving approximately 680 reservists and 120 active duty military personnel who provide training and support (Jones & Stokes Associates, Inc. 1991).

Nonmilitary users of the Presidio include 77 permittees for public services and utilities, including the U.S. Postal Service, the San Francisco Municipal Railway (MUNI) bus service, city utility easements, and telephone facility easements. The Federal Emergency Management Agency and the Red Cross are among the nonmilitary tenants who have offices at the Presidio.

TABLE 6: PRESIDIO ACREAGES AND BUILDINGS BY PLANNING AREA

	Acres*	Number of Buildings	Number Historic	Total Square Feet
Main post	135	149	111	1,324,000
Golden Gate/Fort Point	70	23	21	90,000
Fort Scott	130	159	126	845,000
Letterman complex	60	51	39	1,329,000
Public Health Service hospital	37	21	16	398,000
Cavalry stables	33	16	12	109,000
East housing area	130	135	86	651,000
Crissy Field	145	103	69	558,000
Presidio Hill	255	175	4	952,000
National cemetery	28	5	5	6,000
Presidio forest	228	12	8	46,000
Lobos Creek	69	13	5	51,000
Coastal bluffs	124	8	8	3,000
Totals	**1,444**	**870**	**510**	**6,362,000**

* Acreage figures are reduced by approximately 36 acres to allow for highway alignments.

TABLE 7: PRESIDIO BUILDINGS - CURRENT USES

Current Use	Number of Buildings	Approx. Square Feet	Percent of Total
Dormitory	25	444,000	7
Industrial	64	358,000	6
Infrastructure	61	102,000	2
Institution	14	145,000	2
Medical	2	797,000	13
Military	31	143,000	2
Office	89	1,390,000	22
Residential	383	2,119,000	33
Retail	16	272,000	4
Warehouse	185	592,000	9
Totals	**870**	**6,362,000**	**100**

SOURCE FOR TABLES 6 AND 7: National Park Service, Presidio Building Inventory Files, April 1992

TABLE 8: HOUSING UNIT BREAKDOWN

Housing Type	Number of Buildings	Units
Single dwelling	54	54
2-unit	176	352
4-unit	100	400
6-unit	27	162
8-unit	23	184
10-unit	2	20
12-unit	1	12
Totals	**303**	**1,184**

A number of significant outgrants of Presidio land serve other public functions. The Department of Veterans Affairs operates the 28-acre national cemetery at the Presidio. The Golden Gate Bridge District occupies 56.26 acres for the bridge toll plaza, structures, roadways, and operations and maintenance yards. A Caltrans state highway easement, totaling 14.93 acres, is dedicated to the operation of Highways 1 and 101 extending south and east from the toll plaza.

Golden Gate National Recreation Area currently manages approximately 100 acres of the Presidio that form a continuous strip on the ocean and bay sides. This land has been irrevocably permitted to Golden Gate National Recreation Area, including Baker Beach, 45 acres of Crissy Field, and the 29-acre Fort Point National Historic Site. The 14.7-acre Coast Guard facility was also permitted to Golden Gate National Recreation Area in 1991. Public recreation functions operated by the city of San Francisco include the 7.29-acre Julius Kahn Playground developed in the 1920s and a small portion of Mountain Lake frontage bordering city park land.

Population and Employment

Approximately 4,700 people currently live at the Presidio, including children and dependents of Army and Navy personnel (1990 Census). This represents an 8.2% decline from the 1980 population of about 5,140 (1980 Census). Not all of the Presidio's residents work on the base. An estimated 123 housing units in the Wherry housing area are occupied by Navy families (USACE 1991).

The Presidio employs about 5,500 personnel, including 2,000 active-duty military staff and 3,550 civilians (USACE 1991). Civilians will not be relocated by the Army when the base closes, except those who are moved as part of military families. Presidio employment represents 3%-4% of total military employment and less than 4% of federal civilian employment in the greater Bay Area (USACE 1991). Blue collar jobs outnumber white collar jobs by approximately two to one, according to the Sixth Army garrison (Hall 1991).

Many employees commute to the Presidio from other military bases and housing elsewhere because only active duty personnel are eligible for base housing. The Army estimates that 30% of the Presidio employees and their dependents live in San Francisco, while 85% live in the five-county area surrounding the bay, including San Francisco. According to the *Presidio of San Francisco: Master Plan Report* (Nakata Planning Group, Inc. 1987), out of the 3,000 Presidio dependents attending schools in the region, about 900 attend private and public elementary, middle, and high schools in San Francisco.

Presidio Community Services

The Presidio community today contains the full range of land uses one would find in a small town. The Sixth U.S. Army manages the housing, logistics, law enforcement, information management, phone service, and other responsibilities. In addition to office space and other facilities related to the military mission, there are numerous support facilities and retail uses.

Among the community facilities that serve residents and employees are a child care center (with a capacity for 200 children), a library, a movie theater, and community meeting rooms for boy and girl scouts and other youth and adult activities. Clubs and other activity centers serve the resident, employee, and military retiree populations. These include an officers' club and a noncommissioned officers' club. A religious activities center and several chapels serve the residents. The Army provides a number of hobby shops and skill development centers including auto care, arts, and continuing education. Various psychological support services are also provided, including drug and alcohol counseling. Community facilities are listed in table 9.

TABLE 9: PRESIDIO COMMUNITY FACILITIES

Facility	No.	Location
Army museum	1	Main post
Chapels	3	Main post, Fort Scott
Child care center (200 children)	1	Main post
Community center	2	Fort Scott
Officers' clubs (restaurant/banquet facilities)	2	Main post
Letterman auditorium	1	Letterman complex
Library	1	Main post
Religious activities center	1	Cavalry stables
Movie theater	1	Main post

Each housing area has a mayor and a housing coordinator who focus on maintenance, watering policies, and other neighborhood issues. Thirty neighborhood mayors meet with their neighbors and report monthly to the director of housing to ensure that housing concerns are dealt with equitably. Additionally, there are numerous advisory committees organized around such topics as energy, health and safety, health and fitness, and the post exchange.

The Presidio also offers a range of recreational facilities to help residents and employees stay in good physical condition. The base contains three gyms, a swimming pool, and a bowling alley. Outdoor facilities include numerous tennis courts, several ballfields, a volleyball court, a golf course, a yacht club (at east Fort Baker), and riding stables (at Fort Cronkhite). The golf course is operated by the Army with privileges extended to a private club in exchange for participation in golf course maintenance. There are also children's playgrounds in the family housing neighborhoods.

Commercial services include a grocery store (commissary), department store (PX), convenience store, travel agency, garden center, gas station, and car wash. These commercial facilities have no land costs and assess no sales tax, so prices at some of these facilities offer substantial cost savings from equivalent private establishments.

The commissary is partially subsidized by congressionally appropriated funds. The post exchange is self-supporting and includes the convenience store, fast food restaurant, gas station, car wash, garden supply store, and movie theater. Profits are redistributed to support child care centers and other activities. Support services also include a bank, credit union, and post office at the main post. Primary users of these facilities are active military and retirees in the area. Recent studies show that the majority (approximately two-thirds) of the customers at the exchange and commissary are retirees who combine trips with visits to other facilities, such as the medical center and the clubs.

Primary medical care has been provided at Letterman Army Medical Center to the active military, retirees, and their dependents. The Army estimates that 39,790 were eligible beneficiaries in 1987, and that there will be 34,650 after base closure. Within the Bay Area there are three other military hospitals and 13 military clinics.

Additional information on surrounding neighborhood land uses and community resources is included in the "Surrounding Neighborhoods" section under "Regional Context."

Public Safety Services

Security. As a military base, the Presidio has been an open installation with access into and through main areas, except for most of the buildings. Thousands of recreational visitors already go to the Crissy Field area. Law enforcement is supplied by the Presidio military police — 70 military personnel and 11 civilians; approximately 35–40 individuals are involved in security patrols (USACE 1991). In addition, park rangers and U.S. Park Police patrol Baker Beach, Fort Point, and Crissy Field.

The level of recorded felonies and misdemeanors in the Presidio was low for 1990 and 1991 compared to an urban community of similar geographical and population size. Crime on military bases is typically lower than in urban communities, and the number of nonmilitary users of the Presidio has been relatively low. There were 314 larceny theft complaints in 1990 and 216 in 1991; 60 assaults in 1990 and 63 in 1991; 50 narcotics arrests in 1990 and 29 in 1991; and 50 driving under the influence offenses in 1990 and 29 in 1991. Other offenses, such as burglary, fraud, vehicle theft, and arson, were rare (Jones & Jones 1993b).

Fire Protection. The Presidio has its own fire department, which provides firefighting and fire prevention services, cliff rescues, and other rescues such as those necessary in a structural fire. The fire department is staffed by 35 civilians, with 10 firefighters on duty 24 hours per day. Seven of the 35 staff members are stationed at Fort Cronkhite in the Marin headlands. About 1,500 calls are answered annually (USACE 1991). Response time even to remote areas in the Presidio is approximately four minutes.

A two-company station is at the main post. It is currently equipped with an aerial ladder truck, two pumpers, a rescue truck, a haz-mat truck, a cargo trailer, and four sedans. It has not yet been decided whether the Army will leave this apparatus for park use or move it to another base. The existing fire station is too small to house all relevant operational functions. Recently acquired firefighting apparatus does not fit in the building and must be stored outside, exposed to the elements.

Water flows available for fighting fires do not meet the requirements of the *Uniform Fire Code* in most of the Presidio, and in some areas the available fire flow is only a fraction of what is required. For instance, about 1,350 gallons per minute (gpm) is available at Letterman versus a requirement of 5,000 gpm; at the main post only 2,200 gpm is available versus a need for 5,500 gpm; and at the Director of Engineering and Housing complex at Crissy Field just 1,500 gpm is available where 6,250 gpm is required. Most of the fire flow deficiencies are due to undersized water mains, bottlenecks created by pressure release valves or water meters, or piping not usable because of lack of pressure-reducing valves. In some areas fire hydrants are spaced farther apart than permitted by the code. It is estimated that 18 new hydrants would be needed to overcome this deficiency (Nolte and Associates 1992a).

Emergency Medical Services. The Presidio Fire Department is the primary provider of emergency medical treatment and transportation. Calls to 911 are referred to the Presidio Fire Department. First-response (ambulance) vehicles are staffed with emergency medical technicians. Average ambulance response time is three minutes. From September 1991 through August 1992, the Presidio Fire Department responded to 236 medical service calls. Of these, the administrative and office complexes at the main post generated 62%; another 32% came from the housing areas; and Letterman and other areas made up the remaining 6%. About one-third of the incidents were treated on the scene, and two-thirds required transport to a hospital (Rihtarsich 1993).

The Letterman Army Medical Center provides backup support to the Presidio Fire Department and ambulance transportation of all personnel requiring emergency assistance on the military installation. In addition, the hospital provides routine and emergency patient transport between medical treatment facilities and the helipad.

Presidio Transportation Systems

Regional Transportation

Transportation is a major concern for Bay Area residents. With a population of more than 6 million in the nine-county area surrounding San Francisco, this is a regional issue that must be coordinated among many governing agencies (Metropolitan Transportation Commission 1991). The Metropolitan Transportation Commission coordinates planning efforts and defines policies for the area. Local governments have adopted transportation management programs in response to congestion, parking problems, and the economic and environmental costs of expanding automobile traffic capacity. The city and county of San Francisco has a policy of promoting public transit and other alternatives to private auto use (San Francisco Department of City Planning 1984).

San Francisco requires major employment and activity centers (such as hospitals) within its jurisdiction to employ management techniques to reduce auto traffic. Parking restrictions and fees are used to discourage auto use in densely developed areas and to ensure that adequate parking is available for residents in nearby neighborhoods. Tolls are charged to enter the city on the San Francisco-Oakland Bay and Golden Gate bridges. Both of these facilities operate at or near capacity in peak periods.

Public transit systems are operated by various authorities throughout the Bay Area, including bus, rail, and ferry services. The San Francisco Municipal Railway provides extensive transit service within San Francisco. Regional carriers such as the Bay Area Rapid Transit District (BART), Golden Gate Transit, and others coordinate fees, routes, and schedules to form a linked system for transportation throughout the area. Private carriers offer shuttle and charter services to accommodate specific needs not provided by the public systems.

Presidio Roadway System

General Description. The Presidio has about 60 miles of roadways. Its roadway system was originally designed to accommodate operations of the Army base. As an open post, the Presidio has provided free access to traffic from the surrounding area. Restricted access areas on the base are few and, for the most part, do not affect traffic flow.

Several routes carry the bulk of the Presidio's internal traffic. They also provide connections to San Francisco through the 10 Presidio gateways now in use.

Lincoln Boulevard runs north-south along the west edge of the base and generally east-west along much of the north side. It connects to San Francisco at the southwest corner of the base and has access to and from Highways 1 and 101 at the Golden Gate viewing area near the Golden Gate Bridge. At its eastern end, Lincoln Boulevard connects with Lombard Street and Presidio Boulevard near the Letterman complex. Lombard Street then extends into San Francisco to the east, and Presidio Boulevard extends to the south along the east edge of the base.

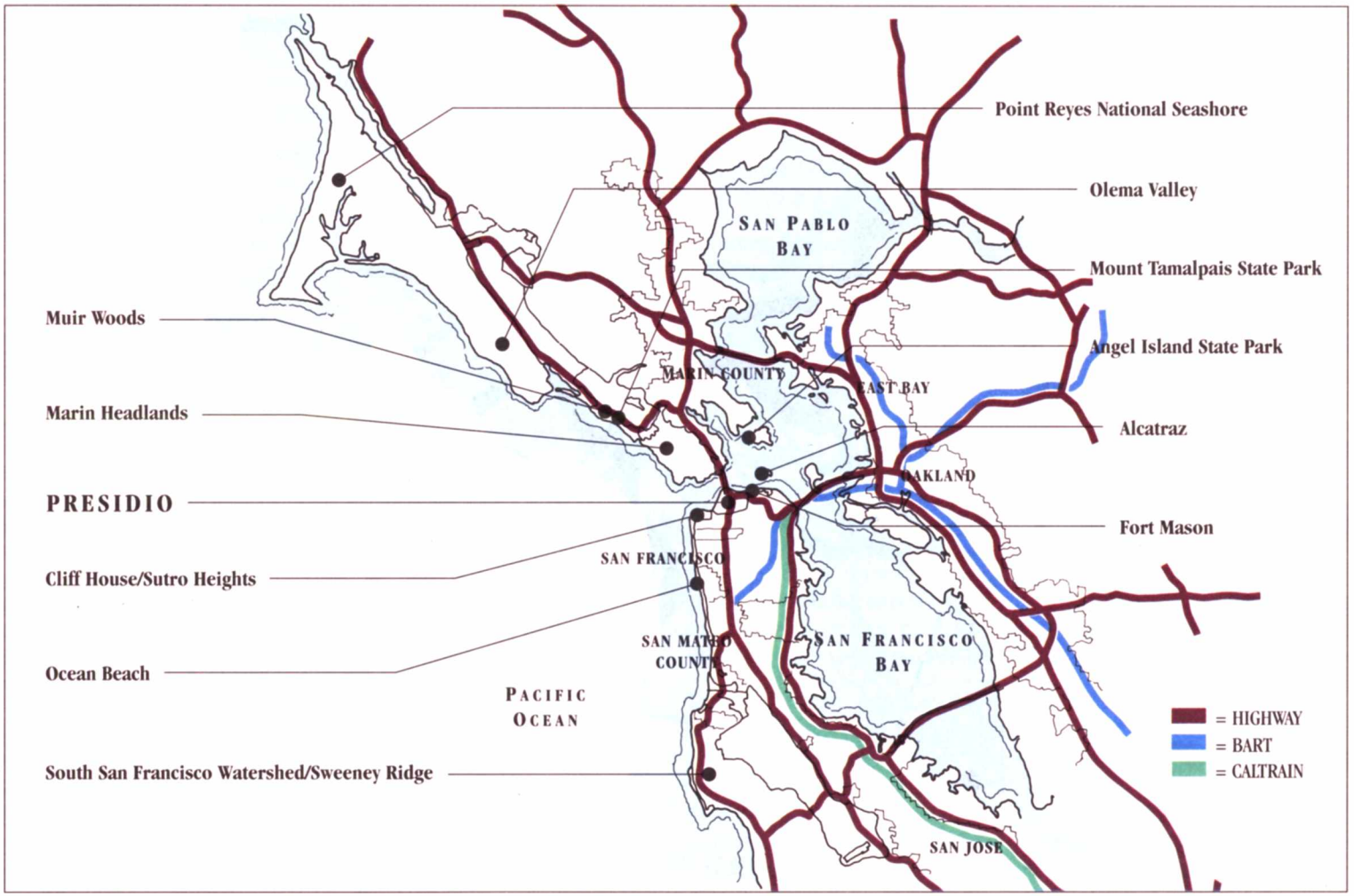
Washington Boulevard runs generally east-west through the central portion of the Presidio. It connects Lincoln Boulevard along the west coast to Battery Caufield Road and Arguello Boulevard, both of which run north-south from the Presidio interior toward San Francisco. Arguello runs south from the main post past Washington Boulevard into San Francisco. Battery Caufield Road runs to the south, connecting to San Francisco via 15th and Wedemeyer streets.

Mason and old Mason streets provide east-west access through the Crissy Field area along the Presidio's northern coast. Mason connects to Marina and Doyle drives at the northeast gateway. At their western terminus, these routes indirectly connect to Lincoln Boulevard by way of three minor roadways (Crissy Field Avenue, McDowell Avenue, and Cowles Street).

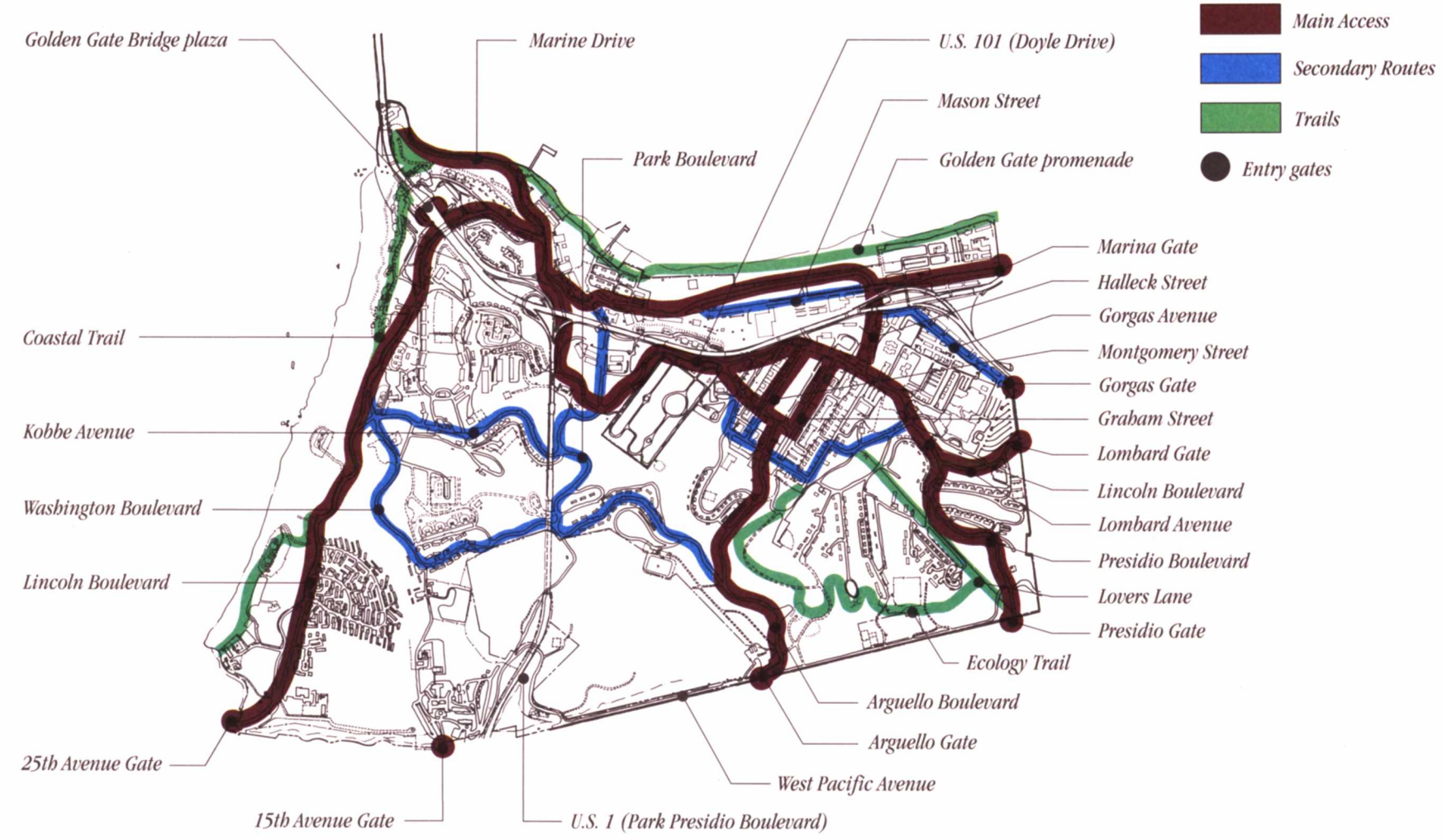
Gorgas Avenue provides east-west access on the north side of the Letterman complex. It connects with Highway 101 and Lyon Street at an eastern gateway. Halleck Street completes the major roadway system, connecting Mason, old Mason, Gorgas, and Lincoln in the area north of the main post.

Other roadways provide local access within the Presidio or serve as shortcuts between the main routes. Although of less importance to the base's overall traffic flow characteristics, these roadways provide essential access to areas within the Presidio that are not directly served by the major routes. In some cases these roadways relieve congestion on the main roadways by serving as alternate routes.

Roadway Characteristics / Standards. Presidio roadways generally have two traffic lanes, although some four-lane sections exist near the main post and on Crissy Field. Roadway alignments are closely tied to existing terrain, and in several locations (such as Fort Scott) roadways are squeezed between buildings or other obstacles. Because of these limitations, many routes have excessive horizontal curves, poor sight distance, and steep grades. However, with capacities of around 750 passenger cars per lane per hour, the Presidio's major routes provide satisfactory levels of service for current traffic demands (CH2M Hill and Nakata Planning Group, Inc. 1989d).



Regional Transportation System



Primary Access and Circulation

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Typical standards for roadway shoulder width call for 2-foot minimum shoulders for any conditions. Typically, 3- to 4-foot shoulders are considered minimal to accommodate pedestrian or bicycle traffic. For most roadways, 8- to 10-foot-wide shoulders are desirable and considered minimal for locations where roadside parking is allowed or expected (Peccia & Associates 1993).

Roadway shoulder widths vary considerably throughout the Presidio. Many roadways have narrow (2 feet or less) paved shoulders, graveled shoulders, or no shoulders at all. The Presidio's main access routes generally have acceptable shoulder widths for most of their lengths, although some segments are inadequate. In some locations shoulders far exceed their required or useful width (Peccia & Associates 1993).

Traffic control devices, including roadway signs and pavement markings, are used throughout the Presidio without adherence to accepted standards. This confuses drivers, resulting in slower traffic, increased potential for accidents, and unnecessary strain on motorists.

Intersections. None of the intersections within the Presidio have traffic signals. All intersections have sufficient capacity for existing automobile traffic loads. The Lincoln Boulevard/Halleck Street intersection operates at near capacity, and a traffic signal could be justified.

Intersections are controlled with stop and yield signs. Many of the intersections are poorly aligned due to terrain limitations and do not offer adequate sight distances. This diminishes the capacity of these intersections and contributes to the potential for accidents.

Intersections outside the Presidio are affected to varying degrees by Presidio traffic. Major intersections with traffic signals are at Mason Street/Marina Drive/Doyle Drive/Lyon Street and at Richardson Avenue/Lombard Street, just outside of the Presidio's Mason Street and Lombard Street entrances. These intersections are near capacity. The Presidio generates less than 10% of the traffic at each of these intersections (Peccia & Associates 1993). Neither intersection can absorb large increases in Presidio traffic.

Intersections outside the Presidio's other entrances are controlled by stop or yield signs. These intersections are operating at well below capacity and could handle additional traffic from the Presidio without significant impacts.

Traffic Characteristics

Traffic on the Presidio includes a mix of internal Army trips, through trips, and commuter, recreational, and other nonwork-related trips. Travel speeds vary from less than 20 mph in residential and business areas to 35 mph on connector roadways and through routes. Drivers are more aggressive on the through routes, especially during peak traffic periods. Major routes within the Presidio have 30 to 35 mph maximum speed limits. Residential areas and other local roadways have 20 to 25 mph posted speed limits (Peccia & Associates 1993).

Volumes. About 55,000 vehicles enter or leave the Presidio on an average weekday. About 20% to 25% of this traffic uses the Lombard Street entrance, 15% uses the Presidio Boulevard entrance, and another 15% to 16% uses the Lincoln Boulevard entrance. About 16% to 19% of the traffic uses the entrances at the Golden Gate viewing area. The remainder is distributed between gateways at Mason Street, Gorgas Avenue, Arguello Boulevard, and 15th Avenue (Peccia & Associates 1993).

Weekend traffic entering and leaving the Presidio is higher along the coasts and lower at the inland gateways than on weekdays. Traffic through the Golden Gate viewing area and Merchant Road gateways increases the most on weekends, while the Gorgas Avenue Gate traffic decreases the most. Interior traffic circulation is primarily served by Lombard Street, Lincoln Boulevard, Presidio Boulevard, and old and new Mason streets. Traffic volumes are generally greatest in the Letterman and main post areas, at the Golden Gate viewing area, and on Lincoln Boulevard along the west coast of the Presidio (Peccia & Associates 1993).

The main post houses U.S. Army headquarters, administrative offices, and service businesses. As a result, this area generates business-related traffic, primarily during daytime weekday hours. Maintenance facilities and office buildings at Crissy Field also generate business-related traffic. Fort Point, Baker Beach, and Crissy Field draw primarily recreational traffic. Housing and other miscellaneous facilities scattered throughout the rest of the base generate background traffic on the main roadways and local streets.

Daily and Seasonal Variations. Presidio traffic volumes increase during normal morning and afternoon peak periods (typically 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.). These daily patterns are caused by commuters and use of the Letterman complex, commissary, PX, and other service facilities. Recreational and

nonwork-related traffic generally has greater influence at other times or during special events (Peccia & Associates 1993).

The Presidio's traffic volumes typically are highest on Friday afternoons, Saturdays, and Sundays. Unlike typical weekday traffic peaks, weekend traffic on the Presidio climbs steadily throughout the morning, remains at or near its peak throughout the middle of the day, and then decreases steadily throughout the late afternoon and early evening. Because much of this traffic is related to outdoor recreational activities, traffic volumes are noticeably affected by weather conditions (Peccia & Associates 1993).

Traffic volumes vary by season, as indicated by year-round tracking on the Golden Gate Bridge. Traffic volumes generally peak in summer at about 105% of the average daily traffic. The lowest traffic volumes typically occur in winter, at about 95% of the average (Peccia & Associates 1993).

Through Traffic. As the major connections to the Golden Gate Bridge, Highways 1 and 101 carry the bulk of its 120,000 vehicle per day traffic load. Highway 1 carries a little more than 60,000 vehicles per average weekday. The Lombard Street section of Highway 101 carries about 50,000 vehicles per weekday. Marina/Doyle Drive contributes about another 32,000 vehicles to Highway 101 on an average weekday. Both highways connect with intersecting streets in San Francisco, but their only direct access to Presidio roadways is at the viewing area near the Golden Gate Bridge (Peccia & Associates 1993).

Although they are separated from most of the Presidio, Highways 1 and 101 affect traffic patterns within it. Most notably, Lincoln Boulevard carries a lot of traffic between San Francisco south of the Presidio and Highway 101 at the Golden Gate viewing area. Arguello Boulevard to Washington Boulevard carries a smaller portion of through traffic between the same areas. Both routes parallel Highway 1, but they are less direct and have lower speed limits. Drivers use the Presidio routes to avoid hectic driving conditions when Highway 1 is congested.

The Mason Street and Gorgas Avenue gateways primarily serve traffic moving between the Presidio and Highway 101. They are also used by San Francisco traffic passing through the Presidio to get to the Golden Gate Bridge from east of the Presidio. These routes are less direct than Highway 101, but they carry a large amount of through traffic when 101 is congested (Peccia & Associates 1993).

Steep terrain and a pattern of one-way city streets impede access between areas of San Francisco immediately south and east of the Presidio. These areas are conveniently connected through the Presidio by Lombard Street and Presidio Boulevard. As a result, the routes are regularly used by through traffic moving between these areas. Because they connect with Highway 101, these routes also serve as a through route between Highway 101 and areas south of the Presidio.

Parking

Unlike surrounding neighborhoods, the Presidio has ample parking space to accommodate existing facilities and activities within its borders. Most of the parking on the post is free, but close-in parking in some of the more developed areas is restricted to use by Presidio personnel only. The Presidio has approximately 13,000 public parking spaces in numerous parking lots and along many of its streets (Peccia & Associates 1993). The base also uses unimproved open areas for public parking, adding the capacity for several thousand additional vehicles. Presidio residential areas have individual garages and private parking spaces.

Over 2,000 of the Presidio's 13,000 parking spaces are on the main post. Much of the Presidio's office space and many of the retail sales facilities and services offered on the post are in this area. Available parking is used regularly on weekdays, except about two-thirds of the 741 spaces on the main post parade grounds (Peccia & Associates 1993).

The Letterman Army Medical Center has about 1,640 parking spaces (Peccia & Associates 1993). When the medical and research facilities are in full operation, more parking is needed than is available, so vehicles park on streets in the adjacent neighborhood and on Crissy Field. The center's parking is generally adequate in off-peak hours and when the facility is not fully operational.

Fort Scott has about 1,350 parking spaces. Full use of facilities in the area can generate parking demand that exceeds capacity (Peccia & Associates 1993). Some overflow parking is available along Merchant Road.

Offices and maintenance facilities on Crissy Field have surplus parking. In addition to normal daytime parking, Crissy Field's paved parking lots and large undeveloped space are used as overflow parking for special events at Fort Mason and other nearby attractions.

The Golden Gate viewing area is served by several nearby parking lots. The closest, right at the viewing area, is regularly filled to capacity. An adjacent gravel lot to the northeast that serves trails to Fort Point National Historic Site is underused because

it is less convenient and not easily recognized. Parking near the viewing area on the southwest side of Highway 101 is primarily used by Golden Gate Bridge maintenance personnel but provides additional space for visitors.

Baker Beach, Fort Point, and the east end of Crissy Field all generate parking demand for recreational activities. Baker Beach and Fort Point offer 297 and 102 parking spaces respectively. Parking demand at both locations often exceeds capacity, and people park on nearby streets.

Parking scattered throughout the rest of the base accommodates a range of uses, including residential, office, recreational, and special events.

Transit Service

MUNI. The San Francisco Municipal Railway (MUNI) provides regular scheduled service within the Presidio on five lines. Lines 28, 29, and 43 run 13 to 20 hours per day. Line 30X runs during weekday morning and afternoon peak traffic periods, and line 76 runs on Sundays (San Francisco Municipal Railway 1991b). Altogether, these lines provide about 300 Presidio trips each weekday, 230 trips on Saturdays, and 240 trips on Sundays (Peccia & Associates 1993).

MUNI also provides service to the corner of Lyon and Greenwich (just outside the Lombard Gate) on lines 41 and 45. Line 41 runs about 40 trips per weekday from 5:00 a.m. to 7:20 p.m.. Line 45 runs 24 hours per day, providing about 120 trips per weekday, 90 trips on Saturday, and 85 trips on Sunday (Peccia & Associates 1993).

MUNI lines 28, 29, and 43 connect the Presidio to southern, central, and western portions of San Francisco. Line 29 serves Lincoln Boulevard and Crissy Field, and line 43 serves Presidio Boulevard. Lines 28 and 43 extend through the Presidio to the Marina district and Fort Mason. Lines 30X, 41, and 45 run between the Presidio and downtown San Francisco. Line 76 provides service from downtown San Francisco through the Presidio on Highway 101 and north to the Marin headlands (San Francisco Municipal Railway 1991b).

MUNI service is most extensive around the Letterman complex and the main post area. Transfers between lines are allowed without additional charge. Most MUNI buses and trolleys accommodate wheelchairs. Bus stops within the Presidio are currently being designated as wheelchair accessible.

Ridership estimates indicate that MUNI provides about 4,000 passengers trips ending or beginning at the Presidio each weekday. Of these, about 3,300 passengers are actually boarding or alighting from a bus on the Presidio. The rest (about 630) are boarding or alighting at MUNI stops just outside the Presidio and walking into or out of the base. On weekends MUNI carries about 1,200 to 1,300 passengers to or from the Presidio each day. Of these, about 240 are boarding or alighting at MUNI stops just outside the Presidio and walking into or out of the base (Peccia & Associates 1993).

Regional Transit. Golden Gate Transit provides regional bus and ferry service in and between San Francisco, Marin, and Sonoma counties. Twenty-six of their bus routes pass through the Presidio, stopping at the Golden Gate Bridge viewing area. All lines but one proceed into San Francisco on Highway 101, with a stop at the corner of Richardson Avenue and Francisco Street (just outside of the Presidio's east boundary). Line 50 turns to the south on Highway 1 and stops at the corner of Park Presidio and California (about two blocks from the Presidio's southern boundary) before continuing into San Francisco (Golden Gate Bridge, Highway, and Transportation District 1991). There is little Presidio-related ridership.

MUNI lines provide direct connections to Golden Gate Transit, the Bay Area Rapid Transit system (BART), and other regional transit authorities. MUNI has free or reduced-price transfer arrangements with Golden Gate Transit, BART, AC Transit (Alameda-Contra Costa counties), Caltrain (Southern Pacific Railroad), and SamTrans (San Mateo County Transit District) (San Francisco Municipal Railway 1991a). Many of the regional transit systems have transfer agreements. This system of coordinated transit services provides transit connections to several counties in the San Francisco Bay Area.

Shuttle and Charter Services. The U.S. Department of Defense provides some shuttle services to its employees, residents, and their dependents on the Presidio. These include limited services within the Presidio, shuttles to other military bases in the Bay Area, and shuttles to and from grade schools in the San Francisco area. Many private shuttle, charter, and tour services serve the Presidio.

Bicycle and Pedestrian Traffic

Daily Transportation. Walking and bicycling are practical daily transportation methods used in some parts of the Presidio. However, these forms of transportation are not widely used for commutes to and from work on the post. Most of the Presidio's roadways lack sidewalks, bicycle lanes, or shoulders of sufficient width to accommodate bicyclists.



Recreational bicycling along the northern coast of the Presidio.

The main post is the most concentrated center of employment on the post. Most of the pedestrian traffic in the main post area occurs around noon lunch breaks when employees run errands, walk to restaurants, and walk or jog for exercise. During one two-hour observation period between 11:00 a.m. and 1:00 p.m. on a weekday, over 100 pedestrians were observed crossing Lincoln Boulevard near the main parade ground (Peccia & Associates 1993). There is also pedestrian traffic immediately before and after normal business hours. Most of this traffic consists of people walking from parking areas to their places of employment and back. There is a low level of pedestrian traffic throughout the day as people walk between office buildings and businesses in the area. Observations of pedestrian activity indicate that people are willing to walk within the main post area and as far as the Letterman complex or the commissary and PX.

Fort Scott has some of the same services offered at the main post but with limited business hours. The area has less daytime employment than the main post but still generates internal pedestrian traffic for business and personal purposes. As at the main post, pedestrians walk within the area to run errands, do business, and exercise but generally switch to cars for trips outside of the area.

Some areas of Crissy Field also generate pedestrian traffic related to employment. As with other parts of the Presidio, short trips are made on foot while longer trips are generally made by car.

Recreational Use. The Presidio is a popular location for walking, jogging, and recreational bicycling. More than 8,000 pedestrians and bicyclists use the Presidio on weekdays, and nearly 16,000 come to the site on weekends. Much of this activity takes place on the Golden Gate promenade — the Bay Trail — on Crissy Field. This popular route runs along the northern coast of the Presidio, connecting San Francisco's Marina district and Fort Point. Based on field surveys of bicyclist and pedestrian use, it is estimated that on a weekend day about 4,000 pedestrians and 180 bicyclists pass through the Marina Gate on the Golden Gate promenade, and about 333 pedestrians and 1,208 bicyclists pass through the Marina Gate on Mason Street (Peccia & Associates 1993).

The Presidio has 5.5 miles of popular walking trails that meander along its coastal bluffs and across its undeveloped green space. For example, on a weekend day, an estimated 770 pedestrians and 123 bicyclists use the Coastal Trail at the battery area south of the Golden Gate Bridge, and an estimated 180 pedestrians and 30 bicyclists use the Ecology Trail (Peccia & Associates 1993). Sections of regional coastal, ridge, and bay trails run through the Presidio. These trail systems are widely publicized to Bay Area residents and visitors, and they attract recreational users from throughout the region. In addition, Presidio roadways and trails provide the only access for nonmotorized travel between San Francisco and the Golden Gate Bridge.

Facilities. The Presidio does not have a continuous system of sidewalks, bicycle trails, or bicycle lanes. These facilities are only provided in the areas where they are needed most. Sidewalks and marked pedestrian crossings are provided within and between the Letterman complex, the main post, the commissary, and the PX and within Fort Scott, Fort Point, some parts of Crissy Field, and the Presidio's residential areas. However, connecting sidewalks, bicycle trails, and bicycle lanes do not connect these areas, so pedestrians and bicyclists are forced to mix with vehicles on the street system to move from one area to another.

Bicyclists on the regional trails through the Presidio are forced to contend with steep grades, steep curbs, narrow shoulders, and hazardous drainage inlets along segments of the Presidio roadway system. Some portions of the off-road trail system are unimproved, and erosion is a continuing problem.

The recreational trail at the Golden Gate promenade serves bicyclists and pedestrians. It includes both paved and dirt segments and varies in width. It is generally acceptable for bicycle or pedestrian traffic, but these two travel modes are not always compatible on a single trail of limited width.

Infrastructure

The Presidio of San Francisco was founded more than 200 years ago, and much of the infrastructure, including water systems, storm and sanitary sewers, electrical systems, roads, and fire protection, has been in place beyond the normal life spans of such facilities. Pipelines made of cast iron or other corrosion-resistant materials may have a lifetime of 100 years, mechanical equipment probably lasts 30 years on

average, and electronic controls can be obsolete in less than 10 years. Engineering studies were commissioned by the Army (CH2M Hill and Nakata Planning Group, Inc. 1989a, b, c) and the National Park Service (Nolte and Associates 1991a, b and 1992a, b) to determine the needs for repair, replacement, or augmentation of existing works.

It has been estimated that the total capital costs of bringing the Presidio's infrastructure up to applicable standards would be about $60 million (*Subagreement #3, Base Operations Expenses* [U.S. Army and Department of the Interior]). The federal appropriation for fiscal year 1992 was $10 million; $23 million was appropriated for 1993; and $27 million has been requested for 1994.

Water Supply and Distribution

Most of the Presidio's potable water supply is taken from Lobos Creek and purified at a treatment plant near the southwest corner of the Presidio. This supply is supplemented by groundwater from wells in the Presidio. In case of fire or other emergency, water from the San Francisco Water Department can be fed into the Presidio water system to augment local sources. Currently, San Francisco only supplies water to Letterman Army Medical Center, the Public Health Service hospital, and the Presidio Golf Course. During nondrought years, the Presidio Golf Course is irrigated with nonpotable water from wells near Mountain Lake. This system is independent of the potable water system, but a physical connection is available to permit use of water from the main water system for golf course irrigation. Because the lake level cannot be maintained while irrigating from the nonpotable supply during a drought, potable water is currently used for irrigation.

In 1987 the total daily demands of the Presidio were estimated to be 2.7 million gallons per day, which is only slightly more than the total treatment capacity of the facility at Baker Beach (USACE 1991).

The water treatment plant has various mechanical and instrumentation deficiencies, some resulting in regulatory violations and others in outdated operations. Trichloromethanes in the treated water exceed the allowable by up to 100%. The plant should be comprehensively upgraded (Nolte and Associates 1992b). Army budget requests for fiscal year 1993 provide for upgrading the treatment plant to meet 1991 water treatment standards.

The Presidio's groundwater has on occasion exceeded legal maximum contaminant levels (MCL) for perchloroethylene (once, 8.3 ppb against a MCL of 5.0 ppb), 1,2-dichloroethane (twice, 1.3 ppb against an MCL of 0.5 ppb), and nitrate (not in the an active potable source, but once in a test well, 67 mg/l against an MCL of 45 mg/l). There were also occasional occurrences of several unregulated chemicals, including methyl-tert-butylether, carbon disulfide, acetone, and chloroform (Nolte and Associates 1992b).

The Presidio has three potable water reservoirs with a total storage capacity of about 7 million gallons. Water from the treatment plant is conveyed to the reservoirs and to points of use in 10 different pressure zones via three pumping stations, 18 pressure-reducing valves, and about 33 miles of pipe ranging from 3 to 12 inches in diameter. Isolation valves separate the pressure zones.

The main reservoir is not built to withstand lateral loading, which means that it is vulnerable to earthquake damage. There are cracks in the roof and hatches that are not rainproof, causing concerns that rain could wash contaminants from the roof into the reservoir. Similarly, the treatment plant clear well is exposed to entry of contamination from above. Fort Scott reservoir is in poor condition and has many health code violations. (The clear well is a reservoir at the discharge end of the water treatment plant from which the treated water is pumped to the main reservoir and the distribution system.) It has been recommended that the Fort Scott reservoir be taken out of service (Nolte and Associates 1992a).

The condition of pump station equipment ranges from "fairly good shape with minor amounts of rust around the packing glands" to "dangerous and in poor condition overall" (Nolte and Associates 1992a). Electrical equipment and wiring, in particular, appear to be in need of immediate attention.

In general, water service pressures should be kept between 40 and 100 pounds per square inch (psi). The California Public Utilities Commission limits service pressures to between 30 and 125 psi, and title 22 of the *California Administrative Code* requires a minimum of 20 psi under combined maximum user hourly demand plus fire flow conditions. Given the hilly topography of the Presidio, pressure-reducing valves and zone isolation valves are needed to achieve reasonable service pressures at all elevations. In fact, without fire flow, pressures range from 24 to 155 psi (Nolte and Associates 1992a). The extreme pressures may be due to defective or improperly set pressure-reducing valves; missing, defective, or open isolation valves; wrong zone boundaries; or a combination of all of these.

Water distribution piping is predominantly cast iron, ductile iron, or asbestos cement. Some of it predates 1900. The Army has been experiencing an average of two water main leaks per week (Nolte and Associates 1992a).

Storm Drainage System

There are over 50 miles of storm sewers within the Presidio. A Corps of Engineers study found about 15,000 feet of these pipelines, ranging from 8 to 96 inches in diameter, to be inadequate for conveying the runoff from a 10-year storm under present conditions (CH2M Hill and Nakata Planning Group, Inc. 1989b). A 1985 television inspection found about 2,000 additional feet of pipe in poor condition (Nolte and Associates 1991a).

Water samples collected by the city and county of San Francisco along the Presidio's shoreline have shown large total coliform counts. (Coliform bacteria are indicators of sewage contamination.) According to the California health and safety code, water contact sports require that the most probable number of coliform organisms be less than 1,000 in 100 milliliters (ml) of water. Counts in excess of 16,000 have been encountered near the Presidio shoreline (Medbery 1991). There are concerns about possible cross connections between the sanitary and storm sewer systems. Recent investigations of storm sewer outfalls failed to provide evidence of cross connections (Nolte and Associates 1991b). The source of the coliform contamination is unknown and is a major concern (Ritchie 1993). The National Park Service is investigating stormwater outfalls through systematic testing at manholes above the high water mark. Although results have been inconclusive (Swanson 1993), the program will continue. A trend analysis over the past five years indicates a consistent decline in sewage contamination (Swanson 1993).

Sanitary Sewer System

Sanitary wastewater is conveyed to the city and county of San Francisco's sewer system via eight lift stations and 18 miles of pipe, ranging from 6 to 24 inches in diameter. Current estimates of annual flow based on existing Army operations are about 300 million gallons per year. An Army Corps of Engineers study found that the system had capacity restrictions that could be alleviated by installing 730 feet of parallel pipes and replacing 470 feet of existing pipe (CH2M Hill and Nakata Planning Group, Inc. 1989c). A more recent study noted that most of the individual pipelines are in need of some rehabilitation. The primary problem is tree root infiltration, which affects about 60% of all sewage mains. Other problems include offset pipe joints, collapsed lines, broken pipe sections, and 45° bends. All of these defects obstruct sewage flow (Nolte and Associates 1991b).

Most of the mechanical equipment of the lift stations has exceeded its life expectancy, and no major maintenance has been performed on these stations since 1984.

Electric Power Distribution

About 80% of the electric power distribution facilities within the Presidio are owned by the Army. The remainder is owned and maintained by Pacific Gas and Electric Company (PG&E). To upgrade the Army's facilities to PG&E standards, all 4,000-volt facilities must be replaced with 12,000-volt facilities, all transformers must be tested for PCBs and remediated where established limits are exceeded, meters must be provided for all buildings, and all substandard facilities must be replaced (Crane 1991).

Telecommunications Systems

The present telephone system at the Presidio is a fully electronic 10,000-fiberoptic switching system and three remote switches with a maximum of 1,200 lines, each connecting the 4,300-line telephone system. This system is fully modular and can be easily removed and transferred with the Army to a new location. It is expected that the Army will do so. Existing cabling includes various grades, from 1922 paper-wrapped line to 1989 fiberoptic technology. The state of California has enacted a law, which will come into effect in August 1993, making the property owner responsible for all infrastructure equipment (Kaminski 1993).

Hazardous Substances/Environmental Remediation

Regulatory Status

Cal EPA has identified the Army as the party responsible for the cleanup of hazardous substances, pollutants, and contaminants (including contamination from underground storage tanks) at the Presidio. The Army and Cal EPA are in the process of finalizing a federal facility site remediation agreement (FFSRA), which will establish the procedures for the cleanup process and the roles and responsibilities of each signatory. The FFSRA is the primary enforcement tool in the environmental remediation process for the Presidio. In general, the Army's cleanup plans and activities, which will be approved by Cal EPA, must conform to applicable federal and state laws and regulations. These laws require cleanup programs to be protective of human health and environment. The FFSRA also incorporates provisions for public review and comment on the Army cleanup process.

The National Park Service is currently negotiating with the Army and Cal EPA to become a signatory to the FFSRA. If the Park Service becomes a signatory, it will monitor the Army's compliance with the terms of the FFSRA (Walters 1993).

Environmental Remediation

The extent of hazardous substance contamination at the Presidio is still being determined by the Army. As the party responsible for all past unauthorized releases of hazardous substances into the Presidio environment, the Army is obligated to

- identify, characterize, and quantify the nature and extent of all contaminants
- execute a program of appropriate remediation and environmental restoration of all contaminated sites in accordance with applicable or relevant and appropriate requirements of environmental laws or as necessary to fully protect human health and the environment
- conduct long-term monitoring and reporting on the effectiveness of the remediation and restoration program

Although the Presidio is not on the national priorities list of the U.S. Environmental Protection Agency (EPA), the above objectives are to be achieved through a process mandated by the state of California Superfund program. The key elements of the Superfund process are, in chronological order,

- preliminary assessment (PA)
- remedial investigation with risk assessment (RI)
- feasibility study (FS)
- remedial action plan (RAP)
- remedial design (RD)
- execution of remedial actions/environmental restoration
- long-term monitoring

A technical review committee consisting of representatives from the Army, Cal EPA, the Park Service, the city and the county of San Francisco's Department of Toxics, Health and Safety Services, the Presidio Council, and two citizen groups (the Arms Control Research Center and the Sierra Club) is convening on a regular basis to evaluate and review technical documents submitted by the Army for accuracy and for determining appropriate methodology for proper remediation.

The Army completed an enhanced preliminary assessment in 1989 and is currently in the RI/FS phase. The objective of the RI phase is to fully characterize contaminated sites by identifying the concentrations of contaminants and the extent of vertical and lateral contamination of soil, groundwater, or other components of the environment. The RI phase is the most time-consuming element of the Superfund process. Extensive sampling and laboratory analysis is required for adequate investigation.

The Army's remedial investigation report and feasibility study for the Public Health Service hospital are currently being reviewed by Cal EPA and the Park Service. The Army will hold a public hearing on the Public Health Service Hospital feasibility study in the fall of 1993. The Army has also submitted a separate preliminary RI report for the main installation to Cal EPA (in March 1993). It is being reviewed by that agency and the Park Service.

The Army has stated its intention to accelerate completion of the final remedial investigation for the main installation and to advance the remainder of the process through the remedial action plan by the end of 1993. Schedules for remediation cannot be estimated until the investigative phase is completed and cleanup projects are developed by the Army. Based on preliminary results for the main installation, the total cost of the Army's remediation program at the Presidio is estimated to be approximately $77 million, including the investigative phase (Buck 1993).

The Army has identified several areas of contamination caused by hazardous substances, pollutants, and contaminants. Various sites contain volatile and semi-volatile hydrocarbons derived from petroleum products, pesticides, heavy metals, polychlorinated biphenyls, and polyaromatic hydrocarbons. These materials are carcinogenic and neurotoxic; exposure can result in both short-term acute toxicity and long-term consequences such as cancer. Soils and water have been examined based on records of chemical spills, records of activities that might lead to dispersion of toxic chemicals, visual evidence of contamination, and hydrogeological reasoning about potential dispersion pathways. Human exposure to chemicals has been evaluated under residential, recreational, and industrial land use categories, depending on existing and future use. Because Park Service uses have not yet been clearly delineated, there may be some gaps in the risk analysis.

An interim remedial action program is going on in the building 900 series study area under the supervision of the California Regional Water Quality Control Board. This study includes a soil gas survey, aquifer testing, and sampling of soil, groundwater, and free products. The study is designed to further characterize the extent of

hydrocarbons in soils and groundwater and the potential for migration of these hydrocarbons. After full and adequate characterization has been determined by the state of California, remediation will begin.

The Army's risk assessment used guidelines outlined by the U.S. EPA for Superfund sites. All carcinogenic chemicals at a concentration that could result in an excess cancer risk of 1 in 10 million were analyzed as chemicals of potential concern. In evaluating potential future soil exposures, it was assumed that soil down to 15 feet deep could be disturbed and brought to the surface or exposed as a result of grading. Therefore, all soil samples from the surface down to a depth of 15 feet were used in estimating future exposure scenarios.

Occupational exposures to chemicals or to hazardous waste generated onsite were not evaluated in the risk assessment. To the extent that similar activities would go on in the same buildings under NPS jurisdiction, such as vehicular maintenance and repair activities, any occupational exposures would continue at current levels unless mitigating measures were implemented.

The hazards of exposure to individual contaminants, the location of significant contamination at the Presidio, and the effects of the contamination on future use of the Presidio are discussed in the "Environmental Consequences" section.

Under section 107 of the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the *Code of Federal Regulations*, title 43, part 11, natural resource trustees are permitted to recover damages for injury to, destruction of, or loss of natural resources resulting from a release of hazardous substances at the Presidio. Any damages collected are to be used for the purposes of restoring, replacing, and/or acquiring equivalent natural resources. In this case, the natural resource trustees would be the secretary of defense, as represented by the Department of Defense; the secretary of the interior, as represented by the National Park Service and the U.S. Fish and Wildlife Service; the secretary of commerce, as represented by the National Oceanic and Atmospheric Administration; and the state of California. For the Presidio, the Department of Defense is a responsible party and a co-trustee. Recently, the trustees requested the Department of the Army to complete a preassessment screen report and determination to determine whether a natural resources damage assessment was warranted. The Army has agreed to complete this report.

In early 1993 Cal EPA issued separate "fence and post" orders to the Golden Gate Bridge District and Caltrans concerning the release of lead-based paint into soils at the Presidio. Both the bridge district and Caltrans have since fenced areas to prevent public access where contamination has been found in soils. After full characterization of the affected areas has been completed, the two agencies plan to fully remediate the affected areas according to state regulatory standards. The Park Service is monitoring the remediation process.

Environmental Consequences



Introduction

Impact Topics

Derivation of Impact Topics

Impact topics were selected on the basis of significant resources and the potential for beneficial or adverse effects on them; concerns expressed during scoping and public involvement activities; and requirements of law, regulation, and NPS policy. (For a discussion of the scoping and public involvement process, see the "Consultation and Coordination" section.) The rationale for selection of topics is discussed below by major category. The environmental consequences of the proposed action and alternatives are described by impact topic in the following sections.

Some aspects of the Presidio environment that were discussed in the "Affected Environment" have not been included as impact topics, for example, climate and geology. These environmental factors are considered important to understanding the area, but they would not be directly or indirectly affected by the proposed action or alternatives. These and other rejected impact topics are listed in the "Impact Topics Dismissed from Further Consideration" section.

Site-specific planning and environmental compliance would be carried out for the more heavily used and developed planning areas after the final GMP amendment was approved. More detailed impact analysis, especially for soil and vegetation disturbance, would be conducted before those plans were approved.

The following were identified as major concerns by city and state agencies, private organizations, Bay Area residents, and other interested parties during the scoping and public involvement sessions for the Presidio plan.

- regional economy and employment — the effects of possible alternative uses within the Presidio on economy and employment in the Bay Area and city of San Francisco
- city services — the additional requirements that visitors, residents, and tenants would place on city services, including public safety services, utility systems, transportation services, and the public school system, and the revenues that would be generated by Presidio uses
- housing — the effects of alternative uses of Presidio housing in relationship to Bay Area housing needs and demands
- health care — the effects of alternative uses of the Letterman Army Medical Center, Letterman Army Institute of Research, and former Public Health Service hospital on health care in the Bay Area
- medical aid incidents — the effects of medical aid incidents on city hospitals
- traffic and transportation systems — the effects of alternative mode travel, increased traffic, parking changes, and roadway and intersection improvements on Presidio traffic and roadways and on the local and regional transportation network; the effects of proposed Doyle Drive reconstruction on Presidio traffic

As the Presidio was converted from a military post to a park, building and land uses would change substantially. The results of these changes and their effects on the Presidio community and surrounding neighborhoods were selected as impact topics because of the differences in park use versus military use.

The Presidio contains a substantial number of buildings, structures, landscape features, and archeological remains that have been determined to be significant in history or prehistory. The site has been a designated national historic landmark district since 1962. The following aspects of the cultural environment were selected as impact topics because of their significance and the potential for possible uses to affect them.

- national historic landmark district, including architecture and the cultural landscape
- archeology, including prehistoric, historic, and submerged resources

Although portions of the Presidio have been intensively developed and used over the years, open spaces and natural areas are an important component of the site. The following natural resources and features were selected as impact topics because of their significance in the Presidio environment and the potential for possible uses to affect them.

- wetlands and natural stream drainages
- native plant communities

- wildlife, including marine, migratory, and native terrestrial and aquatic species
- threatened, endangered, and sensitive plant and animal species
- topography and soils
- air quality
- noise

The conversion of the Presidio from a military post to a park has the potential to greatly enhance visitor experiences. Interpretation and education, recreation, and scenic viewing have been selected as impact topics to analyze the effects of possible Presidio uses on those experiences.

Over the years of military occupation a variety of hazardous substances, pollutants, and contaminants have been stored or accumulated above and below ground at the Presidio. This impact topic analyzes the potential effects of known hazardous materials on human health, safety, and the environment.

The National Environmental Policy Act requires a discussion of the energy requirements of the proposed action and alternatives. This impact topic evaluates the effects of rehabilitating buildings and infrastructure and applying energy conservation measures such as wind energy, solar heating and cooling, tidal energy, and the use of alternative-fuel vehicles.

National Park Service operations would be affected by the levels and types of use and the management responsibilities proposed under each of the alternatives. This impact topic discusses the effects on resource management, law enforcement, other public safety services, interpretation/programs services, and maintenance. It also considers the effects of alternative uses of Presidio housing on staff and park operations.

Impact Topics Dismissed from Further Consideration

Climate. None of the alternatives, including the proposed action, would have significant effects on temperature, wind, precipitation, or other weather conditions and patterns.

Geology. None of the alternatives would have any significant effects on geological processes or conditions.

Earthquakes. All substandard buildings would be upgraded over time to meet applicable seismic codes, laws, and NPS policies.

Floodplains. There are no floodplains in the Presidio. All naturally flowing streams have been diverted into storm drain pipes and leave the Presidio through outfalls at the ocean and bay edges.

Water Quality. Proposed improvements would have only minimal effects on water quality in San Francisco Bay. These effects are discussed as part of the impacts on wetlands and natural stream drainages.

Definition of Terms

Direct, Indirect, and Cumulative Impacts

The environmental analysis in this document includes the direct, indirect, and cumulative effects of the alternative actions on the environment. Direct and indirect effects are the result of the actions themselves — immediate effects and those more removed in time or distance. Cumulative effects are the effects of the actions added to the effects of other past, present, and reasonably foreseeable plans, projects, and activities in Golden Gate National Recreation Area and the Bay Area (the Bay Area is defined in the "Affected Environment" section and described on the Regional Context map). It is not anticipated that any of the alternative actions would have significant cumulative impacts beyond the Bay Area.

Mitigating measures have been identified and analyzed as part of each alternative. When specific measures have been applied, it is noted in the impact analysis section.

Short-Term and Long-Term Impacts

As defined for the purposes of this analysis, short-term (or temporary) impacts are those that would not exceed a year in duration; an example would be soil disturbance during and immediately following construction. Long-term impacts would exceed a year and would likely continue or increase in degree and intensity.

Baseline

A baseline condition was established for each of the impact topics to evaluate the effects of possible future changes. For cultural and natural resources, the baseline condition was defined as the present — the condition that exists today. For most aspects of the socioeconomic environment, the standard baseline condition was the

pre-September 1991 condition described in the 1991 *Final Environmental Impact Statement, Base Closure of the Presidio of San Francisco* (USACE 1991). This DEIS incorporates the 1991 base closure FEIS by reference. If a specific year or condition was selected for an impact topic, the reason is explained in the methodology section of that analysis. For the most part, differences in the baseline condition were because data was not available for preclosure years, there was a need to compare the proposed action against full-scale military operation as opposed to the reduced operation in 1991, or another year or condition was used for analysis in the Army's environmental impact statement or other technical reports.

Summary Tables from Environmental Analysis

The following tables summarize by alternative a number of projections related to proposed uses of the Presidio. They include building space allocation, employment and payroll, water and sewer demands, housing removal and reuse, housing demands, medical aid demands, transportation mode use and traffic volume estimates, park land use and population, projected visitation, and soil disturbance. These projections were used in analyzing potential impacts on the topics described above.

Most of the analyses were based on projections of how the Presidio would be used in the years 2000 and 2010. These years represent partial and full implementation of each alternative and were used to analyze impacts over time as new uses are established at the Presidio.

TABLE 10: BUILDING SPACE ALLOCATION BY ALTERNATIVE – YEAR 2000

	Alternative A		Alternative B		Alternative C		Alternative D	
Use Category	**No. of Buildings**	**Square Feet**	**No. of Buildings**	**Square Feet**	**No. of Buildings**	**Square Feet**	**No. of Buildings**	**Square Feet**
Dormitory	26	392,785	19	340,551	24	342,108	25	369,952
Industrial	41	381,262	63	342,949	38	322,459	40	362,323
Infrastructure	53	47,197	58	80,168	47	46,343	53	47,197
Institution	26	458,675	12	125,802	15	117,559	24	456,016
Medical/ Research	1	354,144	2	796,840	0	0	2	796,840
Military	29	137,242	31	142,562	29	137,242	30	137,886
Office	63	1,070,291	111	1,323,861	60	1,042,669	70	1,106,148
Residential	361	1,932,426	356	2,021,758	348	1,871,319	342	1,861,301
Retail	18	159,729	16	179,803	18	179,592	21	196,270
Warehouse	128	623,763	181	609,233	122	488,731	146	667,940
Total – Reuse	**746**	**5,557,514**	**849**	**5,963,527**	**701**	**4,548,022**	**753**	**6,001,873**
Demolish	124	804,442	0	0	144	585,924	117	360,083
Deauthorize	0	0	21	398,429	25	1,228,010	0	0
Grand Total	**870**	**6,361,956**	**870**	**6,361,956**	**870**	**6,361,956**	**870**	**6,361,956**

SOURCE: National Park Service

TABLE 11: BUILDING SPACE ALLOCATION BY ALTERNATIVE – YEAR 2010

	Alternative A		Alternative B		Alternative C		Alternative D	
Use Category	**No. of Buildings**	**Square Feet**	**No. of Buildings**	**Square Feet**	**No. of Buildings**	**Square Feet**	**No. of Buildings**	**Square Feet**
Dormitory	25	369,952	19	340,551	24	342,108	25	369,952
Industrial	38	379,706	63	342,949	34	301,352	37	360,767
Infrastructure	53	47,197	58	80,168	45	46,318	53	47,197
Institution	25	457,195	12	125,802	15	177,559	23	454,536
Medical/ Research	1	354,144	2	796,840	0	0	2	796,840
Military	29	137,242	31	142,562	29	137,242	30	137,886
Office	60	1,002,746	111	1,323,861	57	975,124	66	1,037,825
Residential	208	989,815	356	2,021,758	159	750,056	334	1,793,823
Retail	15	166,194	16	179,803	13	157,190	17	179,902
Warehouse	115	451,853	181	609,233	113	460,694	131	495,820
Total – Reuse	**569**	**4,356,044**	**849**	**5,963,527**	**489**	**3,287,643**	**718**	**5,674,548**
Demolish	301	2,005,912	0	0	356	1,846,303	152	687,408
Deauthorize	0	0	21	398,429	25	1,228,010	0	0
Grand Total	**870**	**6,361,956**	**870**	**6,361,956**	**870**	**6,361,956**	**870**	**6,361,956**

SOURCE: National Park Service

TABLE 12: DIRECT EMPLOYMENT AND PAYROLL ESTIMATES RELATED TO PARK USE

	Building Space		Employment		Payroll (000s)	
Alternative A	**Year 2000**	**Year 2010**	**Year 2000**	**Year 2010**	**Year 2000**	**Year 2010**
Dormitory	392,785	392,785	83	83	$ 1,558	$ 1,558
Industrial	417,450	379,733	501	456	15,991	14,546
Institutions	458,675	457,195	413	411	14,016	13,971
Medical/Research	354,144	354,144	911	911	29,995	29,995
Office	1,095,622	1,002,746	3,586	3,282	68,355	62,560
Retail	159,839	143,361	288	258	3,180	2,853
Warehouse	652,384	450,553	117	81	2,888	1,994
Totals	**3,530,899**	**3,180,517**	**5,899**	**5,482**	**$135,983**	**$127,477**
Alternative B						
Dormitory	340,551	340,551	79	79	$ 1,486	$ 1,486
Industrial	342,949	342,949	412	412	13,137	13,137
Institutions	125,802	125,802	113	113	3,844	3,844
Medical/Research	796,840	796,840	2,049	2,049	67,490	67,490
Office	1,323,861	1,323,681	4,333	4,333	82,594	82,594
Retail	179,803	179,803	324	324	3,578	3,578
Warehouse	602,520	602,520	108	108	2,667	2,667
Totals	**3,712,326**	**3,712,326**	**7,418**	**7,418**	**$174,796**	**$174,796**
Alternative C						
Dormitory	342,108	342,108	53	53	$ 1,007	$ 1,007
Industrial	358,646	301,352	430	362	13,739	11,544
Institutions	117,559	117,559	106	106	3,592	3,592
Medical/Research	0	0	0	0	0	0
Office	1,068,001	975,124	3,495	3,191	66,631	60,837
Retail	179,702	157,190	323	283	3,576	3,128
Warehouse	525,358	459,460	95	83	2,325	2,034
Totals	**2,591,374**	**2,352,793**	**4,502**	**4,078**	**$ 90,870**	**$ 82,142**

TABLE 12: DIRECT EMPLOYMENT AND PAYROLL ESTIMATES RELATED TO PARK USE, *CONTINUED*

	Building Space		Employment		Payroll (000s)	
Alternative D	**Year 2000**	**Year 2010**	**Year 2000**	**Year 2010**	**Year 2000**	**Year 2010**
Dormitory	369,952	369,952	100	100	$ 1,876	$ 1,876
Industrial	398,511	360,767	478	433	15,266	13,820
Institution	456,016	454,536	410	409	13,935	13,889
Medical/Research	796,840	796,840	2,049	2,049	67,490	67,490
Office	1,130,701	1,038,603	3,700	3,399	70,543	64,797
Retail	196,380	179,902	353	324	3,908	3,580
Warehouse	685,254	494,730	123	89	3,033	2,190
Totals	**4,033,654**	**3,695,330**	**7,213**	**6,803**	**$176,051**	**$167,642**

SOURCES: National Park Service 1992c; Institute of Transportation Engineers 1991; Peccia & Associates 1993; U.S. Bureau of the Census 1989; U.S. Bureau of Labor Statistics.

NOTES:

Assumed Employment Densities and Average Annual Payroll

Employment Density (in square feet per employee)		Average Annual Wages (in dollars per year)
Dormitory, Alt. A	4,275	18,838
Dormitory, Alt. B	3,886	18,838
Dormitory, Alt. C	5,762	18,838
Dormitory, Alt. D	3,344	18,838
Industrial	750	31,922
Institution	1,000	33,953
Medical	350	32,938
Office	275	19,063
Retail	500	11,045
Warehouse	5,000	24,590

Dormitory employment densities are based on an assumed constant average employment of one employee per four rooms. Per square foot densities vary by alternative due to differences in average room size. An overall occupancy rate of 90% is assumed for both years 2000 and 2010 for each land use type.

TABLE 13: SECONDARY EMPLOYMENT AND PAYROLL ESTIMATES RELATED TO PARK USE CITY AND COUNTY OF SAN FRANCISCO

	Employment		Payroll (000s)	
Alternative A	**Year 2000**	**Year 2010**	**Year 2000**	**Year 2010**
Dormitory	47	47	$ 1,998	$ 1,998
Industrial	490	446	13,352	12,146
Institutions	275	273	18,887	18,826
Medical/Research	510	510	24,671	24,671
Office	1,058	968	58,443	53,489
Retail	122	110	2,162	1,940
Warehouse	148	102	2,614	1,805
Totals	**2,650**	**2,456**	**$122,127**	**$114,874**
Alternative B				
Dormitory	45	45	$ 1,906	$ 1,906
Industrial	403	403	10,969	10,969
Institutions	75	75	5,180	5,180
Medical/Research	1,147	1,147	55,511	55,511
Office	1,278	1,278	70,618	70,618
Retail	138	138	2,433	2,433
Warehouse	137	137	2,414	2,414
Totals	**3,223**	**3,223**	**$149,030**	**$149,030**
Alternative C				
Dormitory	30	30	$ 1,291	$ 1,291
Industrial	420	354	11,472	9,639
Institutions	70	70	4,840	4,840
Medical/Research	0	0	0	0
Office	1,031	941	56,970	52,015
Retail	137	120	2,432	2,127
Warehouse	120	105	2,104	1,841
Totals	**1,809**	**1,621**	**$ 79,109**	**$ 71,754**
Alternative D				
Dormitory	57	57	$ 2,408	$ 2,406
Industrial	468	423	12,746	11,540
Institutions	273	272	18,777	18,715
Medical/Research	1,147	1,147	55,511	55,511
Office	1,092	1,003	60,313	55,401
Retail	150	138	2,657	2,434
Warehouse	155	113	2,745	1,982
Totals	**3,341**	**3,152**	**$155,158**	**$147,989**

NOTE: Does not include construction employment and payroll.
SOURCE: Jones and Jones 1993a

TABLE 14: SECONDARY EMPLOYMENT AND PAYROLL ESTIMATES RELATED TO PARK USE BAY AREA REGION

	Employment		Payroll (000s)	
Alternative A	**Year 2000**	**Year 2010**	**Year 2000**	**Year 2010**
Dormitory	94	94	$ 3,996	$ 3,996
Industrial	979	891	26,706	24,292
Institutions	549	547	37,773	37,652
Medical/Research	1,020	1,020	49,342	49,342
Office	2,116	1,936	116,885	106,978
Retail	245	219	4,325	3,880
Warehouse	296	205	5,227	3,609
Totals	**5,299**	**4,913**	**$244,254**	**$229,749**
Alternative B				
Dormitory	89	89	$ 3,812	$ 3,812
Industrial	805	805	21,939	21,939
Institutions	150	150	10,360	10,360
Medical/Research	2,295	2,295	111,021	111,021
Office	2,556	2,556	141,236	141,236
Retail	275	275	4,866	4,866
Warehouse	273	273	4,827	4,827
Totals	**6,445**	**6,445**	**$298,060**	**$298,060**
Alternative C				
Dormitory	60	60	$ 2,583	$ 2,583
Industrial	841	708	22,944	19,278
Institutions	141	141	9,680	9,680
Medical/Research	0	0	0	0
Office	2,062	1,883	113,939	104,030
Retail	275	241	4,863	4,252
Warehouse	240	210	4,208	3,682
Totals	**3,618**	**3,242**	**$158,218**	**$143,507**
Alternative D				
Dormitory	113	113	$ 4,812	$ 4,812
Industrial	934	847	25,493	23,079
Institutions	545	544	37,555	37,431
Medical/Research	2,295	2,295	111,021	111,021
Office	2,183	2,005	120,627	110,803
Retail	300	275	5,315	4,869
Warehouse	311	225	5,490	3,964
Totals	**6,682**	**6,304**	**$310,312**	**$295,979**

NOTE: Does not include construction employment and payroll.
SOURCE: National Park Service

TABLE 15: TOTAL EMPLOYMENT AND PAYROLL ESTIMATES RELATED TO PARK USE CITY AND COUNTY OF SAN FRANCISCO

	Employment		Payroll (000s)	
Alternative A	**Year 2000**	**Year 2010**	**Year 2000**	**Year 2010**
Dormitory	130	130	$ 3,556	$ 3,556
Industrial	991	902	29,343	26,692
Institutions	688	684	32,903	32,797
Medical/Research	1,421	1,421	54,666	54,666
Office	4,644	4,250	126,797	116,049
Retail	410	368	5,342	4,793
Warehouse	265	183	5,502	3,799
Totals	**8,549**	**7,938**	**$258,109**	**$242,351**
Alternative B				
Dormitory	124	124	$ 3,392	$ 3,392
Industrial	815	815	24,106	24,106
Institutions	188	188	9,024	9,024
Medical/Research	3,196	3,196	123,001	123,001
Office	5,611	5,611	153,212	153,212
Retail	462	462	6,011	6,011
Warehouse	245	245	5,081	5,081
Totals	**10,641**	**10,641**	**$323,826**	**$323,826**
Alternative C				
Dormitory	83	83	$ 2,298	$ 2,298
Industrial	850	716	25,211	21,183
Institutions	176	176	8,432	8,432
Medical/Research	0	0	0	0
Office	4,526	4,132	123,601	112,851
Retail	460	403	6,008	5,255
Warehouse	215	188	4,429	3,875
Totals	**6,311**	**5,699**	**$169,979**	**$153,895**
Alternative D				
Dormitory	157	157	$ 4,282	$ 4,282
Industrial	945	856	28,011	25,360
Institutions	683	681	32,712	32,604
Medical/Research	3,196	3,196	123,001	123,001
Office	4,792	4,402	130,855	120,198
Retail	503	462	6,565	6,014
Warehouse	279	202	5,778	4,172
Totals	**10,554**	**9,955**	**$331,205**	**$315,631**

NOTE: Does not include construction employment and payroll.
SOURCE: National Park Service

TABLE 16: TOTAL EMPLOYMENT AND PAYROLL ESTIMATES RELATED TO PARK USE BAY AREA REGION

	Employment		Payroll (000s)	
Alternative A	**Year 2000**	**Year 2010**	**Year 2000**	**Year 2010**
Dormitory	177	177	$ 5,554	$ 5,554
Industrial	1,480	1,347	42,696	38,838
Institutions	962	958	51,789	51,623
Medical/Research	1,931	1,931	79,337	79,337
Office	5,702	5,218	185,239	169,538
Retail	533	477	7,505	6,733
Warehouse	413	286	8,115	5,603
Totals	**11,198**	**10,395**	**$380,236**	**$357,226**
Alternative B				
Dormitory	168	168	$ 5,298	$ 5,298
Industrial	1,217	1,217	35,076	35,076
Institutions	263	263	14,204	14,204
Medical/Research	4,344	4,344	178,511	178,511
Office	6,889	6,889	223,830	223,830
Retail	599	599	8,444	8,444
Warehouse	381	381	7,494	7,494
Totals	**13,863**	**13,863**	**$472,856**	**$472,856**
Alternative C				
Dormitory	113	113	$ 3,590	$ 3,590
Industrial	1,271	1,070	36,683	30,822
Institutions	247	247	13,272	13,272
Medical/Research	0	0	0	0
Office	5,557	5,074	180,570	164,866
Retail	598	524	8,439	7,382
Warehouse	335	293	6,533	5,716
Totals	**8,120**	**7,320**	**$249,088**	**$225,648**
Alternative D				
Dormitory	213	213	$ 6,688	$ 6,688
Industrial	1,412	1,280	40,758	36,899
Institutions	955	953	51,490	51,320
Medical/Research	4,344	4,344	178,511	178,511
Office	5,883	5,404	191,169	175,600
Retail	653	599	9,223	8,449
Warehouse	434	314	8,523	6,154
Totals	**13,895**	**13,107**	**$486,361**	**$463,621**

NOTE: Does not include construction employment and payroll.
SOURCE: National Park Service

TABLE 17: COMPARISON OF THE ECONOMIC IMPACT OF PARK CONVERSION WITH THE IMPACT OF BASE CLOSURE

Existing Income and Labor Force[1] (Income in Millions of Dollars)		Impact of Presidio Base Closure[1] (Income in Millions)		Impact of Presidio Alternatives[2] (Income in Millions)	Alternatives (Average of Year 2000 and Year 2010 Impacts) A	B	C	D
Bay Area		Bay Area		Bay Area				
Population	6,023,577	Employment Loss	-3,150	Employment Gain	10,797	13,863	7,720	13,501
Employment	3,639,000	Percent Change	-0.09	Percent Change	0.30	0.38	0.21	0.37
Personal Income	$127,800	Personal Income	-$132	Personal Income Gain	$369	$473	$237	$475
		Percent Change	-0.10	Percent Change	0.29	0.37	0.19	0.37
San Francisco		San Francisco		San Francisco				
Population	723,959	Employment Loss	-1,575	Employment Gain	8,244	10,641	6,005	10,255
Employment	919,600	Percent Change	-0.17	Percent Change	0.90	1.16	0.65	1.12
Personal Income	$17,200	Personal Income	-$66	Personal Income Gain	$250	$324	$162	$323
		Percent Change	-0.38	Percent Change	1.45	1.88	0.94	1.88

1. U.S. Army Corps of Engineers 1991
2. Jones & Jones 1993a

TABLE 18: DIRECT, SECONDARY, AND TOTAL CONSTRUCTION-RELATED EMPLOYMENT AND PAYROLL ESTIMATES

		Year 1994-2000	Year 2001-2010
Alternative A	Direct Employment	1,445	710
	Direct Annual Payroll (000)	$ 39,811	$ 19,550
	Secondary Employment and Payroll		
	Bay Area Employment	1,871	919
	Bay Area Annual Payroll (000)	$ 70,465	$ 34,604
	San Francisco Employment	936	459
	San Francisco Annual Payroll (000)	$ 35,233	$ 17,302
	Total (Direct plus Secondary) Employment and Payroll		
	Bay Area Employment	3,316	1,629
	Bay Area Annual Payroll (000)	$110,276	$ 54,154
	San Francisco Employment	2,381	1,169
	San Francisco Annual Payroll (000)	$ 75,044	$ 36,852
Alternative B	Direct Employment	1,816	662
	Direct Annual Payroll (000)	$ 50,022	$ 18,226
	Secondary Employment and Payroll		
	Bay Area Employment	2,351	857
	Bay Area Annual Payroll (000)	$ 88,540	$ 32,261
	San Francisco Employment	1,176	428
	San Francisco Annual Payroll (000)	$ 44,270	$ 16,130
	Total (Direct plus Secondary) Employment and Payroll		
	Bay Area Employment	4,167	1,518
	Bay Area Annual Payroll (000)	$138,562	$ 50,487
	San Francisco Employment	2,991	1,090
	San Francisco Annual Payroll (000)	$ 94,292	$ 34,357

SOURCE: Jones & Jones 1993a

TABLE 18: DIRECT, SECONDARY, AND TOTAL CONSTRUCTION-RELATED EMPLOYMENT AND PAYROLL ESTIMATES *CONTINUED*

		Year 1994-2000	Year 2001-2010
Alternative C	Direct Employment	1,288	480
	Direct Annual Payroll (000)	$ 35,492	$ 13,237
	Secondary Employment and Payroll		
	Bay Area Employment	1,668	622
	Bay Area Payroll (000)	$ 62,822	$ 23,429
	San Francisco Employment	834	311
	San Francisco Annual Payroll (000)	$ 31,411	$ 11,714
	Total (Direct plus Secondary) Employment and Payroll		
	Bay Area Employment	2,957	1,103
	Bay Area Annual Payroll (000)	$ 98,314	$ 36,666
	San Francisco Employment	2,123	792
	San Francisco Annual Payroll (000)	$ 66,903	$ 24,951
Alternative D	Direct Employment	2,237	635
	Direct Annual Payroll (000)	$ 61,634	$ 17,501
	Secondary Employment and Payroll		
	Bay Area Employment	2,897	823
	Bay Area Annual Payroll (000)	$109,092	$ 30,977
	San Francisco Employment	1,449	411
	San Francisco Annual Payroll (000)	$ 54,546	$ 15,489
	Total (Direct plus Secondary) Employment and Payroll		
	Bay Area Employment	5,134	1,458
	Bay Area Annual Payroll (000)	$170,725	$ 48,479
	San Francisco Employment	3,686	1,047
	San Francisco Annual Payroll (000)	$116,179	$ 32,990

TABLE 19: WATER USE ESTIMATES

Year 2000 — Water Use Estimates (gal/day)

Land Use	Use Category	Unit(s) of Measure	Avg. Daily Water Use	Alternative A Units	Alternative A Use	Alternative B Units	Alternative B Use	Alternative C Units	Alternative C Use	Alternative D Units	Alternative D Use
Residential	Indiv. Residence	Person	80	3,574	285,920	3,517	281,360	3,666	293,280	2,897	231,760
Dormitory	Apartment House	Person	100	755	75,500	229	22,900	574	57,400	853	85,300
		Employee	10	83	830	79	790	53	530	100	1,000
Industrial	Office	Employee	15	501	7,515	412	6,180	430	6,450	478	7,170
Institutions	School	Student	25	413	10,325	113	2,825	106	2,650	410	10,250
Medical	Hospital	Bed	150	0	0	200	30,000	0	0	200	30,000
		Employee	10	911	9,110	2,049	20,490	0	0	2,049	20,490
Office	Office	Employee	15	3,586	53,790	4,333	64,995	3,495	52,425	3,700	55,500
Retail	Dept. Store	Employee	10	288	2,880	324	3,240	323	3,230	353	3,530
Warehouse	Office	Employee	15	117	1,755	108	1,620	95	1,425	123	1,845
Visitor	Public Lavatory	User	5	16,200	81,000	12,300	61,500	14,200	71,000	16,700	83,500
Total Use					**528,625**		**495,900**		**488,390**		**530,345**

Year 2010 — Water Use Estimates (gal/day)

Land Use	Use Category	Unit(s) of Measure	Avg. Daily Water Use	Alternative A Units	Alternative A Use	Alternative B Units	Alternative B Use	Alternative C Units	Alternative C Use	Alternative D Units	Alternative D Use
Residential	Indiv. Residence	Person	80	1,399	111,920	3,517	281,360	977	78,160	2,795	223,600
Dormitory	Apartment House	Employee	100	755	75,500	229	22,900	574	57,400	853	85,300
			10	83	830	79	790	53	530	100	1,000
Industrial	Office	Employee	15	456	6,840	412	6,180	362	5,430	433	6,495
Institutions	School	Student	25	411	10,275	113	2,825	106	2,650	409	10,225
Medical	Hospital	Bed	150	0	0	200	30,000	0	0	200	30,000
		Employee	10	911	9,110	2,049	20,490	0	0	2,049	20,490
Office	Office	Employee	15	3,282	49,230	4,333	64,995	3,191	47,865	3,399	50,985
Retail	Dept. Store	Employee	10	258	2,580	324	3,240	283	2,830	324	3,240
Warehouse	Office	Employee	15	81	1,215	108	1,620	83	1,245	89	1,335
Visitor	Public Lavatory	User	5	21,600	108,000	18,900	94,500	20,000	100,000	21,900	109,500
Total Use					**375,500**		**528,900**		**296,110**		**542,170**

SOURCE: Jones & Jones 1993a

TABLE 20: PRESIDIO WATER AND SEWER SYSTEM DEMANDS

Sewer and Water System Demand Estimates (gal./day)	Alt. A	Alt. B	Alt. C	Alt. D
Potable Water (Residents, Employees, Visitors) Demand-2000[1]	528,625	495,900	488,390	530,345
Potable Water (Residents, Employees, Visitors) Demand-2010[1]	375,500	528,900	296,110	542,170
Estimated Irrigation Water Demand-2000[2]	1,000,000	1,000,000	1,000,000	1,000,000
Estimated Irrigation Water Demand-2010[2]	1,000,000	1,000,000	1,000,000	1,000,000
Estimated Sewage Discharge-2000[3]	449,331	421,515	415,132	450,793
Estimated Sewage Discharge-2010[3]	319,175	449,565	251,694	460,845
On-Site Water Availability (gal./day)	**Alt. A**	**Alt. B**	**Alt. C**	**Alt. D**
Estimated Minimum Available Potable Water-2000[4]	1,600,000	1,600,000	1,600,000	1,600,000
Estimated Minimum Available Potable Water-2010[4]	1,600,000	1,600,000	1,600,000	1,600,000
Demand for Outside Services (gal./day)	**Alt. A**	**Alt. B**	**Alt. C**	**Alt. D**
Potable Water (Residents, employees, Visitors) Demand-2000[5]	0	0	0	0
Potable Water for Letterman Special Uses-2010[6]	9,110	50,490	0	50,490
Reclaimed Water for Irrigation-2010[7]	0	0	0	0
Sewage Discharge-2000[8]	449,331	421,515	415,132	450,793
Potable Water (Residents, employees, Visitors) Demand-2010[5]	0	0	0	0
Potable Water for Letterman Special Uses-2010[6]	9,110	50,490	0	50,490
Reclaimed Water for Irrigation-2010[7]	1,000,000	1,000,000	1,000,000	1,000,000
Sewage Discharge-2010[8]	319,175	449,565	251,694	460,845
Potential On-site Water surplus (gal./day)	**Alt. A**	**Alt. B**	**Alt. C**	**Alt. D**
Surplus Water From On-Site Sources-2000[9]	80,485	154,590	111,610	120,145
Surplus Water From On-Site Sources-2010[10]	1,223,610	1,121,590	1,303,890	1,108,320

SOURCE: National Park Service

NOTES:

1. Potable water demand from residents, guests, and employees based on average water consumption figures published in *Wastewater Engineering: Treatment, Disposal and Reuse*, Metcalfe and Eddy, Inc., 1991; includes water needed for special uses such as hospital, research, and boiler feeder. See table 19 for water use estimates.
2. Based on data from Department of Engineering and Housing, U.S. Army, Presidio.
3. Sewage discharge is 85 percent of potable water use.
4. Onsite water availability estimated to range from 1.6 to 1.8 million gal/day. Estimate by Department of Engineering and Housing, U.S. Army, Presidio.
5. Onsite water is projected to be sufficient to meet demand for potable use.
6. Potable water for special uses is a component of the total potable water use figures shown in the upper part of the table; existing connection to the city of San Francisco water system would be maintained to supply Letterman special uses. Consumption data from the Department of Engineering and Housing, U.S. Army, Presidio.
7. The reclaimed water system would not be online until after 2000. In 2000 all irrigation water would be assumed to be supplied by onsite sources. By 2010 all Presidio irrigation needs could be met using reclaimed water supplied by the city of San Francisco.
8. All Presidio sewage discharge would be fed into the city of San Francisco sewer system for treatment and disposal.
9. Year 2000 potential surplus water would equal onsite availability, less potable water demand, less irrigation water demand. Surplus water might be available for creek restoration and/or transfer to city of San Francisco water system.
10. Year 2010 potential surplus water would equal onsite availability, less potable water demand. By 2010 irrigation needs would be met by reclaimed water. Surplus water may be available for wetlands restoration and/or transfer to City of San Francisco water system.

TABLE 21: PRESIDIO HOUSING UNITS AND DORMITORY BEDS REMOVED AND REUSED

Alternative and Year	Housing Units Removed	Housing Units Remaining	Dormitory Beds Converted/ Removed	Dormitory Beds Remaining
Alternative A				
Year 2000	52	1,132	674	741
Year 2010	738	446	674	741
Alternative B				
Year 2000	0	1,173	708	707
Year 2010	0	1,173	708	707
Alternative C				
Year 2000	102	1,071	934	481
Year 2010	868	305	934	481
Alternative D				
Year 2000	52	1,132	524	891
Year 2010	92	1,092	524	891

NOTES: Alternatives A and D include 11 housing units in the Public Health Service hospital complex. Alternatives B and C exclude this area from the Presidio. Year 2010 housing removal totals include units removed by 2000.

SOURCE: National Park Service

TABLE 22: REUSE OF PRESIDIO HOUSING UNITS AND DORMITORY BEDS BY TYPE OF USER

HOUSING UNITS

Alternative and Year	NPS/Partner Staff	Military	Guests	Other Tenants	Total
Alternative A					
Year 2000	301	746*	85	0	1,132
Year 2010	211	150	85	0	446
Alternative B					
Year 2000	75	150	59	889	1,173
Year 2010	75	150	59	889	1,173
Alternative C					
Year 2000	836	150	85	0	1,071
Year 2010	70	150	85	0	305
Alternative D					
Year 2000	255	792*	85	0	1,132
Year 2010	215	792*	85	0	1,092

DORMITORY BEDS

Alternative and Year	Staff	Guests	Total
Alternative A			
Year 2000	255	486	741
Year 2010	255	486	741
Alternative B			
Year 2000	634	73	707
Year 2010	634	73	707
Alternative C			
Year 2000	205	276	481
Year 2010	205	276	481
Alternative D			
Year 2000	255	636	891
Year 2010	255	636	891

*A total of 150 units would be used by Sixth Army staff working onsite (included as Presidio employees in the housing demand analysis); 34 units would be used for military community support in such functions as a housing office, a store, and a child care center; about 562 units would be used by other military employees working at other Bay Area bases.

SOURCE: National Park Service

TABLE 23: EMPLOYEE HOUSING DEMAND MET BY PRESIDIO HOUSING

Alternative and Year	Total Presidio Employment	Total Households[1]	Potential Presidio Employees who live in San Francisco Bay Area who would desire Presidio Housing[2]	Potential Presidio Employees who live outside Bay Area who would desire Presidio Housing[3]	Presidio Housing Demand[4]	Staff Housing Available at Presidio[5]	% of Presidio Employee Housing Demand Satisfied at the Presidio[6]
Alternative A							
2000	5,898	4,537	1,021	851	1,871	706	38%
2010	5,481	4,216	949	791	1,739	616	35%
Alternative B							
2000	7,417	5,705	1,284	1,070	2,353	1,748	74%
2010	7,417	5,705	1,284	1,070	2,353	1,748	74%
Alternative C							
2000	4,503	3,464	779	649	1,429	1,191	83%
2010	4,078	3,137	706	588	1,294	425	33%
Alternative D							
2000	7,215	5,550	1,249	1,041	2,289	660	29%
2010	6,803	5,233	1,177	981	2,159	620	29%

1. Number of employees/1.3 workers per household.
2. Assumes that 30% of those 75% of potential Presidio employee households from the Bay Area would desire to move to the Presidio.
3. Assumes that 75% of those 25% of potential Presidio employee households from outside the Bay Area would desire to move to the Presidio.
4. Potential employees from Bay Area plus outside Bay Area.
5. Number of Presidio housing units and dormitory beds allocated for staff use.
6. Staff housing available/housing demand.

SOURCES: National Park Service; Peccia & Associates 1993

TABLE 24: NEW REGIONAL HOUSING DEMAND ESTIMATES

Alternative and Year	Total Presidio Employees	Presidio Employees from outside Bay Area[1]	New Households from outside Bay Area due to Presidio employment[2]	Employee Housing Units at the Presidio[3]	Net New Regional Housing Demand by the Presidio[4]	New San Francisco Demand (40%)[5]	New North Bay Demand (36%)[6]	New East Bay Demand (11%)[7]	New Peninsula Demand (13%)[8]
Alternative A									
2000	5,898	1,475	1,134	706	428	171	154	47	56
2010	5,481	1,370	1,054	616	438	175	158	48	57
Alternative B									
2000	7,417	1,854	1,426	1,748	(322)	(129)	(116)	(35)	(42)
2010	7,417	1,854	1,426	1,748	(322)	(129)	(116)	(35)	(42)
Alternative C									
2000	4,503	1,126	866	1,191	(325)	(130)	(117)	(36)	(42)
2010	4,078	1,020	784	425	359	144	129	40	47
Alterantive D									
2000	7,215	1,804	1,388	660	728	291	262	80	95
2010	6,803	1,701	1,308	620	688	275	248	76	89

SOURCES: National Park Service; Jones and Jones 1993a

1. 25% of total employment.
2. Number of employees/ 1.3 workers per household.
3. Number of Presidio housing units and dormitory beds allocated for staff use.
4. New households minus Presidio housing units.
5. Assumes that 40% of new Presidio employee housing demand will be in San Francisco.
6. Assumes that 36% of new Presidio employee housing demand will be in the North Bay.
7. Assumes that 11% of new Presidio employee housing demand will be in the East Bay.
8. Assumes that 13% of new Presidio employee housing demand will be in the Peninsula (South Bay).

TABLE 25: PROJECTED PRESIDIO MEDICAL AID INCIDENTS

Alternative and Year	Number of Visitors	Percent Increase of Visitors Over Baseline	Medical Transport due to Visitors	Percent Change of Housing Units to Baseline Year	Medical Transport Due to Housing	Total Transport to Hospitals	Increase over Baseline Year
Baseline	3,700,000	0%	106	0	52	158	0
Alt. A – 2000	5,900,000	159%	169	96%	50	219	61
Alt. B – 2000	4,500,000	122%	129	99%	52	180	22
Alt. C – 2000	5,206,000	141%	149	91%	47	196	38
Alt. D – 2000	6,190,000	167%	177	95%	49	227	69
Alt. A – 2010	7,900,000	214%	226	38%	20	246	88
Alt. B – 2010	6,900,000	186%	198	99%	52	249	91
Alt. C – 2010	7,300,000	197%	209	26%	14	223	65
Alt. D – 2010	8,000,000	216%	229	91%	47	277	119

Source: Jones & Jones 1993a

TABLE 26: TRANSPORTATION MODE USE ESTIMATES

Year/Scenario	Vehicle Trips	Person Trips by Vehicle[1]	Transit/Charter Person Trips[2]	Bicycle/Pedestrian Person Trips[3]	Total IE/EI Person Trips[4]
Existing (1988) Weekday	37,400	56,100	6,935	8,100	71,135
Existing (1988) Weekend	33,900	50,800	4,255	15,800	70,855
2000/Alternative A Weekday	49,100	73,700	8,900	11,600	94,200
2000/Alternative B Weekday	50,000	75,100	8,700	10,300	94,100
2000/Alternative C Weekday	43,300	65,000	7,400	9,600	82,000
2000/Alternative D Weekday	52,300	78,500	10,100	11,600	100,200
2000/Alternative A Weekend	48,000	72,000	5,900	22,600	100,500
2000/Alternative B Weekend	45,400	68,100	5,100	20,100	93,300
2000/Alternative C Weekend	44,600	66,900	5,300	22,300	94,500
2000/Alternative D Weekend	49,100	73,700	6,000	22,600	102,300
2010/Alternative A Weekday	58,200	87,300	14,900	15,600	117,800
2010/Alternative B Weekday	59,000	88,500	9,900	12,600	111,000
2010/Alternative C Weekday	51,900	77,800	14,300	13,600	105,700
2010/Alternative D Weekday	62,600	93,900	17,200	15,600	126,700
2010/Alternative A Weekend	56,100	84,100	13,300	30,300	127,700
2010/Alternative B Weekend	53,800	80,700	5,700	24,500	110,900
2010/Alternative C Weekend	52,400	78,600	13,100	30,000	121,700
2010/Alternative D Weekend	58,300	87,400	14,100	30,300	131,800

SOURCE: Peccia & Associates 1993

NOTES: The table shows internal/external (I/E) and external/internal (E/I) vehicle trips and person trips by various travel modes (each way counted separately; totals do not include internal traffic or cut-through traffic). Alternative C 2000 and 2010 projections do not include trips to LAMC and LAIR because it is assumed that these facilities would be outside the park boundary. Reuse of the two structures would add an estimated 12,800 person trips per weekday and 2,800 total person trips per weekend day through Presidio gateways.

1. Total I/E and E/I person trips by automobile based on average auto occupancy of 1.5 persons per vehicle.
2. Total I/E and E/I person trips by transit, including MUNI, charter, and shuttle bus trips.
3. Total I/E and E/I person trips by bicycle or on foot.
4. Total I/E and E/I person trips for all transportation modes, excluding internal and cut-through traffic.

TABLE 27
PRESIDIO TRAFFIC MODELLING
ENTRANCE VOLUMES SUMMARY
(Vehicle Trips)

Presidio Entrances	Existing Condition PM Peak	Existing Condition Wday ADT	Existing Condition Wend ADT
Mason	610	5,200	5,100
Gorgas	540	5,200	2,600
Lombard	1,170	12,800	11,400
Presidio	720	8,000	7,200
Arguello	490	4,100	3,500
15th Ave.	130	1,200	1,100
Lincoln	860	7,700	8,400
G.G. Viewing	750	6,200	7,400
Entrance Totals	5,270	50,400	46,700

Presidio Entrances	ALT. A w/Doyle 2000 PM Peak	No NPS 2000 PM Peak	ALT. A 2000 PM Peak	ALT. B 2000 PM Peak	ALT. C 2000 PM Peak	ALT. D 2000 PM Peak	ALT. A w/Doyle 2000 Wday ADT	No NPS 2000 Wday ADT	ALT. A 2000 Wday ADT	ALT. B 2000 Wday ADT	ALT. C 2000 Wday ADT	ALT. D 2000 Wday ADT	ALT. A w/Doyle 2000 Wend ADT	No NPS 2000 Wend ADT	ALT. A 2000 Wend ADT	ALT. B 2000 Wend ADT	ALT. C 2000 Wend ADT	ALT. D 2000 Wend ADT
Doyle Intrchg.	890						8,540						8,540					
Mason	950	690	850	850	840	840	8,540	5,880	7,000	7,000	7,000	7,000	7,950	5,760	7,100	6,900	7,100	7,100
Gorgas	580	610	590	760	750	740	5,900	5,880	5,900	7,000	7,000	7,000	3,300	2,940	3,300	3,500	3,600	3,600
Lombard	510	1,320	1,240	1,410	1,400	1,400	5,210	14,460	15,200	16,300	16,200	16,300	4,590	12,880	14,700	14,700	14,900	14,900
Presidio	940	810	850	930	930	920	10,170	9,040	9,400	10,000	9,900	9,900	9,970	8,140	9,100	9,000	9,200	9,200
Arguello	950	550	850	850	930	840	6,820	4,630	6,000	5,500	6,200	5,500	6,450	3,960	5,500	4,800	5,400	4,900
15th Ave.	360	150	360	180	0	470	3,300	1,360	3,300	1,600	0	4,400	3,100	1,240	3,100	1,500	0	4,300
Lincoln	1,150	970	1,150	1,150	1,200	1,140	9,400	8,700	9,400	9,300	9,800	9,300	10,700	9,490	10,700	10,500	11,200	10,600
G.G. Viewing	1,060	850	990	1,060	1,060	990	8,400	7,010	7,600	8,000	8,000	7,600	9,790	8,360	9,000	9,000	9,200	9,000
Entrance Totals	7,390	5,950	6,880	7,190	7,110 (6,710)	7,340	66,280	56,960	63,800	64,700	64,100 (61,300)	67,000	64,390	52,770	62,500	59,900	60,600 (59,900)	63,600

Presidio Entrances	ALT. A w/Doyle 2010 PM Peak	No NPS 2010 PM Peak	ALT. A 2010 PM Peak	ALT. B 2010 PM Peak	ALT. C 2010 PM Peak	ALT. D 2010 PM Peak	ALT. A w/Doyle 2010 Wday ADT	No NPS 2010 Wday ADT	ALT. A 2010 Wday ADT	ALT. B 2010 Wday ADT	ALT. C 2010 Wday ADT	ALT. D 2010 Wday ADT	ALT. A w/Doyle 2010 Wend ADT	No NPS 2010 Wend ADT	ALT. A 2010 Wend ADT	ALT. B 2010 Wend ADT	ALT. C 2010 Wend ADT	ALT. D 2010 Wend ADT
Doyle Intrchg.	1,050						10,000						10,100					
Mason	1,120	760	1,000	970	970	960	10,000	6,450	8,200	8,200	8,000	8,200	9,400	6,320	8,400	8,200	8,200	8,400
Gorgas	720	670	730	860	860	850	7,100	6,450	7,100	8,200	8,000	8,200	4,000	3,220	4,000	4,200	4,100	4,200
Lombard	630	1,450	1,520	1,630	1,650	1,610	6,200	15,870	18,100	19,200	19,000	19,100	5,400	14,140	17,300	17,300	17,400	17,500
Presidio	1,120	890	1,010	1,050	1,080	1,070	11,900	9,920	11,000	11,500	11,500	11,700	11,500	8,930	10,500	10,400	10,500	10,700
Arguello	1,150	610	1,030	970	1,120	1,000	7,500	5,080	6,600	6,500	7,300	6,700	6,800	4,340	5,800	5,600	6,400	5,900
15th Ave.	400	160	400	210	0	510	3,600	1,490	3,600	1,900	0	4,800	3,300	1,360	3,300	1,800	0	4,600
Lincoln	1,380	1,070	1,380	1,330	1,430	1,320	11,100	9,550	11,100	11,000	11,700	11,000	12,500	10,420	12,500	12,200	13,000	12,500
G.G. Viewing	1,220	930	1,140	1,110	1,130	1,130	9,500	7,690	8,600	8,600	8,600	9,000	11,100	9,180	10,200	10,000	10,200	10,400
Entrance Totals	8,790	6,540	8,210	8,130	8,240 (7,840)	8,450	76,900	62,500	74,300	75,100	74,100 (71,300)	78,700	74,100	57,910	72,000	69,700	69,800 (69,100)	74,200

NOTE:
"No NPS" values are based on 1988 traffic models, adjusted upward by 1% per year.
Alternative C entrance totals without LAMC/LAIR traffic are shown in parenthesis below the actual projected entrance volumes.
15th Avenue gateway volumes will actually be split between 14th and 15th Avenues in Alternative A.

TABLE 28: LAND USE, EXISTING AND YEAR 2010

Acreage and Percentage	Commercial/ Office	Institutional	Recreation/ Open Space	Industrial	Residential	Special Use	Total Acres
Existing Conditions							
Acres	121	109.2	779	102.3	289.7	78.9	1,480
Percentage	8.2%	7.4%	52.6%	6.9%	19.6%	5.3%	
Alternative A							
Acres	25.9	203.4	983.5	39.0	163.7	64.5	1,480
Percentage	1.7%	13.7%	66.5%	2.6%	11.1%	4.4%	
Alternative B							
Acres	159.4	39	779	102.3	284.9	78.9	1,443
Percentage	11.0%	2.7%	54.0%	7.1%	19.7%	5.5%	
Alternative C							
Acres	29.2	132.1	1007.3	53.7	132.9	64.6	1,420
Percentage	2.1%	9.3%	70.9%	3.8%	9.4%	4.5%	
Alternative D							
Acres	28.7	199.7	894.0	45.0	248.1	64.5	1,480
Percentage	1.9%	13.5%	60.4%	3.0%	16.8%	4.4%	

Types of Use by Category

Commercial/office: general offices, community centers, restaurants, retail stores
Institutional: museums and other visitor education facilities, conference and residential education centers, research facilities
Recreation/open space: open space, including native plant habitat, forested areas, and beachfront; developed outdoor recreation areas, including ballfields and golf course; indoor facilities, including gymnasiums and swimming pool
Industrial: maintenance, warehouse, and storage areas; infrastructure
Residential: single- and multi-family housing, dormitories
Special use: cemetery, highway rights-of-way

SOURCE: National Park Service

TABLE 29: PRESIDIO POPULATION ESTIMATES

	Year 2000		Year 2010	
Alternative A	**Units**	**Occupants**	**Units**	**Occupants**
Residential Units Occupied by Staff	1,047	3,319	361	1,144
Residential Units Occupied by Guests	85	269	85	269
	Dorm Beds	**Occupants**	**Dorm Beds**	**Occupants**
Dormitory Beds Occupied by Staff	225	255	255	255
Dormitory Beds Occupied by Guests	486	486	486	486
Total Residents		**3,574**		**1,399**
Total Guests		**755**		**755**
Alternative B	**Units**	**Occupants**	**Units**	**Occupants**
Residential Units Occupied by Staff	1,088	2,883	1,088	2,883
Residential Units Occupied by Guests	59	156	59	156
	Dorm Beds	**Occupants**	**Dorm Beds**	**Occupants**
Dormitory Beds Occupied by Staff	634	634	634	634
Dormitory Beds Occupied by Guests	73	73	73	73
Total Residents		**3,517**		**3,517**
Total Guests		**229**		**229**

SOURCES: National Park Service; U.S. Bureau of Labor Statistics.

NOTE: Population Densities for Residential Units:

Residential, Alt. A	700	square feet per occupant or	3.17	persons per unit
Residential, Alt. B	650	square feet per occupant or	2.65	persons per unit
Residential, Alt. C	700	square feet per occupant or	3.51	persons per unit
Residential, Alt. D	650	square feet per occupant or	2.55	persons per unit

TABLE 29: PRESIDIO POPULATION ESTIMATES *CONTINUED*

	Year 2000		Year 2010	
Alternative C	**Units**	**Occupants**	**Units**	**Occupants**
Residential Units Occupied by Staff	986	3,461	220	772
Residential Units Occupied by Guests	85	298	85	298
	Dorm Beds	**Occupants**	**Dorm Beds**	**Occupants**
Dormitory Beds Occupied by Staff	205	205	205	205
Dormitory Beds Occupied by Guests	276	276	276	276
Total Residents		**3,666**		**977**
Total Guests		**574**		**574**
Alternative D	**Units**	**Occupants**	**Units**	**Occupants**
Residential Units Occupied by Staff	1,036	2,642	996	2,540
Residential Units Occupied by Guests	85	217	85	217
	Dorm Beds	**Occupants**	**Dorm Beds**	**Occupants**
Dormitory Beds Occupied by Staff	255	255	255	255
Dormitory Beds Occupied by Guests	636	636	636	636
Total Residents		**2,925**		**2,823**
Total Guests		**853**		**853**

TABLE 30: ESTIMATED VISITOR PROJECTIONS, YEARS 2000 AND 2010

Year/Period	Alternative A	Alternative B	Alternative C	Alternative D
Annual (in millions)				
2000	5.9	4.5	5.2	6.1
2010	7.9	6.9	7.3	8.0
Per Day				
2000, avg. day	16,200	12,300	14,200	16,700
2010, avg. day	21,600	18,900	20,000	21,900
2000, weekday	14,400	10,500	12,400	14,900
2000, weekend	20,700	17,300	19,000	20,800
2010, weekday	19,400	17,400	17,600	20,100
2010, weekend	27,100	22,300	26,000	26,700

Source: Peccia & Associates 1993

Note: Visitor projections reflect individual visits per day, including some repeat visits. Visitors may include people going to outdoor recreation areas or programs, people visiting offices, and overnight guests or conference participants.

TABLE 31: SOIL DISTURBANCE BY PLANNING AREA

	Alternative A (Acres)	Alternative B (Acres)	Alternative C (Acres)	Alternative D (Acres)
Main post	43	7	43	43
Golden Gate/Fort Point	15	3	15	15
Fort Scott	13	1.4	21	13
Letterman complex	16	0	13	13
Cavalry stables	8	0	8	8
Public Health Service hospital	11.5	0	0	11.5
East housing area	8.8	0	14.5	8.8
Crissy Field	94	32	94	94
Presidio Hill	52.6	1.6	52.6	3
National cemetery	–	–	–	–
Presidio forest	10	0	24	10
Lobos Creek	1.8	0	2.5	1.83
Coastal bluffs	77	0.2	77	77
	351	**39**	**365**	**298**

SOURCE: National Park Service

Alternative A (Proposed Action)

Impacts on the Regional Economy and Employment

Methodology

This analysis involved calculating projections of employment, payroll, state sales and use tax revenues, and visitor and employee expenditures for the Presidio in the years 2000 and 2010. It is based on information in the *Presidio Planning Socioeconomic Analysis Report* prepared by Jones & Jones in 1993. Appendix C provides additional detail on the data and calculations used in estimating these figures.

Employment and Payroll Estimates Related to Park Use. Development and reuse of the Presidio as a national park would generate jobs and increase household income in the city of San Francisco and the Bay Area. Some of the jobs would be generated at the Presidio itself; these jobs, and the associated payroll, would be direct economic benefits resulting from reuse. In addition, new activities at the Presidio would have secondary economic benefits by generating additional jobs and payroll in the surrounding city and region. The methodologies used in deriving direct, secondary, and total employment and payroll estimates, other than those related to construction, are discussed below. Construction-related employment and payroll were calculated separately.

Direct Employment and Payroll — To estimate employment levels at the Presidio, the use categories that would generate jobs and the anticipated types of employment were first identified (see table 32; the categories of infrastructure, military, and residential were not included because they would not be likely to generate additional employment). Using the figures in tables 10 and 11 in the previous section, the total building space available for each use category was determined, and these numbers were multiplied by an assumed occupancy rate of 90% (Jones & Jones 1993 – The 90% occupancy rate was used in both the transportation and socioeconomic analyses for consistency; this occupancy rate is optimistic for the year 2000 because of the current recession and low absorption of vacant leasable space in San Francisco over the past several years). The adjusted building space totals were then divided by assumed average employment densities (based on data published by the Institute of Transportation Engineers [1991]) to determine the number of jobs in each category. In the analysis, projected employment levels were compared to a baseline of 5,550 jobs — the level of employment reported by the Army in the 1991 *Final Environmental Impact Statement, Base Closure of the Presidio of San Francisco* (USACE 1991).

To estimate the total payroll for jobs at the Presidio in each use category, U.S. Census Bureau reports of payroll estimates for standard job categories were identified. The total payroll numbers were then divided by total employment in each category to obtain average annual wages. A baseline of $70 million in annual wages was used for comparison — the payroll of Presidio military and civilian employees reported in the Army's base closure FEIS.

TABLE 32: ANTICIPATED EMPLOYMENT BY BUILDING USE CATEGORY

Use Category	Anticipated Types of Use	Anticipated Employment
Dormitory	Short-and long-term lodging for park visitors and staff	Housekeeping staff
Industrial	Job skills training centers, building rehabilitation workshops, repair and maintenance facilities	Skilled trades/labor
Institution	Museums, visitor/interpretive centers, other educational and visitor facilities	NPS staff, docents, interpretive guides, researchers, training staff
Medical	Medical research and education facilities	Researchers, technicians, administrators, support staff
Office	Organizational and program support	Professional, administrative, and support staff
Retail	Dining and convenience shopping facilities	Service-related positions, including food service workers, cashiers, sales people, and managers
Warehouse	Long-term storage	Operators, security guards

Secondary Employment and Payroll — Secondary economic benefits were estimated using input/output multipliers adopted from a recent study of the Bay Area economy by the Association of Bay Area Governments (ABAG 1991). The association study focused on money flow between 38 different sectors of the Bay Area economy, and it provided measures of the total increase in jobs and payroll in the region that would be generated by the direct increase in jobs or payroll in one enterprise in the region, such as in the Presidio. These measures are termed "multipliers."

Seven of the 38 sectors identified in the Bay Area study were selected to represent the types of businesses expected at the Presidio, corresponding with the building uses listed in table 32. The ABAG model provides two types of multipliers for each sector — a larger (type II) multiplier and a smaller (type I) multiplier. In theory, type II multipliers are used to estimate impacts from new jobs in a closed economy. New jobs are those that are added to, rather than transferred from within, the region; a closed economy is one in which all payroll is spent inside the region. In theory, type I multipliers are used to estimate impacts from new jobs in an open economy. An open economy is one where all payroll is spent outside the region.

In reality, some jobs generated by reuse of the Presidio would be new and some would be transferred from within the region (calculations in the 1993 Jones & Jones report suggest that 70% of the jobs would be new and 30% would be transferred); similarly, some payroll would be spent outside and some would be spent within the Bay Area. Accordingly, the authors of the ABAG study recommended using average multipliers to estimate the local (city and county of San Francisco) and regional (Bay Area) impacts of Presidio reuse. They proposed that local impacts be calculated using the average of the type I multiplier and the direct impact (ABAG 1991 and personal communication); for regional impacts they proposed that the estimate be based on the average of the type I and type II multipliers (ABAG 1991).

Income and employment associated with each of the seven business types were estimated by multiplying the number of jobs and payroll dollars of direct employment at the Presidio (table 12) times the appropriate average multiplier for that business industry sector (Jones & Jones 1993a). The average local multipliers suggest that San Francisco would be likely to capture a relatively small portion of the total regional employment and income expected from Presidio reuse. That is because much of the payroll generated by the Presidio would be spent outside the city but within the region.

Total Employment and Payroll — Total local and regional employment and payroll estimates were calculated by adding the direct and secondary estimates for each use category. New jobs were projected using the 70% estimate described previously.

Comparison of Base Closure and Park Conversion and Use — Summary employment and payroll multipliers were derived to compare the effects of base closure with those of new park use. Summary multipliers are the average of the job and payroll multipliers associated with the seven business types weighted by the number of direct jobs for each type. The summary local payroll and employment multipliers are 1.9 and 1.4, respectively; the summary regional employment and payroll multipliers are 1.9 and 2.8. These figures indicate that each job at the Presidio would generate almost two jobs in the region.

A total multiplier of 2.0 was used to estimate the impact of closing the Presidio military base on regional employment (USACE 1991). Military base closure impacts were then compared with those of park conversion and use.

Construction-Related Employment and Payroll Estimates. Construction employment and payroll were estimated based on construction expenditures (ABAG 1991). Multipliers for both direct and secondary construction employment and payroll generated by the Presidio were derived using the same methodology as described in the "Employment and Payroll Estimates Related to Park Use" section above. Additionally, construction employment was estimated based on an assumed 20.4 jobs per $1 million in expenditures. Construction earnings were estimated assuming income of $0.56 per dollar of expenditures. Expenditures were assumed to be evenly distributed over the forecasting periods.

State Sales and Use Taxes. Sales tax revenues were derived by multiplying the square footage of space used for retail by the average sales per square foot by the tax rate. It was assumed that all space would be fully utilized. The square footage of retail space was determined by multiplying the total available square footage by a factor representing the proportion of space devoted to retail activity; the retail sales per square foot value used in the analysis was $200.

Part of the total sales and use tax is apportioned to the city of San Francisco. This part of the tax was excluded from the state (regional) tax analysis, as were two

temporary tax levies due to expire in 1993 (see the "City Services" section for the impacts on city revenues). The state portion of the sales and use tax excluding city and temporary levies is 5.5%. The Bay Area Rapid Transit (BART) District, a regional agency, is allocated 0.5% of the sales tax.

All of the sales and use tax revenues generated by the Presidio in the future would be new revenues, because the military is exempt from state taxes.

Resident, Employee, and Visitor Expenditures. This methodology was designed to estimate potential revenues from resident, employee, and visitor expenditures and to determine whether projected levels of use could support operations at lodging, food and beverage, and retail concessions. To this end, the potential revenues of each of these concessions types were estimated, and the revenues per square foot were projected and compared with industry standards. Additional information on the figures and calculations used to derive these estimates is included in appendix C. All of the revenue estimates are expressed in 1993 dollars.

Analysis

Employment and Payroll Related to Park Use. Table 12 shows direct employment and payroll estimates under alternative A. Under this alternative about 5,900 people would be employed at the Presidio in the year 2000; because of the decrease in building space, only about 5,480 people would be employed in 2010. This represents an eventual decrease of 2% from the baseline total of about 5,550 jobs. The greatest proportion of Presidio employment would be in the office use category — more than 3,000 employees. The next largest category would be medical/research, with about 900 employees. All other employment categories would have fewer than 500 employees each.

Based on the highest potential employment estimates, total payroll at the Presidio could potentially reach $127 million per year when the Presidio reached stabilized occupancy (2010). This represents a decline from the year 2000 estimate of $136 million as a result of the reduction in employment-generating space. The relative distribution of total wages paid for each use category would generally follow employment distribution. The $127 million yearly payroll would represent an increase of approximately $57 million over the baseline payroll.

Tables 13 and 14 show the estimates of local and regional secondary employment and earnings that would be generated by activities at the Presidio in the years 2000 and 2010. Tables 15 and 16 show the total effects on industry sectors in the city and the region resulting from Presidio activities, except those of construction employment and payroll. The effects on the construction industry were estimated separately.

The secondary and total employment estimates suggest the relative impact of office-related and medical-related uses at the Presidio for generating jobs and income in the region. The numbers also suggest the relatively smaller economic importance of the industrial and institutional uses for generating jobs and the significantly smaller importance of the retail, warehouse, and dormitory activities. Office-related uses at the Presidio are expected to account for roughly half the jobs and income generated in the city and Bay Area for all years covered.

Secondary employment in the seven industry sectors represented at the Presidio is expected to generate about 2,650 jobs in 2000 and 2,460 jobs in 2010 in the city of San Francisco. These jobs are estimated to raise annual payroll by about $122 million in 2000 and $115 million in 2010. Secondary employment is projected to add about 5,300 jobs in 2000 and 4,910 jobs in 2010 in the region. These jobs would raise the annual regional payroll by about $244 million in 2000 and $230 million in 2010.

Total Presidio employment, in all sectors except construction, is estimated to add about 8,550 jobs in 2000 and 7,940 jobs in 2010 in San Francisco. This would raise the annual payroll by $258 million in 2000 and $242 million in 2010. Total Presidio employment is expected to generate about 11,200 jobs in 2000 and 10,400 jobs in 2010 in the region. This would increase the annual regional payroll by $380 million in 2000 and $357 million in 2010.

The effects on employment and earnings from closing the military base versus converting it for park use are compared in table 17. Based on Army estimates, the closure of the military base is estimated to cause a decline of 3,150 jobs and $66 million in income in the Bay Area (USACE 1991). In contrast, National Park Service reuse of the Presidio under alternative A is estimated to increase San Francisco employment by more than 8,240 jobs and earnings by more than $250 million. Additionally, park conversion is estimated to increase Bay Area employment by about 10,800 jobs and Bay Area earnings by more than $369 million.

None of the changes in employment and earnings are expected to cause a large disruption in the regional labor market. The increase in Presidio-related jobs represents only a 0.3% (3/10 of 1%) gain in regional employment; the increase in

Presidio-related earnings represents only a 0.29% gain in regional income. Nevertheless, these changes should provide a boost to San Francisco's economy. If the Presidio's direct employment and income are factored in, much of the employment and income gain is expected to occur within the city and county of San Francisco. Conversion of the Presidio is estimated to increase city employment by 0.9% (9/10 of 1%) and city payroll by about 1.45%.

Construction-Related Employment and Payroll. The construction period at the Presidio is expected to continue from year 1994 to year 2010 (see table 18). Construction would be most intense between 1994 and 2000; it would decline between years 2001 and 2010, generating less than half of the regional jobs and payroll as in the earlier period.

Direct employment related to Presidio construction activities is estimated to be about 1,450 jobs in 2000 and 710 jobs in 2010. The annual construction payroll is expected to be about $40 million annually between 1994 and 2000 and about $20 million annually between 2001 and 2010.

Secondary construction activities are expected to generate about 940 jobs annually in the city and county in 2000 and 460 jobs in 2010. Secondary construction activities are estimated to raise the annual payroll in San Francisco by $35 million annually between 1994 and 2000 and by $17 million annually between 2001 and 2010. Approximately 1,870 jobs are expected to be generated annually in the region between 1994 and 2000, and about 920 jobs annually between 2001 and 2010. Annual payroll in the region is estimated to increase by $70 million in 2000 and $35 million in 2010.

Total (direct and secondary) construction activities related to the Presidio conversion are expected to generate about 2,380 jobs in 2000 and 1,170 jobs in 2010 in San Francisco; annual payroll would be raised by $75 million annually between 1994 and 2000 and by $37 million annually between 2001 and 2010. In the region, total construction activities are expected to generate about 3,320 jobs in 2000 and about 1,630 jobs in 2010 and to raise annual payroll by $110 million annually between 1994 and 2000 and $54 million between 2001 and 2010.

State Sales and Use Taxes. Based on estimated commercial activities at the Presidio, an additional $2 million in state sales and use tax revenues would be generated in the year 2000, and $1.8 million would be generated in 2010. BART would collect about $179,000 in 2000 and $162,000 in 2010. There would be a dramatic increase in state revenues because no sales tax is currently collected at the Presidio; military commercial facilities are exempt from this tax.

Resident, Employee, and Visitor Expenditures. Under alternative A Presidio concessioners and other commercial service providers would be able to maintain reasonable levels of operation based on the number of users projected. Residents, employees, and visitors would generate about $29.5 million in revenues in the proposed square footage allocated for services and overnight lodging during the year 2000; this figure could increase to over $35 million by the year 2010 and would likely continue in the future at an acceptable level for both retail and food and beverage operations. Sales projections are summarized in table 33.

A few visitor services are proposed at Crissy Field, but their revenues were not included in this analysis because of the small sales component. Developing food, beverage, and retail concessions closer to the waterfront and improving access for visitors might stimulate increased revenues for the Presidio retail and food and beverage concessions in the future. The impacts of additional visitor services at Crissy Field would be analyzed as tenant programs were developed and the ferry service implemented.

Conclusion

Under alternative A there would be some positive effects on employment opportunities and on the local and regional economy, including indirect effects on local businesses and tax revenues. More than 5,400 jobs would be created at the Presidio by the year 2010 (3,780 of these would be new jobs), and the annual payroll would increase by about $57 million. In 2010 total employment in construction and other employment sectors in the city and the region would increase by about 9,100 jobs and 12,020 jobs, respectively; of this, about 6,370 jobs would be new to the city and 8,415 jobs would be new to the region. Total earnings in the city and the region would increase by $281 million ($197 million attributable to new jobs) and $411 million ($288 attributable to new jobs), respectively. Park conversion would generate enough jobs and earnings in the region to more than offset jobs and income lost from the closure of the Presidio military base. Nevertheless, anticipated jobs and earnings would only be a small percentage of existing jobs and earnings in the city and Bay Area.

Under alternative A state sales and use tax revenues from the Presidio would increase by about $2 million annually, because no such taxes are collected under military jurisdiction. This alternative would generate approximately $30 million in the year 2000 and nearly $35 million in the year 2010 in service and overnight lodging revenues.

Cumulative Impacts

Conversion of the Presidio into a national park system area would have a minor but positive cumulative effect on local and regional employment and income and on state tax revenues. Resident, employee, and visitor expenditures at the Presidio would contribute a small percentage to the regional economy.

TABLE 33: SUMMARY OF FOOD, BEVERAGE, AND RETAIL SALES - ALTERNATIVE A

Presidio Sales Summary		
	2000	**2010**
Total Food and Beverage Sales	$ 8,173,000	$ 8,788,000
Total Retail Sales	13,976,000	16,396,000
Total Guest Room Revenues	7,403,000	9,832,000
Total Revenues	**$29,552,000**	**$35,016,000**
Presidio Sales by Square Footage		
Food and Beverage	$104.18	$112.02
Retail	$163.34	$191.63

Impacts on City Services

Methodology

This analysis focused on potential costs and revenues to the city and county of San Francisco as a result of the Presidio's conversion to a national park. Costs would relate to police, fire, emergency medical, water, wastewater, and storm drainage services and transportation service improvements; revenues might stem from increases in property taxes (if applicable), sales taxes, business taxes, and several "general government" revenue sources. The cost and revenue analysis is based on information in the 1993 *Presidio Planning Socioeconomic Analysis Report* prepared by Jones & Jones. Appendix C provides additional detail on the data and calculations used in estimating these figures.

City Cost Estimates. Public safety service impacts were calculated because of the interest in the potential costs of having those services provided by contractors, including the city of San Francisco. The Presidio would rely on the city for at least a portion of its water needs and for all of its sewage treatment and disposal needs. Impacts related to water, sewer, and stormwater systems were based on projected resident, visitor, and employee populations. The projected use data was reviewed by city of San Francisco departments to determine the potential rates of services to be charged by the city; costs for the city to provide necessary services were estimated as applicable.

Transportation-related costs were estimated for improvements that would specifically benefit the Presidio (Peccia & Associates 1993). The transportation analysis included recommendations to extend MUNI trolley service (the route of lines 41/45) from the boundary of the Presidio to the main post — as previously proposed by MUNI; this would require electrification of the route and reopening of the Greenwich Street gate for bus use only. It also estimated the operating expenses to extend service on lines 29 and 43; this extension would not require capital expenditures. The capital and operating costs of these services were estimated using cost information provided by MUNI. Cost estimates for improvements to intersections outside the boundary were also included, based on NPS class C cost-estimating guidelines. Intersection improvements would range from restriping to add turning lanes to signalization. They were included because Presidio-bound traffic, along with city and regional traffic, contributes to the need for upgrading.

City Revenue Estimates. Estimates of potential increased revenues were based on the types and amounts of building uses, as summarized in the "Impacts on the Regional Economy and Employment" section, and on resident, visitor, and employee population projections. This data was used to determine the revenues that would be generated by the different uses and users.

City revenues from the Presidio could derive from five major sources: property taxes, sales and use taxes, a tax on hotel room rentals, taxes and fees on business activity, and revenue from general governmental activity. Four of these categories — property, sales and use, hotel, and business — could generate revenue from specific activities, while the fifth would incorporate miscellaneous taxes, fees, and fines. Property (or possessory use) taxes might not be applicable because the Presidio has exclusive federal jurisdiction status; the applicability of this tax is under legal review. The figures were included in the analysis to indicate possible revenues if the tax was determined to be applicable. Because of the tax-exempt status of many park activities, revenue generation would vary substantially by type of use. All tax revenues would be new because the military base was exempt from these taxes.

Public School Enrollment. In 1990 the San Francisco public school enrollment was 65,078. The military base closure analysis reported that about 900 children from the Presidio were enrolled in San Francisco schools out of the total of 3,000 dependents of Presidio employees in regional schools. (USACE 1991).

For this analysis, the proportion of school-aged children (5-18 years) who would live in Presidio residential units was estimated. It was assumed that the percentage of school-aged children in the Presidio population would be equal to the percentage in the nine-county Bay Area region in 1990, or 17.9%. After the number of Presidio school-aged children was estimated, the proportion of those children who would enroll in public elementary or high schools in San Francisco was calculated. Calculations were based on census information that 73.36% of the school-aged children in San Francisco in 1990 were enrolled in public schools.

A payment in lieu of taxes to the local school district might be applicable for children living on federal land and attending public schools. This is a payment per child assessed for dependents of federal employees. A nominal charge might also be assessed for nonfederal employee dependents. The applicability of this payment is being determined.

Analysis

City Costs. The following costs would accrue to the city of San Francisco with the implementation of alternative A.

Police, Fire, and Emergency Medical Services — The National Park Service would have primary law enforcement responsibility within the Presidio through the United States Park Police, which is currently responsible for law enforcement duties within Golden Gate National Recreation Area. Dispatching for Presidio police services would be handled by personnel assigned to the U.S. Park Police. These people would also provide dispatching for the Presidio fire department and its associated emergency medical services. Because the park would not require regular patrols by the San Francisco Police Department, alternative A would not have significant fiscal impacts on the city of San Francisco related to police protection. However, it is expected that the city and park police forces would establish mutual aid agreements that would allow personnel to assist one another if requested in time of emergency. The fiscal impacts of participating in such an agreement could not be determined until the agreement provisions were negotiated.

Proposed law enforcement services at the Presidio and in the national recreation area are expected to be sufficient to control criminal activity, and no negative effects on nearby neighborhoods are anticipated. However, if NPS personnel were not able to contain criminal activity at the Presidio, additional crimes might occur in surrounding neighborhoods. This could place additional demands on city law enforcement in those neighborhoods.

Fiscal impacts on the city related to fire protection are also expected to be minor. Fire protection services at the Presidio would be provided by the Park Service at the same levels as currently provided by the Army. The San Francisco Fire Department would not include the Presidio in its regular response area; however, the existing informal mutual aid agreement between the San Francisco and Presidio fire departments would be formalized, allowing either department to request assistance from the other in time of special need. The fiscal impacts of participating in such an agreement could not be determined until the provisions were negotiated.

Emergency medical services, including basic and advanced life support and hospital transportation for victims, would be provided within the Presidio by NPS personnel assigned to the proposed Presidio fire department; therefore, there would be no significant fiscal impacts on the city related to this service. Emer-

gency units operated by the San Francisco Department of Public Health would not normally respond to emergencies in the Presidio; however, an EMS mutual aid agreement would be established between the two jurisdictions. The fiscal impacts resulting from participation in such an agreement could not be determined until the provisions were negotiated.

Water, Sewer, and Stormwater Services — The Park Service would own, operate, and maintain the entire water distribution system within the Presidio, including the system at the Public Health Service hospital. Water used within the Presidio would come primarily from onsite sources and would be treated by onsite facilities operated by the Park Service. Total water consumption is not projected to exceed total water available onsite. As stated in the mitigating measures for this alternative, if water was required at the LAIR facility of a purity that is not available from onsite sources (a maximum of 10,000 gallons per day), the Presidio could transfer equal amounts of excess water from onsite sources to the city water system that would be suitable for everyday potable uses or could mix city and Presidio water to reduce the effect on the city water supply.

According to current rate information provided by the San Francisco Department of Public Works, annual charges for water supplied to the Presidio by the city water system would amount to about $4,000 in both 2000 and 2010. These charges are based on the 1992/1993 rate structure and could vary in the future depending on the overall costs to operate the city water system and the specific costs to supply water to the Presidio.

By the year 2010, it is expected that a reclaimed water system established by the city would be online and capable of supplying irrigation water for use in the Presidio. As shown in table 20, the availability of reclaimed water from the city would free up substantial amounts of onsite water that could be used for wetlands restoration and/or transfer to the city water system.

The goal of the Park Service would be to connect all future users, including the Public Health Service hospital, to the Presidio water system. Emergency connections between the city of San Francisco and Presidio water systems would be maintained.

The entire wastewater collection system at the Presidio, including the infrastructure at the Public Health Service hospital site, would also be owned, operated, and maintained by the Park Service. All wastewater would be fed into the city wastewater system for treatment and disposal. As shown in table , estimated sewage discharge for alternative A would be about 449,000 gallons per day in 2000 and would drop to about 319,000 gallons per day in 2010 (Jones & Jones 1993a). This would not place an additional burden on the city system because it has the capacity to easily handle this level of discharge. The Park Service would pay sewage fees to the city for wastewater treatment and disposal. These payments would be offset by collecting user fees from tenants to pay for disposal and wastewater system maintenance.

The sewer service cost would be $1,038,000 in 2000 and $740,000 in 2010, expressed in constant dollars, based on current city sewer rates provided by representatives of the San Francisco Department of Public Works. Future rates would vary according to a number of factors, including inflation and the level of the city's sewer system-related bonded indebtedness. The service charges are calculated so that the system pays for itself; therefore, there would be no net benefit or cost to the city for provision of Presidio sewer service.

The Park Service would own, operate, and maintain the entire storm drainage system within the Presidio, and there would be no effect on the city of San Francisco.

Transportation Service Improvements — If the MUNI trolley extension was constructed by the city from the former Greenwich Street gate to the main post transportation hub, as recommended under this alternative, capital costs would be $1,687,000 (not including electrical substation relocation) and annual operating costs would be $68,600. Extension of MUNI line 29 to provide service to the officers' club on the existing route between Crissy Field, the main post, and the Letterman complex would increase annual operating costs by about $5,000 a year, and extension of MUNI line 43 from the Letterman terminus to the main post transportation hub would increase costs by $36,000 (Peccia & Associates 1993).

If the recommended intersection improvements near the Presidio boundary were implemented as needed to eliminate problems and safety hazards related to regional and Presidio traffic increases, the total cost would be $2,540,000; initial safety and traffic flow improvements would cost about $2,270,00 and second-phase improvements at two intersections would cost about $270,000 (Peccia & Associates 1993). The Park Service would assist in seeking funding for these improvements.

City Revenues. The city revenues generated onsite under alternative A would total $4,257,000 from all sources in the year 2000 and $3,628,000 in the year 2010. Because many of the revenue sources would depend on the square footage used for different business activities, there would be a decrease between the two periods as available square footage was reduced. Table 34 summarizes individual sources of

TABLE 34: CITY REVENUES FROM ALL SOURCES - ALTERNATIVE A

Revenue*	2000	2010
Property Tax**	$1,485,000	$1,488,000
Sales Tax	$626,000	$565,000
Business Tax	$575,000	$524,000
Hotel Tax	$464,000	$464,000
Other	$1,107,000	$587,000
Total	**$4,257,000**	**$3,628,000**

*All revenues are expressed in constant dollars.
**This tax may not be applicable.

tax revenue for each of the two periods. Property tax revenue would account for the largest share. No tax revenues were granted by the military base, so these taxes would be a new revenue source for the city.

Public School Enrollment. Under alternative A 420 children living at the Presidio would be enrolled in San Francisco public schools in the year 2000. As the population decreased by 2010, 140 children would be enrolled in public schools. The year 2000 number of children would be 0.64% of the total San Francisco school enrollment and would decline to 0.22% by 2010. The short-term demand on public schools would be less than half the Army base demand in 1990, the long-term demand would be less than 20% of the 1990 demand.

According to the structure of the public school finance system in California, San Francisco school district revenue limits are established annually by the state Department of Education, based primarily on average daily attendance. If a school district's property tax revenue allocations do not parallel the changes in enrollment, the state will adjust its contribution of operating revenues so that the local school district is funded to its new revenue limit. In this way, as enrollment changes, the amount of money available to the district on a per student basis remains constant, except for cost of living adjustments. Because of this school financing arrangement, it is not expected that minor changes in enrollment because of changes in Presidio occupancy would have a significant impact on school district operations in terms of funding (Jones & Jones 1993a).

Because the number of school-aged children from the Presidio enrolled in public schools would be smaller than at present, the demand on school facilities would be slightly reduced. There would be about 1,014 school-aged dependents in 2000 and 942 dependents in 2010 attending schools in the region; this is less than one-third of the dependents enrolled in schools under Army use of the Presidio.

Conclusion

Under alternative A the city would be reimbursed $744,000 annually for provision for water and wastewater services by the year 2010. Services would not place an additional burden on city systems because they have the capacity to handle this demand. City stormwater operations would not be affected. There would be no demand on public safety services other than any services that might be provided through mutual aid arrangements. The city would benefit from the potential $3,628,000 increase in revenues from taxes and user fees, if all taxes were applicable.

Transportation-related improvements, including MUNI service, and intersection improvements, would have estimated one-time capital costs of $4,227,000 and annual operating costs of about $110,000. Tax levies and fare revenues would help support these improvements.

Presidio schoolchildren would constitute a very small percentage of the total San Francisco school enrollment. The children would likely attend schools throughout the area, and the public school system could adequately provide the needed services. This would not cause an increased burden on city finances.

Cumulative Impacts

The Presidio would contribute in a minor way to the tax revenues currently being generated in the city and would therefore have a minor cumulative effect on city revenues. The Presidio demand on city services, when added to the demands of other national recreation area projects, would have a minor cumulative effect. The cumulative effect of other Bay Area projects is unknown at this time.

Impacts on Housing

Methodology

For the baseline condition, it was assumed that the existing 1,184 housing units and approximately 1,415 dormitory beds (some two or more to a room) were fully occupied; for this analysis, one dorm bed per room was assumed. The impacts of reuse were compared to this baseline. About 4,700 military personnel and dependents lived in Presidio housing; they included active-duty Army and some Navy personnel working at bases in San Francisco, the East Bay, and Marin County. Civilian employees were not eligible for housing on the post. It is the goal of the National Park Service to arrange for reuse of Presidio buildings to minimize the period of vacancy during the transition from management by the Army to management by the National Park Service.

The analysis also assumed that a portion of the Presidio housing units would be reserved for use by Army or other military employees. Most of these employees would be working offsite in the Bay Area, but some of them would be based at the Presidio as part of the Sixth Army contingent. Presidio-based Army employees were considered as part of the total projected Presidio staff in future housing demand estimates.

The calculations used in determining future housing use and estimating future housing demand are included in appendix C. The comparative tables (tables 21 and 22) showing the results of the analysis are included in the "Summary Tables from Environmental Analysis" section. The information is the analysis is based on the *Presidio Planning Socioeconomic Analysis Technical Report* (Jones & Jones 1993a).

Analysis

Housing Stock Use. Tables 21 and 22 indicate the amount of Presidio housing that would be removed or reused under each of the alternatives and how the reused housing would be allocated. Under alternative A a total of 1,132 units and 741 dormitory beds would be used by the military, NPS staff, partner/tenant staff, and guests through the year 2000; 52 units would be removed before that time to restore natural areas and enhance the cultural landscape. Of the reused housing, 301 units would be available to NPS staff and employees of park partners, 150 units would be used by Presidio-based Army employees, and 596 units would set aside for interim use by the military. Interim military housing and 90 of the units used by NPS/park partner staff (686 units total) would be phased out and removed between 2000 and 2010. The phase out of military housing would be scheduled to coincide with moves associated with the normal rotation of military personnel so that no families would be displaced. There would be 446 housing units remaining in 2010. Eighty-five of these units would continue to be used as guest quarters, leaving 361 housing units available for persons working at the Presidio, including 150 units for Army staff.

Barracks and dormitories would be reused as lodging for the conference facility, housing for youth employment and similar programs, or housing for staff use. A total of 674 dormitory beds would be removed by the year 2000, leaving a balance of 741. Of these, 486 would be reserved for visitor or guest use, and 255 beds would be used by NPS and park partner staff. Because the dormitory beds were not presumed to be occupied during the baseline period, the dormitories could be removed or converted without displacing residents.

Although the Park Service is not considering placing Presidio housing on the open market, the planned reduction of Presidio housing was compared to local and regional housing reductions to provide a benchmark for understanding the level of effect. Presidio housing would be reduced by a total of 738 housing units by 2010. This would reduce the Bay Area housing stock by 0.03% (3/100 of 1%) over the 1990 level. For San Francisco the reduction would be 0.23% (1/4 of 1%) of the 1990 level. Assuming that the 1980–1990 demolition rate in San Francisco of 170 unit per year continued, the removal of 738 housing units from 1995 to 2010 would be equivalent to 29% of the total demolitions during the implementation period. Between 1980 and 1990 the rate of new housing construction in San Francisco averaged 1,582 units per year. Assuming that this rate continued, the 738 units would equal 3.3% of the new housing constructed from 1995 to 2010.

Housing in Golden Gate National Recreation Area is used primarily by the military and former owners with reserved use rights. There is limited use by park staff and park partner employees and some guest dormitory use, including hostel and educational program use. Park housing, excluding that at the Presidio, consists of 18 permanent staff housing units and 22 dormitory beds for seasonal staff (40 employees). Currently, this housing accommodates about 10%-13% of the almost 300-member staff. In the future, if the total park staff increased by the 347 positions needed at the Presidio (to about 650 people), about 15% of the national recreation area staff could be housed within the park in existing housing and the 60 Presidio units proposed for NPS staff use. Park partner staff, who are currently allocated only a few (less than five) residences, would have 150 units available to them at the Presidio.

Up to the present, Presidio housing has not been open to the civilian work force, who represent about 60% of Presidio employees. The military occupies 166 housing units at Forts Mason, Barry, and Baker, or almost 70% of the existing housing stock in the national recreation area excluding the Presidio. Under alternative A the Sixth Army would occupy 150 of the Presidio's housing units, and other military personnel would use Presidio housing for an interim period, ending between 2000 and 2010. Until temporary military housing was phased out, military personnel would occupy 65% of Presidio housing units. It is assumed that they would pay market value rents.

Housing Demand Estimates. Under alternative A the housing demand created by Presidio employment would be 1,871 housing units in 2000 and 1,739 housing units in 2010 (see table 23). The Presidio housing stock would meet about 38% of potential employee housing demand in 2000 and 35% in 2010. (Between 2000 and 2010 the number of units available for persons working on the Presidio would decrease from 451 to 361 units.)

Some of the new demand on regional housing might replace existing Presidio-related military and civilian demand. The new demand because of Presidio employment would be 428 units in 2000 and 438 units by 2010 (see table 24). By 2010 the demand would be about 175 units in San Francisco (or about equal to 1% of new housing construction between 1980-1990), 158 units in north of the bay, and 105 units on the peninsula and in the East Bay.

Some households expected to occupy Presidio housing would be classified as requiring low to moderate income housing according to HUD income guidelines. Because most of the average wages projected for Presidio jobs would likely be low and moderate income — both for NPS and park partner staff — housing for a variety of income levels would need to be available onsite and housing removal could cause a loss of affordable housing units. The practice of adjusting rents to ensure affordability might be applied at the Presidio to allow households with lower incomes to consider onsite housing.

Conclusion

Under alternative A a total of 706 housing units and dormitory beds would be available for employees in the year 2000, and a total of 616 would be available in 2010. About 35% of employee demand for housing could be accommodated on site in 2010. A total of 738 housing units would be removed, and 674 dormitory beds would be removed or converted to other uses; 85 units would be used for overnight guest accommodations.

By 2010 Presidio employees would create a housing demand of about 175 housing units in San Francisco and a total regional housing demand of 438 units. Housing at the Presidio would only support the needs of the park community, much as it has supported military use in the past. Considering the total housing stock of the Bay Area and city of San Francisco, the reduction in housing at the Presidio, the use of Presidio housing for park purposes, and the potential housing demand created by Presidio employment would not have significant effects on the regional housing market.

Cumulative Impacts

The Presidio housing demand would be a small portion of the employment-related housing demand increases in San Francisco and the Bay Area. Similarly, the reduced Presidio housing stock would be a small portion of the total housing stock in the city and region. However, given the short supply of affordable housing in the city, there would be an adverse cumulative impact from removing comparatively affordable housing stock at the Presidio.

Impacts on Health Care and Medical Research

Methodology

The methodology and analyses presented here are based on information in the 1993 *Presidio Planning Socioeconomic Analysis Technical Report* by Jones & Jones.

For the baseline condition, it was assumed the Army had vacated the Letterman Army Medical Center (LAMC) and that the impacts on health care for military staff, dependents, and the Bay Area health care system had already occurred; those impacts were discussed in the Army base closure FEIS (USACE 1991). (A fully occupied LAMC building was used as the baseline for some of the other impact analyses, including transportation and employment.) The Letterman Army Institute for Research (LAIR) was assumed to be an active research facility. The Public Health Service hospital facilities were assumed to be inactive and vacant.

Analysis

Letterman Army Medical Center and Letterman Army Institute of Research. The overall impact on the military of closing the Letterman facilities was described in the Army base closure FEIS as follows: "Closure of the Presidio would result in one unavoidable significant impact: increased costs of medical care for military retirees and their dependents now served by LAMC." This impact would occur before the baseline condition was established.

Under alternative A the Letterman Army Medical Center (LAMC) would be removed and the Letterman Army Research Institute (LAIR) would be leased to a tenant or tenants for reuse as a research facility. Removal of LAMC would not negatively affect the availability of acute-care hospital beds in San Francisco or the Bay Area because there is already an oversupply of acute-care beds. However, the hospital would not be available for other potential medical uses such as a specialized hospital or a long-term chronic care facility, for which there is an unmet demand. It would also not be available for reuse by the Navy or the Veterans Administration, both of which have expressed interest in moving to the facility. Removal of the hospital would reduce the options of the Navy and VA in finding alternatives to their facilities, which are considered outmoded.

Although the specific impacts of reusing LAIR cannot be identified without a reuse proposal, general impacts are described below to indicate a range of possible consequences. Additional analysis would be conducted after proposals were submitted.

The LAIR facility would meet many of the needs of the tenant for medical, life science, and/or earth science research space. Because many hospitals with medical research programs in San Francisco have space needs, the facility would help satisfy those needs and would not constitute duplication. Medical or other scientific research programs at LAIR would be easily accessible to nearby complementary facilities. There would also be indirect benefits to patients and to medical science from the research conducted at the facility.

Depending on arrangements with the staffs of existing hospitals and research institutions, there would be benefits to those institutions from interaction and cooperation with LAIR researchers. The research facilities would attract scholars and students as well as grant funds, increasing the potential for employment and increased economic activity.

The research facility might lead to spin-off companies in the Bay Area with applications of medical, life science, or earth science research. For example, two major biotechnology firms have developed as an outgrowth of research done at the University of California at San Francisco in the biological sciences.

Public Health Service Hospital. The former Public Health Service hospital is currently vacant and outside the boundary of the park. A number of reuse options and their impacts for the facility were described in the Army base closure FEIS. The general impacts of its reuse are described below; additional analysis would be conducted when a tenant was selected.

Under alternative A the hospital complex would be included in the park boundary and developed by a private or nonprofit partner as a residential/educational and conference center. Its development as a residential/educational and conference center would not affect the existing supply of acute-care hospital beds in the Bay Area for two reasons: It is currently vacant, and there is an oversupply of acute-care beds in San Francisco and the Bay Area. Development as a conference center would preclude the hospital's use as a long-term health care facility, and a need for such facilities has been identified in San Francisco (Baxter 1991).

The city of San Francisco holds a lease option authorized by Congress for use of the Public Health Service hospital until 1998. To date, it has not allocated funds to exercise this option to establish a long-term chronic care facility (City and County of San Francisco [CCSF] 1993). If the city did not release this option, federal legislation might be required to revoke the option and release the property before the expiration date.

Conclusion

Alternative A would have a positive impact on medical, life science and/or earth science research in the Bay Area by providing needed research space at the LAIR facility. The Letterman and Public Health Service hospital sites would be precluded from use as long-term health care facilities, which would have an adverse effect. There would be no impact on acute care facilities.

Cumulative Impacts

Research efforts at the LAIR facility would contribute to medical and life and earth science knowledge and discovery in the Bay Area. There would be no cumulative impacts on acute care facilities under this alternative; however, the military closure of LAMC, combined with other recent closures (e.g., the Oak Knoll Naval Hospital), would have an adverse cumulative impact on health care for military retirees.

Impacts on Medical Aid Incidents

Methodology

In 1991 there were 279 emergency ambulance runs from the Letterman hospital (USACE 1991). In fiscal year 1992 (September 1991-August 1992) the Presidio Fire Department responded to 236 medical aid incidents on the Presidio (Jones & Jones 1993b). About one-third of these incidents were treated on the scene, and two-thirds required transport to a hospital.

To estimate the medical aid incidents that would require transport in the future and examine potential demand at hospital emergency rooms, numbers were calculated based on the fire department's one-third/two-thirds estimate. The number of such incidents involving employees and visitors was determined based on data from the fire department that in FY 1992 two-thirds of the incidents were from these sources; one-third of the incidents were from housing on the Presidio.

Forecasts for medical aid incidents requiring transport were made using projections of increases in visitor use in the years 2000 and 2010. Forecasts of medical aid incidents for housing were made using the projected number of housing units. For example, under alternative A there would be a decrease in housing units in 2000 to 95% of the current amount and a total decrease in 2010 to 37%. These percentages were applied to the number of medical aid requests requiring hospital care in the baseline period, FY 1992. The total number of medical aid incidents that required transport in FY 1992 was 158.

Analysis

Under alternative A the total number of medical incidents requiring hospital care would increase to 219 by 2000 and 246 in the year 2010 (see table 25). This would be an increase in 2000 of 61 incidents over the baseline year of 158 incidents and an increase of 88 incidents in 2010 over the baseline year. The increased number of incidents would not be significant. Cases would probably be distributed among area hospitals, and the existing hospital emergency medical care system throughout the city could adequately provide the needed services. Some patients might be uninsured and therefore might use San Francisco General Hospital. See the "Impacts on Management and Operations" section for additional information.

Conclusion

The increase in the number of medical aid incidents would amount to about one medical incident requiring hospital care every sixth day by the year 2000 and one every fourth day by 2010. This increase would not be significant, and cases would be distributed among area hospitals.

Cumulative Impacts

The increase in medical aid incidents requiring hospitalization would have an insignificant cumulative impact on area hospital services.

Impacts on Traffic and Transportation Systems

Methodology

The analysis of traffic and transportation impacts is based on information in the 1993 *Presidio Transportation Planning and Analysis Technical Report* prepared by Peccia & Associates. Future traffic and travel conditions were analyzed based on proposed building and land uses under each of the Presidio management alternatives. The modeling process assumed full use of all proposed facilities in the years 2000 and 2010; thus, the traffic models illustrate worst-case traffic conditions based on proposed uses. The use data was combined with other information and statistics, and preliminary trip productions were estimated for all future models, assuming no change in the proportions of vehicle, transit, bicycle, and pedestrian travel. The baseline year ("existing conditions" model) used for impact comparison was 1988, when the Presidio was still under Army management and the transition had not yet begun; traffic volumes were studied that year.

Once preliminary trip productions were established, future changes in non-auto travel were estimated. This was accomplished by assessing the impacts of expanded transit service, improved bicycle and pedestrian facilities, limited parking, and other proposed transportation system management (TSM) measures. These measures would be employed to varying degrees under all of the alternatives to shift travel from the private automobile to any of the other modes, thereby reducing associated pollution, congestion, noise, and other environmental impacts. This assessment resulted in revised transportation mode estimates for travel to and from the Presidio as well as for trips of more than a few blocks within the Presidio.

After the estimates for trips shifted from autos to other modes of travel were developed, they were subtracted from the preliminary trip production estimates. The alternative mode use estimates were conservative, so only modest gains

resulted. The computer modeling was then completed, resulting in estimated vehicle trips, or average daily traffic, on major roadways within the Presidio with transit and other alternative-mode travel improvements in place. Once these forecasting steps were completed, the effects of parking changes and intersection capacity were evaluated. The details of transportation mode and vehicle trip modeling as well as parking and intersection capacity analysis are included in appendix C.

The traffic and transportation analysis also included an assessment of the effects of the proposed Doyle Drive (Highway 101) reconstruction project on the Presidio and the effects of Presidio-bound traffic on future Doyle Drive conditions. This was a preliminary assessment, as decisions about the final design of Doyle Drive have not been made. Further impact analysis for the project would be carried out by Caltrans in partnership with other involved agencies as the project progressed. The methodology used in completing the preliminary assessment is also included in appendix C.

Analysis

Impacts on Presidio Traffic and Roadways. The following sections summarize the impacts of alternative transportation use, traffic volumes, parking changes and improvements, and Doyle Drive reconstruction on traffic levels and patterns within the Presidio. Presidio traffic volumes do not include Highway 1 and 101 traffic.

Impacts of Alternative Transportation Use — The transportation use estimates in this section are based on the phased implementation of the following services and incentives: transportation hubs for bus transfer at the main post and the Golden Gate Bridge, with information and pass sales services; extension of MUNI lines 41/45, 29, and 43 to the main post transportation hub; a Presidio shuttle bus; a military shuttle bus to off-Presidio work locations; a water taxi service; parking limitations and restrictions; roadway, trail, and sidewalk improvements; and tenant requirements to support TSM proposals. As shown in the estimates, some increases in transit, pedestrian, and bicycle use based on new transportation services would be substantial, although only a few percentage points in mode share would be gained.

The recommendations and costs of extending MUNI lines within the Presidio are discussed in the "Impacts on City Services" section. The costs and potential routes of park shuttle bus and water taxi service are discussed in the "Impacts on Management and Operations" section.

Table 26 shows the projected daily transportation mode shares, estimated in person trips, for weekday and weekend use. Person trips for automobile use were calculated by multiplying the total vehicle trips, or average daily traffic (ADT), times 1.5 persons. Internal and cut-through traffic were not included in these calculations; the "Impacts of Traffic Volumes at Presidio Entrances" section contains the estimates of total vehicle trips including internal and cut-through traffic.

Year 2000 projected weekday travel into and out of the Presidio is estimated at 94,200 person trips per day. The weekday transportation mode split would be similar to that in 1988 and would reflect partial implementation of improvements for nonauto travel, which would keep pace with projected growth during the period. Auto use would remain at 79% of weekday travel, climbing from 56,000 to 73,900 person trips per day. Transit use would account for about 9% of weekday travel, increasing from 6,900 to 8,900 trips per day. Bicycle and pedestrian use would account for about 12% of weekday travel; the number of these trips would climb from 8,100 to 15,800 trips per day.

Year 2000 projected weekend travel in and out of the Presidio would be about 100,500 person trips per day. The weekend transportation mode split would also remain essentially the same as in 1988, with overall increases in volume. The weekend auto share would be 72% of total travel, increasing from 50,800 to 72,000 trips per day. Transit shares would remain constant at 6% of the daily travel, climbing from 4,300 to 5,900 trips per day. Bicycle and pedestrian travel shares would account for about 22% of travel, increasing from 15,800 to 22,600 trips per day.

By the year 2010, additional improvements for nonauto travel would be in place, resulting in corresponding shifts in the Presidio's mode split. Weekday travel into and out of the Presidio would reach an estimated 117,800 person trips per day. The share of travel by autos would drop to 74% of daily travel, with about 87,300 trips per day. Weekday transit use would climb to 13% of the total, with about 14,900 trips per day. Bicycle and pedestrian shares would remain relatively constant at 13% of travel, climbing to 15,600 trips per day.

The 2010 mode split for weekend conditions would also improve over baseline and year 2000 conditions. Of the estimated 127,700 total person trips per day, auto travel would be reduced to 66% of daily travel, with 84,100 trips per day. Weekend transit travel would climb to 10% of the daily total, with about 13,300 trips per day. Weekend bicycle and pedestrian travel would be about 24% of the daily total, climbing to 30,300 trips per day.

By the year 2010 the Presidio would generate as many as 8,000 additional person trips daily on MUNI, Golden Gate Transit, Presidio transit services, and other transit lines. This would eliminate some potential auto trips and increase fare revenues on underused lines. However, heavily patronized lines would be more crowded and might have to increase service during peak travel periods. The costs for additional service would be supported by tax levies and fares collected by the city, some of which would be generated by the Presidio. The additional growth in transit ridership would eliminate about 5,800 potential auto trips each weekday and about 4,300 auto trips each weekend day. Overall transit use would increase 114% on weekdays and 212% on weekend days by 2010.

More optimistic estimates of public transit ridership were derived to illustrate other possible futures. With more extensive implementation of transit and water taxi services such as extending service times, the mode split could shift even more toward alternative transportation modes, with 72% auto travel, 15% transit, and 13% pedestrian/bicycle use of weekdays and 63% auto, 13% transit, and 24% pedestrian/bicycle use on weekends. If F-line service was ever extended from the Embarcadero to the Presidio, these percentages could change to 68% auto, 18% transit, and 14% pedestrian/bicycle on weekdays and 58% auto, 17% transit, and 25% pedestrian/bicycle on weekends.

By the year 2010 the Presidio would also generate about 7,500 additional pedestrian and bicycle trips each weekday and 15,000 additional pedestrian and bicycle trips each weekend between the park and surrounding neighborhoods. With additional bicycle rentals and other support facilities in place, this growth would have few if any negative impacts and would eliminate some potential auto trips. Total pedestrian and bicycle use would increase by 92% on both weekdays and weekend days by the year 2010.

Because of the transit services and incentives that would be put in place at the Presidio and in the region and the resulting shift in the transportation mode split at the Presidio, auto-related congestion and noise and air pollution would not increase as quickly or as much as they would otherwise. The reduced growth in auto traffic would also allow roadway, intersection, and parking system improvements to be phased in as park uses were established and visitation increased.

Impacts of Traffic Volumes — This section analyzes the effects of average daily traffic (ADT) volumes on Presidio roadways. Traffic volumes have been calculated for all major Presidio entrances, or gateways; the estimates are in vehicle trips rather than person trips, which account for more than one person per vehicle, and they include internal and cut-through traffic. Highway 101 and 1 traffic volumes are not included in the Presidio traffic volumes.

Table 27 and figures C-1 through C-9 in appendix C show the baseline and projected p.m. peak and average daily traffic volumes at major Presidio entrances. Total ADT volumes through Presidio gateways in 1988 were 50,400 vehicles per day (vpd) on weekdays and 46,700 vpd on weekends. Traffic models for alternative A indicate that the Presidio's weekday gateway ADT would increase by 26.5% to 63,800 vpd by the year 2000 and weekend gateway ADT would increase by 34% to 62,500 vpd during the same period. In comparison, year 2000 projections for continued military use of the Presidio (the "no-NPS" scenario) indicate that gateway traffic would increase 13% (56,960 weekday ADT, 52,770 weekend ADT) by the year 2000. Thus, alternative A park uses would generate 13.5% of the increase in daily gateway traffic on weekdays and 21% on weekends. Weekday ADT would likely continue to be higher than weekend ADT because there would be more commuter and business-related traffic in addition to recreational traffic.

By the year 2010 weekday gateway ADT would total 74,300 vpd and weekend gateway ADTs would total 72,000 vpd. These projected traffic volumes reflect total increases of 47% over existing weekday conditions and 54% over existing weekend conditions. Continued military use projections under the no-NPS scenario would result in a weekday increase of 23% (62,500 weekday ADT) and a weekend increase of 25% (57,910 weekend ADT). This indicates that alternative A park uses would generate 24% of the increase in daily gateway traffic levels on weekdays and 29% on weekends.

As indicated by the ADT projections, alternative A weekend volumes would be similar to weekday volumes, with slightly higher volumes along the coast and at the Golden Gate viewing area and lower volumes elsewhere. Weekend traffic volumes would peak at different times than on weekdays, but they would generally cause the same roadway impacts as weekday traffic.

The models for alternative A indicate that traffic volumes on Lincoln Boulevard (near the main post), Lombard Street (within the Presidio), and the Anza Street extension (replacing Halleck Street) could reach the two-lane road capacity by the year 2000, requiring four-lane sections to be added on these roadways by the year 2010. Traffic signals, additional turning lanes, and access control measures would also become necessary at several intersections along these roadway segments.

Traffic volumes on Lincoln Boulevard (along the west coast), old Mason Street, and Presidio Boulevard would reach the upper limits of the roads' capacities for desirable driving conditions as two-lane roadways by the year 2000. At projected traffic levels the roadways would be busy throughout daytime and evening hours, with increased congestion during morning and afternoon peak travel periods. Motorists, bicyclists, and pedestrians would have difficulty crossing or merging with traffic streams on these roadway segments. Traffic volumes on these routes would continue to increase to the year 2010, resulting in increased congestion but not reaching levels that would require construction of additional traffic lanes. Intersection and minor roadway improvements, such as traffic signals and turning lanes, would be necessary to maintain satisfactory operating conditions along these routes by the year 2000 and would become essential as traffic volumes grew to projected 2010 levels.

Traffic volumes on other roadways throughout the Presidio would grow in similar proportions to the growth on major routes. With lower overall traffic volumes, however, these roadways generally would not require significant improvements to maintain acceptable levels of safety and convenience in most locations. Some problem areas and busy intersections would require improvements to satisfactorily accommodate the projected traffic loads.

A level of service (LOS) analysis was completed for nine intersections within the Presidio using the service ratings established by the Institute of Transportation Engineers in the 1985 *Highway Capacity Manual* (see table C-1 in appendix C). The analysis indicated that each of the intersections has at least one turning movement that would fall to a marginal or unacceptable level of service by the year 2010, as shown in table C-4. Accordingly, safety and circulation improvements are recommended these intersections to eliminate the problems. These improvements, which might include adding turning lanes, realigning intersections, or installing traffic signals, are expected to bring the intersections up to an acceptable level of service (level of service B). Minor improvements could be made to improve conditions before more costly solutions became necessary. Cost estimates for these intersection improvements are included in the site development costs.

Impacts of Parking Changes — Alternative A calls for extensive parking system improvements. Nearly 40% of the available parking spaces at the Presidio would be removed, reducing its parking supply from 13,030 to 7,645. This would entail reconfiguration of existing parking as well as additions and removals, for a net reduction of 5,385 spaces.

Changes to the Presidio's parking system would reduce the number of available spaces while simplifying and better defining parking areas, locating them where needed, and eliminating the oversupply. Parking in neighborhoods around the Presidio's perimeter would not be affected by Presidio parking demand. Presidio parking would accommodate average daily parking demand under normal conditions, with only minor shortages during peak periods. Most of the parking reductions would be in interior locations; as a result, parking spaces would be harder to find in some of these areas during peak periods, especially where transit service was concentrated. Long-term parking would generally be around the outer edges of developed areas, making it less convenient to drive and easier to use alternative modes of travel. Adequate short-term, service, and disabled-access parking would continue to be provided in convenient locations. U.S. Park Police would enforce parking restrictions and regulations.

The removal of parking would achieve several goals. Improvements would increase traffic, bicycle, and pedestrian safety by reducing confusion, conflicting maneuvers, and congestion on or near busy streets and intersections. The historic, natural, and recreational values of certain areas would be enhanced where intrusive parking was removed, especially areas with sensitive resources that would be adversely affected by easy access and use by large numbers of visitors. Planned parking improvements would increase visitor convenience by placing parking areas near activity centers and would make areas more accessible because they would conform to parking requirements of the Americans with Disabilities Act. The net reduction in parking would correspondingly reduce maintenance costs.

Incentives for alternative-mode travel combined with limited available parking within the Presidio would continue to shift the mode split toward alternative transportation. In time, parking demand should decrease because of the mutual actions of transit agencies like Golden Gate Transit and the city's MUNI service to increase transit opportunities and transfer capabilities at the main post and Golden Gate Bridge transit hubs. However, adequate parking would be provided just inside the Presidio boundaries to ensure that nearby neighborhoods were not adversely affected by Presidio parking demands. Issuing city permits for neighborhood parking around the perimeter where they are not already in use would also dissuade visitor parking outside the Presidio boundary.

Special event parking would be accommodated in part by temporary parking areas on Crissy Field. However, larger special events would need to be planned to

take advantage of permanent parking spaces during off-peak periods because the parking system would not be designed to accommodate the peak demands of general and event visits simultaneously. Event coordination between staff of the Presidio, the city of San Francisco, Fort Mason Foundation, and the Exploratorium would reduce concurrent demand for available parking spaces. Exploratorium parking might be expanded to reduce the demand deficit as the Exploratorium increased activities. The need for 800 parking spaces to support that facility was factored into the parking demand analyses.

Restrictions on parking along some streets and outside of planned parking lots would generally reduce the number of accidents related to parked or parking vehicles.

Impacts of Doyle Drive Reconstruction — Proposals for the new Doyle Drive include rebuilding the section through the main post, Crissy Field, and Letterman areas. Design features would emphasize the Richardson/Lombard corridor as the primary Highway 101 through-route. Access to and from Marina Boulevard might be provided at a new interchange in this area; direct access to and from the Presidio might be combined with the Marina Boulevard connection or served by a separate interchange. Other features under consideration include the options of rebuilding the new roadway through the main post/Crissy Field area on an elevated structure as it is now, at-grade, or in a cut-and-cover section.

Reconstruction of Doyle Drive would cause serious disruptions to traffic flow within the Presidio throughout the construction period. Unless extensive measures were taken to provide Presidio connections across the Doyle Drive corridor during construction, it would effectively sever the east end of Crissy Field from the rest of the Presidio. The only remaining access would be to the west end of Crissy Field via McDowell Avenue and Crissy Field Avenue.

Construction activities would probably require the use of Crissy Field for up to three years for traffic detours and construction staging, temporarily reducing its capacity for recreational use. These factors would have impacts on Crissy Field's recreational and environmental qualities that would have to be addressed by Caltrans. Marina neighborhood streets would also probably experience additional congestion during construction.

Doyle Drive reconstruction would temporarily decrease air quality and increase noise in and near the Presidio. Appropriate mitigating measures for these impacts would have to be identified in Caltrans' environmental analysis for the project.

After reconstruction was complete, the new Doyle Drive might have continuing impacts on the Presidio's noise and air quality. Options that call for lowering the elevated structures might cause more noise and a greater impact on air quality at ground level on either side of the highway. Options that call for cut-and-cover treatments would reduce these impacts along the cut-and-cover segments, although the tunnel designs would need to incorporate air circulation and possibly appropriate ventilation systems. Noise levels would be higher for motorists within any tunnel segments. and noise and air quality impacts might be intensified at the ends of the cut-and-cover segments and at ventilation outlets.

The effects of Doyle Drive reconstruction on Presidio resources would include use of land for the right-of-way. Preliminary designs indicate that an additional 5-20 acres of Presidio land would be used for the roadway, depending on the number of lanes and parkway design and engineering specifications. Also, a substantial number of trees and about 15-35 buildings would need to be removed under the various reconstruction scenarios. Some of these are nonhistoric buildings slated for eventual demolition, e.g., utility structures on Crissy Field, but about 4-20 historic buildings would be involved, and federal cultural resource compliance procedures would have to be completed to permit removal. Archeological resources might also be affected. Under most of the scenarios it is possible that a riparian corridor to feed Crissy Field wetlands could be reestablished if incorporated into the roadway design and engineering project. Public transit access to the Presidio and the Exploratorium/Palace of Fine Arts could be improved under any of the design scenarios. Access through neighborhoods could be prevented by redirecting auto and bus traffic to major routes.

Traffic modeling indicates that after Doyle Drive reconstruction was complete, about 50%-70% of traffic entering the Presidio at its Lombard Street entrance would shift to Richardson Avenue to use the new Doyle Drive access (up to 10,000 vehicle trips per average weekday). This would effectively eliminate a serious capacity problem that is forecast for the Lombard entrance without the new Doyle Drive access. In addition, improvement of the intersection and access to the Presidio would raise the LOS on the highway from level F to level D during the 2010 p.m. peak hour. The traffic shift would reduce traffic volumes along Presidio Boulevard and Lincoln Boulevard from Lombard Street through the main post area by roughly 50% in 2010. It would also reduce Presidio Boulevard traffic between Funston Avenue and Lincoln Boulevard by about 25%. These reductions would eliminate the extreme congestion of the Lombard Street section between Richardson Avenue and Presidio Boulevard and would relieve congestion on the

other roadway segments. Marina Boulevard and Mason Street traffic volumes might show recreational traffic increases. Gorgas Avenue traffic volumes would remain stable since the avenue already has access to Doyle Drive.

Because of the new interchange, Doyle Drive would provide a connection for internal circulation between the main post/Crissy Field areas and the Fort Scott/Golden Gate Bridge areas. As a result, internal traffic might be shifted onto Doyle Drive and off several local Presidio roadways.

The new access to Doyle Drive would create additional cut-through traffic on Presidio and Arguello boulevards, serving parts of the Richmond district, Pacific Heights, and Presidio Heights south of the Presidio. It would increase traffic volumes on the two routes and through the main post. Sections of Presidio Avenue and Arguello Boulevard outside of the Presidio might have less reserve capacity to absorb traffic increases because of their location in a densely population area of the city, and intersection signals might be warranted.

The new access to Doyle Drive might cause some traffic to divert away from the Lincoln Boulevard and north 15th Avenue entrances onto Park Presidio Boulevard. Motorists traveling between the main post and Crissy Field areas and neighborhoods south of the park near the shore (such as the western portion of the Richmond district) would be able to use the new interchange via Highway 1 and Highway 101 rather than traveling on local streets through the Presidio. If all connections between Highways 1 and 101 were maintained, this would improve projected traffic conditions on Lincoln Boulevard as long as travel times on the highways were shorter than travel times on the local streets.

Traffic flow at the Presidio would be affected by whether combined or separate Marina Boulevard/Presidio access was provided and whether the new interchange accommodated entering and exiting movements in all directions. Computer modeling results show that about 15,000 vehicles per day would travel across (under) the Doyle Drive corridor near the main post in 2010. This movement would be more conveniently accommodated by separating it from Marina Boulevard traffic. Models used for both combined and separate access included a Girard Road extension to old Mason Street that had at-grade intersections with Richardson Avenue and old Mason Street. The Girard extension was included to achieve two goals. First, it would extend the city-street character of the Richardson Avenue portion of Highway 101 to a point farther into the Presidio, which is considered desirable because it would slow travel speeds on Richardson Avenue just east of the Presidio boundary. Second, extending Girard Road across the Doyle Drive corridor would provide additional access between the main post, Crissy Field, and the Palace of Fine Arts.

Two alignment options are being considered by Caltrans to make the connection from the bayfront section of Doyle Drive to the city section of Highway 101 on Richardson Avenue and Lombard Street. The present alignment, Richardson Avenue, is between and behind the Palace of Fine Arts and the Gorgas Avenue warehouses. One design option is to move the roadway closer to the rear of the warehouses; the other, suggested by neighborhood groups, is to use Gorgas Avenue for the highway alignment to reduce roadway impacts on one or more blocks of Richardson Avenue residences.

The portion of Gorgas Avenue under design consideration is a historic industrial streetscape within the national historic landmark district. Section 4(f) of the Federal Transportation Act prohibits use of park land or land from a historically significant site for transportation projects unless it is determined that there is no "prudent or feasible alternative" and that "the proposed action includes all possible planning to minimize harm to the property resulting from such use." Because there is a prudent and feasible existing alignment, alternatives to that alignment would probably not be granted under section 4(f). Additionally, the Gorgas Avenue alignment would require the addition of a complex curve to the highway at the high-volume intersection of Gorgas and Richardson avenues and Francisco Street.

A Caltrans proposal discussed as an option for Doyle Drive reconstruction called for eliminating intracity connections between Highway 1 to/from the south and Highway 101 to/from the east. This would remove about 18,000 vehicles from the Doyle Drive/Park Presidio Boulevard (Highway 1) system each day, forcing these vehicles onto other routes such as Geary Boulevard or California Street to make this connection. It is expected that 40-70% of these vehicles would travel through the Presidio. This new cut-through traffic would affect travel volumes on Presidio, Arguello, and Lincoln boulevards, contributing to undesirable congestion throughout the park.

Impacts on the Local and Regional Transportation Network. The local and regional transportation network would also be affected by future Presidio-generated traffic and by changes to Doyle Drive. Following are the projected effects under alternative A.

Level of service summaries indicate that additional traffic generated by the Presidio under alternative A would have some effect on intersections just outside of each of its major gateways (see table C-3). Two intersections associated with Doyle Drive — the Mason Street/Marina Boulevard and Lombard Street/ Richardson Boulevard intersections — would fall to unacceptably low levels of service by the year 2010, primarily due to high volumes of through traffic on Highway 101. Both of these intersections provide access to and from the Presidio, which would be hindered by congestion at their predicted levels of service. Improvements such as signing and turning lanes are recommended for the intersections to provide simpler and easier Presidio access while maintaining acceptable operations in the intersections. These improvements would be dependent on implementation of specific Doyle Drive design features. With the improvements, service at these intersections would be raised to level D during the p.m. peak hour in 2010. The Presidio's contribution to the traffic through the intersections would be less than 10%. Recommended improvements at a third intersection — the Gorgas Avenue/Francisco Street/Richardson Boulevard intersection — would include installation of left-turn lanes that would improve access to the Letterman area. These improvements would raise the level of service to B in the intersection during the 2010 p.m. peak hour.

In addition to the three intersections associated with Doyle Drive, four other intersections around the Presidio's perimeter would be affected by increased Presidio traffic. At least one turning movement in each of these intersections would fall to marginal or unacceptable levels by the year 2010. Improvements are recommended for these intersections to alleviate the predicted problems. Improvements would vary according to the specific characteristics of the intersections.

At the Presidio Boulevard/Pacific Avenue intersection, recommendations call for removing parking at the intersection, adding turning lanes, and eventually adding a signal to improve LOS operation to level B during the 2010 p.m. peak hour. About 90% of the traffic through this intersection would be Presidio-related (going into or out of the site), but much of this (40% or more) would be cut-through traffic to Lombard Street.

Turning lanes and eventually a signal are also recommended for the Arguello Boulevard/Jackson Street intersection to improve the level of service to B. About 75% of the traffic through this intersection would be Presidio-related, although some of this traffic would be bound for the Golden Gate Bridge.

The 15th Avenue/Lake Street intersection level of service would improve because of minor improvements, designating it for outbound Presidio traffic only, and opening the 14th Avenue Gate for inbound traffic. Both the 14th and 15th avenue intersections at Lake Street would be expected to operate at LOS A during the 2010 p.m. peak hour.

Improvements to the Lincoln Boulevard/25th Avenue/El Camino del Mar intersection would include removing parking at the intersection, installing turning lanes, and adding a signal. This would bring the 2010 p.m. peak hour level of service to C. Although about 90% of the traffic would be Presidio-related, 40% or more would be through traffic to the Golden Gate Bridge.

In most cases, intersection problems would not occur until later in the park's development, so improvements would not need to be completed right away. In some cases, minor improvements like restriping and removing parking to add turning lanes could be made to improve conditions before more costly solutions like installing traffic signals became necessary. The costs of the intersection improvements are discussed in the "Impacts on City Services" section.

In addition to local concerns, projected growth in Presidio traffic would affect regional traffic conditions to some extent. Traffic volume estimates indicate that vehicle trips into and out of the Presidio would grow from less than 38,000 vehicle trips per day in 1988 to more than 58,000 vehicle trips per day in the year 2010. Cut-through traffic would add an estimated 10,000 to 16,000 vehicles per day to the traffic generated by the Presidio.

The projected distribution of traffic at Presidio gateways indicates that about 10% of Presidio-related vehicles (or 6,000 vpd) would travel over the Golden Gate Bridge in 2010. This would be about 2,200 vpd more than in 1988, a small portion of the bridge's 120,000+ vehicles per day. About half of the Presidio's new traffic would be at other than normal peak travel periods (mornings and evenings on weekdays, midday on weekends), so it would have little impact on Golden Gate Bridge congestion.

It is estimated that less than 2.5% of Presidio-related vehicles (1,400 vpd) would enter the park on Highway 1 (Park Presidio Boulevard) in the year 2010. The section of this highway that passes through the Presidio currently carries about 60,000 vehicles per day; of these, less than 1,000 are Presidio-bound. If Presidio-bound traffic increased by a projected 400 vpd in 2010 and traffic volumes on Highway 1 stayed at the same levels, park traffic would account for about 2% of Highway 1 traffic.

About 20% of Presidio-related traffic would be traveling to and from the Pacific Heights area or on 15th Avenue, Lincoln Boulevard, and 25th Avenue. This would amount to about 12,000 vpd, or about 4,000 vpd more than in 1988. The Presidio's additional traffic could be expected to have limited impacts on traffic conditions in the Lincoln Boulevard/El Camino Del Mar/25th Avenue intersection and on 25th Avenue as far south as California Street, resulting in slightly more congestion than would occur without Presidio growth. As much as one-half of this traffic might continue on to 19th Avenue, traveling to areas farther south, and as much as one-fourth might continue on to San Mateo County, resulting in slight increases in traffic on this route but not enough to change driving conditions on this roadway.

About 25% of the Presidio's traffic (or 15,000 vpd) would travel on Arguello and Presidio boulevards to and from the Presidio Heights area. This increase of about 5,500 vpd over 1988 levels would result in slightly increased congestion for several blocks south of the Presidio. As much as one-half of this traffic might continue on to 19th Avenue, traveling to areas farther south, and as much as one-fourth might continue on to San Mateo County.

The remaining 45% of Presidio traffic (or about 27,000 vpd) would use Lombard Street and Marina Boulevard to travel between the Presidio, the Marina district, and other parts of San Francisco to the east. An estimated 50% or more of this traffic might continue beyond downtown San Francisco to East Bay cities on the Bay Bridge and Interstate 80 or to San Mateo County on Highway 101.

Presidio traffic volumes peak each weekday morning and afternoon and through most of the midday on weekends in much the same way that they peak on nearby regional routes. As the site was adapted for park use, its total travel demand would increase by over 50% by the year 2010. Part of the projected increase would occur during peak travel periods; however, at least half of the increase would be during off-peak hours. The Presidio's peak period travel demand increases would add traffic to local and nearby regional routes. This would contribute to peak-period congestion on Lombard Street and Park Presidio Boulevard and would have a minor impact on weekday peak-period travel conditions on the Golden Gate Bridge. Weekend traffic growth related to the Presidio would contribute to increasingly congested afternoon travel conditions on the Golden Gate Bridge. Increased congestion on these routes would result in corresponding increases in travel times and auto-related noise and air pollution.

About half of the Presidio's travel demand increases — those related to recreational activities — would add traffic to local and nearby regional routes during off-peak travel periods, when congestion usually is not a problem. As a result, this portion of the Presidio's new traffic would have less effect on travel times and auto-related noise and air pollution.

In July 1992 Caltrans undertook a traffic count on Doyle Drive and its entrance and exit ramps to Highway 1 and the Marina district. The NPS traffic model, based on Caltrans data, estimates that 6,000 vpd, or 7% of Doyle Drive traffic, originates at or is destined for the Presidio. During peak hours the Presidio accounts for 5%-6% of the traffic volume.

Two scenarios were evaluated to determine the effect of Presidio-related traffic on Doyle Drive in the year 2010. The assumptions were that each vehicle trip would be one-way, that the Presidio volumes would include a 1% annual regional growth rate, and that Doyle Drive traffic would not increase from current conditions, as is now the trend. It was also assumed that there would be available roadway capacity to accommodate Presidio traffic; if this was not the case, Presidio volumes would decrease.

Under the first scenario, existing access from Doyle Drive to the Presidio was assumed, and the number of new vehicle trips per day was estimated based solely on the proposed changes in Presidio land uses. Estimates showed that an additional 3,000 vpd would use Doyle Drive to enter or exit the Presidio in the year 2010; therefore, Presidio-related traffic would account for about 9,000 vpd, or 10% of Doyle Drive traffic. The second scenario assumed that a direct Presidio interchange would be constructed on Doyle Drive; new vehicle trips per day were estimated based on land uses changes and on easier access from the highway. Under this scenario Presidio-related traffic was estimated to account for about 16,000 vpd, or 17% of Doyle Drive traffic (13%-16% in the peak hours). The reason for the dramatic difference with the interchange is that two-thirds of the trips, or 7,000 of the 10,000 vpd increase, would be intra-Presidio trips — trips between the main post and the Golden Gate Bridge overlook because of convenience. Only 3,000 vpd would be attributed to new Presidio-bound traffic.

Use of the interchange would result in a decrease in traffic in nearby neighborhoods and at the gates mentioned above. The operational characteristics of Doyle Drive should not be affected adversely by the increase of up to 3,000 vpd coming to the Presidio or the potential internal use of the interchange by up to 7,000 vpd.

The new roadway would have additional capacity with the increase in lane width. The capacity of each lane might be increased by 10%-15%, and other traffic safety features might further increase capacity. If additional capacity was not available, intra-Presidio traffic between the main post and the bridge would most likely use local Presidio roadways rather than Doyle Drive, decreasing Presidio-related traffic on the drive.

Conclusion

Proposed land use changes at the Presidio under this alternative would result in increased travel to, from, and within the Presidio. Planned improvements would reduce the share of trips into and out of the site by auto and increase the share of trips made on transit; the percentage share of bicycle/pedestrian trips would drop slightly, but volumes would increase. As many as 8,000 person trips daily would be added on MUNI, Golden Gate Transit, and other transit lines by 2010. This would eliminate some potential auto trips and increase fare box revenues for underused bus lines; however, heavily patronized lines might be more crowded during peak travel periods. Bicycle and pedestrian trips between the Presidio and surrounding neighborhoods would increase by about 7,500 each weekday and 15,000 each weekend day. This increase would have few if any negative impacts and would also eliminate an estimated 5,800 auto trips each weekday and 4,300 each weekend day. By 2010 total transit use would increase by 114% on weekdays and 212% on weekend days; pedestrian and bicycle use would increase by 92% on both weekdays and weekend days.

Average daily traffic is projected to increase by 29% on weekdays and 24% on weekends by the year 2010 as a result of Presidio land uses changes. The potential for congestion and other impacts related to traffic increases would be highest within the Presidio and near its boundaries. However, most impacts would be avoided by implementing roadway and intersection improvements and correcting dangerous traffic conditions at several locations. Some of the increased auto traffic would be on regional routes, resulting in slight increases in auto-related impacts on these routes; however, there would not be enough volume to create operational difficulties on the roadways.

The Presidio would generate increased demands for parking; however, planned parking improvements and the development or expansion of alternative transportation modes for access would reduce those demands. No significant negative impacts are anticipated.

Short-term impacts related to Doyle Drive reconstruction would include potentially serious traffic congestion at and near construction sites, increased noise and air pollution, increased traffic volumes on Presidio roadways from shortcutting, and the use of Presidio land for staging equipment. Long-term effects would include the irretrievable commitment of land for the right-of-way, the probable removal of some historic buildings, the possible disturbance of archeological resources, and continuing air and noise pollution. Presidio traffic increases should not cause significant impacts on Doyle Drive, because Presidio use would be higher during off-peak travel periods. A Presidio interchange would be benefit the local traffic network by decreasing traffic at several other park gateways.

Cumulative Impacts

Traffic increases generated by the Presidio would have a negative cumulative effect on regional traffic growth and related congestion. Of the estimated 47% increase in weekday regional traffic and 54% increase in weekend regional traffic in the vicinity of the Presidio in the year 2010, about 24% weekday and 29% weekend is expected to be related to Presidio use. About 6,000 vehicles per day, or 5%, of the 120,000 vehicles passing over the Golden Gate Bridge would be Presidio-bound. Presidio-bound traffic would account for only 9,000 to 16,000 of the more than 90,000 vehicles per day using Doyle Drive, or 10% to a maximum of 17% of the traffic on that highway. About 1,400, or 2%, of the 60,000 vehicles per day on Highway 1 would be coming to the park. The cumulative effects of Doyle Drive reconstruction would be addressed by Caltrans and other affected agencies in future environmental analyses; the cumulative effects of ongoing or planned projects other than Doyle Drive reconstruction are not known at this time.

Impacts on Land Use, the Presidio Community, and Surrounding Neighborhoods

Methodology

Land Use. This analysis involved identifying proposed building and land uses at the Presidio, the makeup of the community and the services to be provided, and the effects of new uses on the Presidio and surrounding neighborhoods. The associated impacts of reusing buildings and changing land uses, including the effects on the regional economy and employment, city services, housing, health care, and traffic, were presented in previous sections.

To quantify the changes in building use, a building database was developed that identified the 1989 use and square footage of each structure in the Presidio. For the purposes of assessment, each building was assigned a treatment and use code (for example, rehabilitation for current or new use, removal) corresponding with proposed actions, and the building use categories were totaled. In addition, land use maps were developed on a broader scale to represent overall use of the planning areas. Acreage figures were calculated for the potential land uses.

For the most part, building and land uses are self-explanatory; however, several categories need clarification. After the Presidio was converted into a park, the military use category would include only historic coastal defense structures (military administrative uses are included in the office category). The medical use category would apply to research facilities as well as medical functions. Institutional use of buildings would include a wide range of educational activities, including visitor centers, museums, and environmental training facilities; institutional use of land would include future park program areas. Special uses would include state highways and lands administered by the Veterans Administration.

Population. The 1993 *Presidio Planning Socioeconomic Analysis Technical Report* by Jones & Jones provided the information for this analysis. The estimates of future Presidio resident population were based on the number and sizes of housing units available in the Presidio. To estimate the number of future residents, the total square feet of dwelling space was divided by an average floor area per occupant, taking into account available housing types. The current statewide average household size was used as a benchmark to test the reasonableness of the chosen average residential density factors. The calculations used in estimating future population size are included in appendix C. The results of the analysis are shown in table 29. Precise information profiling families and individuals expected to live in the Presidio is not available at this time.

Community Support Services. Based on the potential land use activities at the Presidio, the type of individuals who might work and reside there was predicted. The appropriate level of community support services was then derived.

Analysis

Land Use. The pattern of land use would not change under alternative A. A total of 301 buildings (2.0 million square feet) would be removed, reducing total building square footage by about 31% to approximately 4.3 million. The only significant change would be that new visitor-oriented programs and services and increased open space and recreational opportunities would be provided. About 154 residential structures (738 housing units) would be removed over time. The percentage breakdown of the total remaining building square footage by use (shown in table 11) would be residential (23%), office (23%), institution (11%), warehouse (10%), industrial (9%), dormitory (8%), and retail, military defense structures, and infrastructure (each 4% or less).

The amount of land dedicated to recreation/open space and institutional use would increase significantly under this alternative (see table 28 and the Alternative A – Land Use map in the "Alternatives Including the Proposed Action" section). Overall, recreation/open space acreage would increase by more than 200 acres to about 985 acres, or 66.5% of the total land area; this would be a 26% increase in open space. Institutional use would double, comprising approximately 203 acres (13.7%). Other uses would include residential (164 acres, 11.1%), special (79 acres, 4.4%), industrial (39 acres, 2.6%), and commercial/office (26 acres, 1.7%). The density and character of land uses would not change at the main post, Fort Scott, or the Letterman complex, but the areas would be used for institutional purposes. The public recreation potential of Crissy Field and the Golden Gate Bridge/Fort Point area would be realized by consolidating development and expanding open space. The now-vacant Public Health Service hospital buildings would be reoccupied and used for institutional and lodging purposes.

Most residential areas would continue to be used for lodging and housing. The Wherry and Washington Boulevard housing areas in the Presidio Hill planning area would be occupied by the military on an interim basis, but would eventually be removed. This would expand open space and consolidate housing closer to the main activity areas. The land use character would not change in other areas that are primarily devoted to open space.

Land uses in the neighborhoods surrounding the Presidio are primarily residential. These areas are densely developed, and proposed Presidio uses are not expected to have any significant effects on residential development or population growth. The Presidio's conversion would contribute little to the demand for additional housing in the city, especially because some housing would be available within the park area (see the "Impacts on Housing" section).

Generally, Presidio land uses along or near the boundary would not change dramatically from existing conditions and would include open space, residential,

and institutional uses; therefore, no significant impacts on park neighbors are anticipated. The exception is the Public Health Service hospital site, which has been vacant for about a decade. Neighbors could be affected by increased activity at this site and by additional noise and traffic in the vicinity. However, the proposed residential education uses of the site would be of a relatively low intensity in terms of potential impacts.

Population. Table 29 shows the total availability of residential units and dormitory beds under this alternative and the total resident population that could be accommodated at the Presidio. Occupancy by staff and guests is shown separately.

About 3,600 residents and 800 guests would be housed at the Presidio on a daily basis in year 2000, which is similar to existing conditions. By the year 2010, a substantial amount of housing would be removed, decreasing the resident population to about 1,400. The guest population would not be affected by decreases in the amount of residential space and would remain around 800 per day (Jones & Jones 1993a).

Community Support Services. Under alternative A the new Presidio community would be a diverse group of park and park partner employees, Sixth Army personnel, visiting teachers, researchers, and trainees and students of programs contributing to the park's purpose. Approximately half of the existing housing units would be used by the military on an interim basis, and exclusive military commercial and community support services would be provided within the Wherry housing area.

To strike a balance between reducing traffic associated with errands and minimizing competition with commercial businesses outside the park boundary, the following community services would be provided on the site. Day care services would be included for children of residents and employees. Community facilities, including recreation areas and assembly and meeting spaces, would be available on a fee basis to Presidio residents as well as the visiting public and Bay Area groups. Specialty services would not be provided on the site; however, other commercial services, including food service and convenience store concessions, would be included in several major activity areas to support residents and visitors. These services would provide for the community's daily needs.

Within a few blocks of the Presidio are several small-scale commercial districts in the Marina area to the east and the Richmond and Pacific Heights areas to the south. Farther east is the moderate-scale Lombard Street district, and farther south the moderate-scale Geary Boulevard district (CCSF 1988). Much of the property in these districts is already developed, and any addition or intensification of commercial use would be subject to San Francisco planning and zoning regulations. Because commercial services within the Presidio would be tailored to meet basic visitor and community needs only, no significant negative impacts on businesses in these districts are anticipated. Presidio employees, residents, and visitors would purchase goods and services from local businesses, including specialty services, but not in sufficient quantity to encourage the growth of competing enterprises. See the "Impacts on the Regional Economy and Employment" section for additional information.

Conclusion

The largest land use change would be the 31% reduction in building space and the 26% increase in open space. Recreation/open space and institutional uses would expand, while industrial and residential uses would occupy less space. Total building square footage would be reduced by 2.0 million square feet.

Although the population of the Presidio would change and become more diverse by 2010, no adverse impacts on land use would result. The size of the Presidio community would decrease over time, but the present level of support services would be maintained to support both visitors and the community. No significant land use impacts on surrounding neighborhoods are expected as a result of proposed Presidio uses.

The potential for additional residential or commercial development in areas near the park is limited under existing land use controls, except on undeveloped or underdeveloped lots. The addition or intensification of land uses in these areas would be subject to San Francisco planning and zoning regulations, and no significant changes are anticipated under existing controls. Employee, residents, and visitor spending would benefit local businesses but would not be great enough to induce the growth of competing businesses.

Cumulative Impacts

The restoration of about 200 acres of open space would have a minor but positive cumulative effect on efforts to preserve open space in the city and region. Land use changes at the Presidio under this alternative would have an insignificant cumulative effect on surrounding neighborhoods.

Impacts on the National Historic Landmark District

Methodology

Between 1990 and 1992 the Park Service prepared a series of reports and studies in compliance with the National Historic Preservation Act of 1966 to identify and evaluate significant cultural resources at the Presidio and aid the general management planning effort. These studies included a historic resource study of the Spanish and Mexican periods of occupation (Langelier and Rosen 1992); a special history study, which provided an overview of the U.S. Army occupation from 1846 (Thompson and Woodbridge 1992); a cultural landscape analysis (Land and Community Associates 1992); a building inventory and limited condition survey of all Presidio buildings; an assessment of the rehabilitation potential of about 45 historic building prototypes; and an assessment for potential reuse of the Public Health Service hospital. All of these studies helped to provide a further level of detail than the national historic landmark nomination form and a baseline for assessing the impacts of the management alternatives.

The revised regulations of the Advisory Council on Historic Preservation (section 800.8, title 36, of the *Code of Federal Regulations*) provided the methodology for assessing impacts on historic resources. In assessing the impacts of the alternatives for the Presidio, several steps were taken: (1) identifying the location of a proposed action, (2) comparing that location with the location of resources listed on or eligible for listing on the National Register of Historic Places, (3) identifying the extent and type of impact of the proposed action on the national historic landmark district, and (4) assessing those effects according to procedures established in the regulations.

Definitions

A proposed undertaking is considered to have an *effect* on a historic resource if it may in any way change the characteristics that qualify that property for inclusion on the National Register of Historic Places. If the undertaking would diminish the integrity of the property, it is considered to have an *adverse effect*. An effect that may occur later than or at a distance from the undertaking is termed an *indirect effect*.

Analysis

Presidio Historic Buildings. The entire Presidio is listed on the National Register of Historic Places as a national historic landmark district. Of the 870 buildings within the Presidio, 510 are listed as contributing to the significance of the district. Fort Point National Historic Site, which is within the district boundary, is listed individually on the national register. Appendix B lists the 510 buildings and their proposed treatment under each of the management alternatives. Table 35 summarizes the treatment of Presidio buildings under alternative A. Treatment categories are stabilization/preservation, rehabilitation, restoration, and removal.

TABLE 35: SUMMARY OF BUILDING TREATMENTS - ALTERNATIVE A

Treatment	Historic	Nonhistoric	Total
Stabilize and Preserve	114	24	138
Rehabilitate	355	72	427
Restore	4	0	4
Remove	37	264	301
Excluded from Park	0	0	0
Total	**510**	**360**	**870**

Under alternative A the overall impact on historic buildings would be beneficial. A total of 473 historic buildings would be retained. Of these, 355 would be rehabilitated to accommodate new uses; 114 would be stabilized and preserved; and four would be restored.

Rehabilitation is defined as the conversion of a building to a state that "makes possible an efficient contemporary use while preserving those features that are significant" and character-defining (NPS 1992f). For each building to be rehabilitated, a use would be selected that would require minimal alteration of the building's defining characteristics — either a compatible new use or the use for

which the building was originally designed. Some historic buildings would have to be altered to accommodate new uses — for example, historic barracks converted into classroom/training facilities — which could have an effect on historic building fabric or materials. The standards for rehabilitation contained in *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1992f) would be the minimum standards for proposed changes. Building-specific assessments of existing conditions, an inventory of the character-defining elements of each historic building, and the Presidiowide rehabilitation guidelines would aid in minimizing adverse impacts.

Impacts related to rehabilitation of historic buildings would be addressed when tenants were selected and proposals submitted. Historic building rehabilitation would be certified by National Park Service preservation staff through the 1992 Golden Gate Operations and Maintenance Programmatic Agreement.

Buildings supporting public uses would be made fully accessible to physically disabled visitors, as required by federal law. In addition, during rehabilitation, buildings would be made to meet the nationally accepted model building codes to the maximum extent feasible.

A total of 114 historic buildings, largely batteries and infrastructure facilities, would be stabilized, preserved, and in some cases made available for interpretation. Stabilization, as defined in the *Standards for the Treatment of Historic Properties*, would reestablish structural stability and weather-resistance. This work would be done in a way that detracted as little as possible from the building's appearance and significance; thus, no negative impacts would result.

The majority of the Presidio's historic coastal defense structures would be stabilized to allow for their continued preservation, and some would be rehabilitated for interpretation or for new uses such as storage. Access roads and other landscape features of the historic settings would be maintained. No adverse impacts are anticipated as a result of these actions.

Under alternative A, 37 historic buildings would be adversely affected because of their demolition and removal. These buildings include the Directorate of Engineering and Housing complex at the east end of Crissy Field and the World War II barracks at the west end. To mitigate adverse effects, all historic buildings and structures identified for removal that contribute to national historic landmark significance would be recorded according to Historic American Building Survey standards. In addition, samples of their significant building materials might be preserved, accessioned, and cataloged into the park's museum collection. Mitigating measures would be developed in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation.

During and after the transition from military post to park, some of the historic buildings would remain vacant. Although they would be mothballed and monitored to prevent deterioration, there could be adverse impacts on the historic fabric of those buildings.

Presidio Cultural Landscape. Under alternative A, significant landscape features and spaces, such as manicured gardens and lawns, would be rehabilitated and preserved in the process of making site changes to accommodate new uses. Preservation of these significant features and spaces would have a beneficial effect on the cultural landscape.

Restoration of the historic forest within its original boundaries using species originally selected for planting would also have a beneficial effect on the cultural landscape; about 57 acres of forest would be restored. To guide this management action, further research would be conducted to determine the extent of the historic forest, its originally designed boundaries, its changes over time, and species planted. A forest management plan would be developed to guide future maintenance activities, such as hazard tree removal and pruning.

Site improvements would be made to enhance the historic setting and visual characteristics of the Presidio as well as to accommodate new uses. Such actions would include removing excess pavement, vegetation clearing, and introducing new wayside exhibits, signs, site furniture, trails, paths, and lighting. Introduced landscape elements would be compatibly designed, and the removal of existing features would be guided by a future cultural landscape report for the Presidio. There would be an effect on the national historic landmark district, but that effect would not be adverse.

Vegetation would be cleared, and 264 nonhistoric buildings would be removed to restore historic vistas and views from within the site. These actions would reestablish important visual linkages that were characteristic of the Presidio at an earlier time. Some of the ground disturbance required to restore these vistas could affect small-scale landscape features and archeological sites.

Circulation improvements such as converting roadways for pedestrian traffic, redesigning intersections, eliminating some access roads, and providing new parking would affect the character of the historic setting. Primary historic circulation routes and their character-defining features would be maintained, rehabilitated, and preserved. Some historic paths, such as Lovers Lane, would be restored. Improvements like the reduction in paved surfaces next to historic buildings and the reestablishment of formal paths and sidewalks would reduce adverse impacts on historic fabric and enhance the historic setting of specific areas. All proposed changes to the cultural landscape would follow *The Secretary of the Interior's Guidelines for the Treatment of Historic Landscapes* (NPS 1992g).

New construction could have negative impacts on the cultural landscape. Such construction would only be permitted if existing buildings and improvements did not meet essential management needs. Every reasonable consideration would be given to using existing buildings for park purposes compatible with their preservation and public appreciation. Alterations and additions might need to be made to historic buildings to accommodate new uses. Any new construction, including individual buildings and additions, would be compatibly designed and sited in keeping with the character-defining elements of their settings following the *Standards for the Treatment of Historic Properties*. The Park Service would develop Presidio design guidelines to encourage the design of new buildings to be compatible in scale, color, material, and character with the historic landmark district.

Main Post. A number of proposed actions would have a beneficial effect on the cultural landscape of the main post. Restoring the main parade ground by removing about 7 acres of pavement within its historic boundaries would enhance the integrity of the area. Restoring the streetscapes along Funston Avenue, Montgomery Street, and Halleck Street would reestablish historic settings and linkages that have been lost through time because of modern uses, new construction, and increased use of automobiles. Selective removal of trees north of Infantry Terrace would reestablish the visual connection between Infantry Terrace and the main parade ground.

The north end of the main parade ground, north of Lincoln Boulevard, would be reconfigured to accommodate a public transit hub. Improvements would include a new waiting shelter for passengers, road and parking alterations, and new landscaping. These changes could have an adverse effect on the cultural landscape in this area and the historic setting of buildings 210, 218, and 220.

Two historic garages (buildings 113 and 118) listed as contributing to the national historic landmark would be removed to provide replacement parking for the parking that would be lost when the parade ground was restored. These buildings have been greatly altered and have only marginal integrity (NPS 1992d); however, their removal is considered an adverse effect on the landmark district.

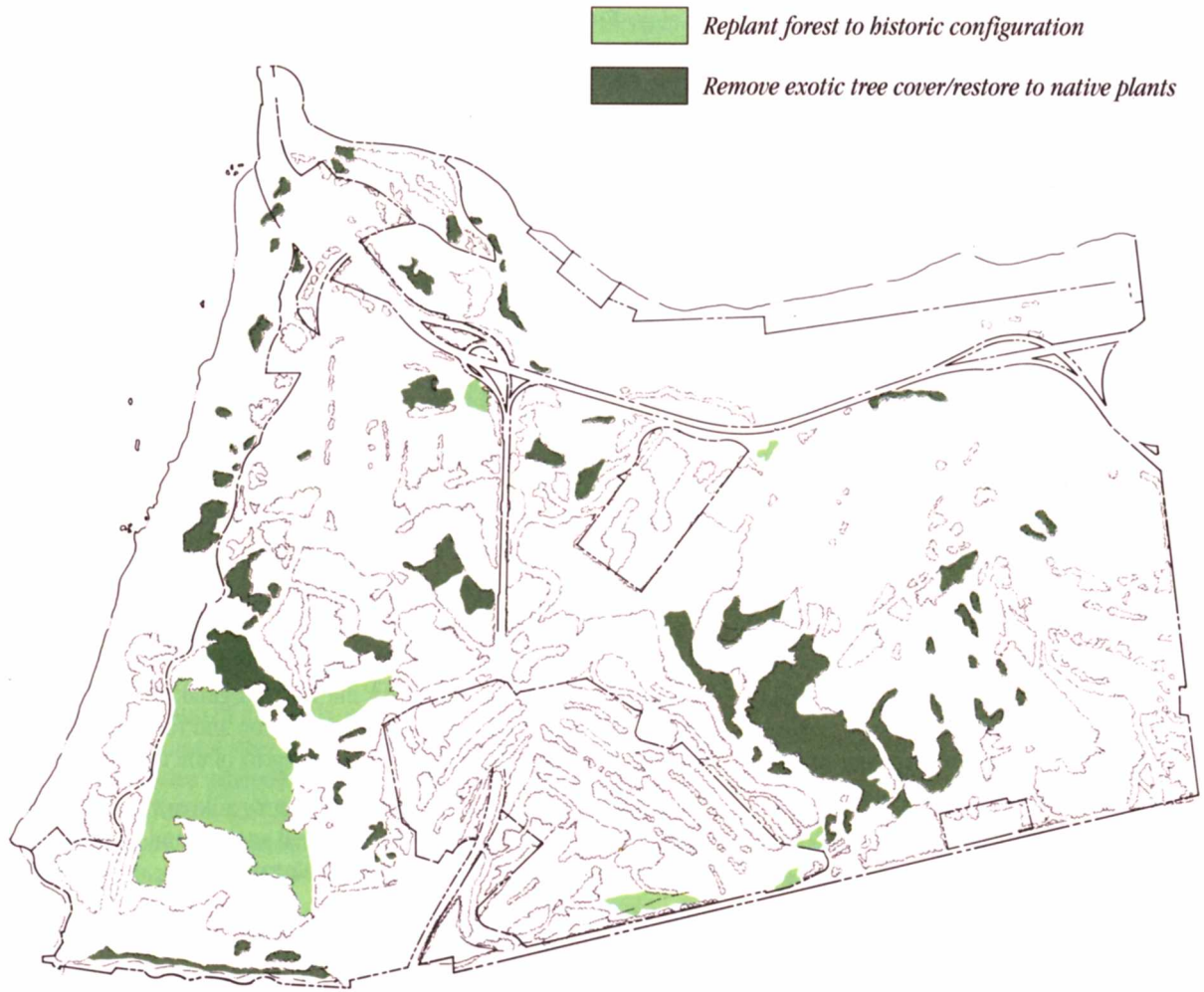
Two World War II temporary barracks (buildings 40 and 41) might be removed to permit testing for and interpretation of the Spanish and Mexican presidios, the remains of which are probably underground in this area. Dating from as early as 1776, these significant archeological resources would be researched before the removal of buildings 40 and 41. Additional impact analysis would be conducted before the action was implemented. The removal of the buildings would constitute an adverse effect on the landmark district.

Golden Gate/Fort Point. Site improvements at the Golden Gate Bridge plaza would involve the removal of temporary maintenance structures currently used by the Golden Gate Bridge Authority on the west side of the plaza. A 1980 "Determination of Eligibility for the Golden Gate Bridge" states that the bridge and its related structures should be surveyed and nominated as a national historic landmark district. However, the temporary maintenance structures, which are directly on top of some of the coastal defense batteries, are nonhistoric and in poor condition; their removal and the subsequent stabilization and preservation of the batteries for visitor access and interpretation would have a positive effect on the Presidio landmark district.

The east side of the bridge plaza would be redesigned and landscaped to improve traffic safety and visitor experiences in the area. Improvements, including construction of a new visitor facility next to the bridge structure, could have an adverse effect on the historic setting.

Some historic buildings at the torpedo wharf might have to be removed to accommodate the proposed one-way road connecting Crissy Field to Fort Point. Further study would be necessary to determine the exact design and location of this road and whether it would cause any impacts on the cultural landscape of the district. If the buildings were removed, this would be an adverse effect.

Fort Scott. At Fort Scott the removal of nonhistoric recreational facilities from the parade ground would have a beneficial effect on the cultural landscape. In addition, remnant historic gardens and landscaped areas would be rehabilitated throughout the planning area. The restoration of historic vegetation, paths, and



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Historic Forest Removal/Restoration – Alternative A

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

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small-scale features such as curbing and retaining walls would enhance the historic setting. Some archeological investigation would be required to determine the extent of remnant vegetation and the appropriate materials for rehabilitation.

Building 1387, originally a World War II vintage theater and later a bowling alley, has not been in use for some time; the building is in a severely deteriorated condition and its interior integrity has been compromised by years of modifications (NPS 1992d). This building would be removed, which would have an adverse effect on the district.

The existing maintenance buildings south of the Battery Dynamite complex would be used as a maintenance facility by the Golden Gate Bridge District. Some demolition of nonhistoric buildings and construction of new support facilities would occur. This could affect the historic setting of the battery to the north. Additional environmental planning and analysis would be conducted before any actions were taken.

Nonhistoric tree cover on top of Batteries Dynamite and Howe-Wagner would be removed to restore the historic setting. This would have a beneficial effect on the district.

Letterman Complex. Within the Letterman complex, removal of the nonhistoric Letterman hospital building (1100) would allow for restoration of the historic setting of the earlier hospital complex and have a beneficial effect on the district. Rehabilitation and preservation of the historic streetscapes of O'Reilly and Gorgas avenues would also enhance the historic scene. Preservation of the Gorgas Avenue streetscape would protect the last remaining industrial/maintenance center in the historic district.

Removing the paving in the former courtyard of the historic complex and relandscaping the area would have a beneficial effect on the cultural landscape. Removing other pavement around the complex, some of which has had an impact on historic building fabric, would also be beneficial.

Historic buildings 1006 and 1049 (a former laboratory and a hospital ward) would be removed because they are seriously contaminated with heavy metals and other toxins and are in a deteriorated condition. Their removal would constitute an adverse effect.

Any new buildings that were constructed on the sites of former historic buildings would be designed to be in keeping with the historic scene. Further analysis would be completed during design.

Crissy Field. At the east end of Crissy Field, eight buildings listed as part of the landmark district would be removed to restore open space and reestablish wetlands. These buildings (275, 277, 280, 282, 283, 284, 285, and 288 in the Directorate of Engineering and Housing complex) have been severely altered and the integrity of the complex has been destroyed because of the removal of a large number of buildings that historically made up the complex. The removal of the eight buildings is considered an adverse effect.

To restore and interpret the historic Crissy airfield, a total of 24 historic buildings (buildings 901 through 919, 949, 950, 973, and 974, which are World War II temporary barracks now used as offices and training classrooms) would be removed and the airfield restored to a specific time period. This time period would be determined based on the findings of additional research into the evolution of the airfield and its support structures. The field would not be used as an active airfield. For the most part the World War II barracks duplicate the cantonment that is preserved and interpreted at Fort Cronkhite in the national recreation area across the bay. However, the removal of the Presidio buildings is considered an adverse effect.

Public Health Service Hospital. The nonhistoric front addition to the Public Health Service hospital (building 1801) would be removed, and the historic front facade rehabilitated and possibly restored. Building 1801 is listed as contributing to the significance of the district, but with marginal integrity because of its nonhistoric addition. Removal of the addition and rehabilitation of the facade would have a beneficial effect on the integrity of the original hospital building.

If a suitable tenant for the hospital complex could not be found, the hospital building might be demolished. Additional analysis and subsequent mitigation would be completed before implementing this action.

Presidio Hill. The nonhistoric golf course buildings would be removed to permit construction of a new public clubhouse on the same site. New construction in this highly visible area could have an adverse effect on the historic setting of the golf course and the Arguello Gate entrance.

Conclusion

Overall, the actions proposed under alternative A would preserve and enhance the Presidio's historic buildings and cultural landscape. Continued use of historic buildings would provide for their preservation, and removal of 264 nonhistoric buildings and structures would enhance the historic setting by minimizing

modern intrusions. The removal of 37 historic buildings would have an adverse effect on the national historic landmark district but would not affect the status of the landmark. In general, the overall impact to buildings would be beneficial as the facilities would be rehabilitated over time, brought up to compliance with national building and safety codes, and hazardous materials, asbestos and lead, abated.

Cumulative Impacts

There has been a continuing loss of historic buildings regionally, including those related to military history. Because the buildings and cultural landscape within the Presidio national historic landmark district would be rehabilitated and preserved under this alternative, it would have a positive cumulative effect on regional efforts to preserve such resources and their settings.

Impacts on Archeology

Methodology

Section 110 of the National Historic Preservation Act of 1966, as amended, specifies that archeological resources must be taken into consideration before implementing any federal action. The Archeological Resources Protection Act of 1979, as amended, defines archeological resources; requires federal permits for excavation; provides for curation of materials, records, and other data; provides for confidentiality of archeological sites; and, in the 1988 amendment, requires the surveying of public lands for archeological resources. The Native American Grave Protection and Repatriation Act (NAGPRA) of 1990 outlines the federal government's responsibilities for the treatment and ultimate disposition of human burials and grave-related materials. *NPS-28, Cultural Resources Management Guideline*, outlines the NPS policies to preserve all archeological resources through active protection and preservation. These laws, regulations, and policies have been followed in analyzing potential impacts on archeological resources. In addition, consultation with American Indian groups has begun and a memorandum of understanding outlining future consultation processes is underway. Any materials recovered that are not covered by NAGPRA would be accessioned and cataloged into the park museum collection.

Analysis

General. Based on archeological discoveries in San Francisco, it is possible that potentially significant subsurface prehistoric archeological sites are present within the Presidio. The 200 years of use suggest that historic archeological remains would also be found. There is one state-recorded archeological site in the Presidio.

Any ground-disturbing work undertaken within the park would have the potential to affect undiscovered archeological sites and resources. Until exact locations were selected and preliminary designs were available for specific projects, it would not be possible to accurately survey and determine the effects on such resources. Direct effects would vary and be closely related to specific actions. The proposed upgrading of all utilities would require ground disturbance of various types, as would hazardous material remediation. Direct effects would be avoided to the extent possible through consultation between designers and the park's archeology staff. If sites could not be avoided, mitigating measures including excavation and recording of sites would be carried out in consultation with the state historic preservation officer. If previously unknown resources were uncovered during construction, work would be stopped in the discovery area, and the National Park Service would consult with appropriate parties according to section 800.11, title 36, of the *Code of Federal Regulations*.

The restoration of riparian corridors, drainages, and other water features, including El Polin Spring, Lobos Creek, and Mountain Lake, could have an impact on archeological resources, particularly prehistoric sites. Most prehistoric sites in the San Francisco area have been discovered where aquatic foods were available and near freshwater streams.

New construction on any part of the Presidio could adversely affect archeological resources. For example, improvements to Doyle Drive could have an impact on potential prehistoric sites in the Crissy Field area as well as on historic archeological resources. The removal of structures or pavement on any part of the post would also have the potential to disturb archeological resources.

Ongoing repair and maintenance of buildings, roads, and utilities near archeological sites would increase the likelihood of resource damage.

No known sacred sites have been identified in consultation with Native American groups (NPS 1993b).

Main Post. Removal of the pavement from the main parade ground could disturb archeological resources that have been previously protected by that pavement. The restoration and enhancement of the riparian corridor along Tennessee Hollow could affect remnant prehistoric resources in the area.

Testing to locate the Spanish and Mexican presidios and possible excavation under buildings 40 and 41 (the World War II barracks across from the Presidio officers' club) would affect archeological resources at these sites. However, the location and interpretation of these important resources would offset the possible negative impacts.

Rehabilitation of the officers' club, which contains historic adobe wall fragments most likely dating from the early 1800s, would require further investigation, identification, and dating. This work would be done in conjunction with building rehabilitation to avoid any negative impacts on the archeological resource.

Letterman Complex. Any new construction at the Letterman complex might adversely affect archeological remains at the site. However, before construction, archeological resources would be identified, surveyed, and avoided through design if possible. If necessary, mitigating measures would be identified in consultation with the state historic preservation officer, the Advisory Council on Historic Preservation, and any affected Native American groups.

Public Health Service Hospital. The location of the historic marine cemetery might need to be further verified with test excavations. Once the cemetery was located, it would be protected from further impacts.

Crissy Field. The restoration of 20-80 acres of wetlands at Crissy Field, which would involve the removal of the Directorate of Engineering and Housing buildings as well as landfill soils from the 1915 Panama Pacific International Exposition, could affect both prehistoric and historic archeological resources.

The actions required to provide for ferry/water taxi service to the Coast Guard station could have an adverse effect on submerged archeological resources in this area. Such actions would include new construction, dredging, and resultant wave action. Further analysis and surveying for archeological resources would be required before implementation.

Lobos Creek. Improvements to bring the water treatment plant into compliance with drinking water standards could have a negative effect on archeological resources in the Lobos Creek drainage. New construction, well drilling, and drainage diversions could all affect the drainage, which is a probable site for both prehistoric and historic resources.

Conclusion

Direct impacts on archeological sites cannot be analyzed at the present time because sites have not been identified. Many of the actions required to make utilities and other infrastructure safe and/or in compliance with current standards might affect unknown archeological resources. New construction as well as repair and maintenance of existing buildings, roads, and other features would increase the likelihood of inadvertent damage to sites. Measures to be implemented by the Park Service would avoid or mitigate any adverse impacts on sites.

Cumulative Impacts

Cumulative impacts on known archeological sites and resources on known sites are not anticipated to be adverse; cumulative impacts on unknown sites would not be significant because mitigating measures would be implemented by the Park Service as described in the "Alternative A" section.

Impacts on Wetlands and Stream Drainages

Analysis

Under alternative A, wetlands at Crissy Field would be reestablished, Lobos Creek and three other stream drainages would be restored, and other small pockets of wetland habitat would be protected and enhanced. Before wetland and creek restoration actions were implemented, detailed environmental analysis would be conducted to identify any specific impacts on water quality, natural and cultural resources, recreational opportunities, or access and circulation.

Crissy Field. Approximately 20-80 acres of tidal wetlands would be restored at Crissy Field. Free tidal interchange between the wetlands and the bay would involve less than 0.25 mile of shoreline. The edges of the restored wetlands would be revegetated with a wide variety of native plants, which would increase the biodiversity of habitats and the animal species inhabiting the area. The restored wetlands would provide productive habitat for plants and animals now absent or scarce in the area as well as a food source able to support a relatively large wildlife population. They would also have a beneficial effect on stabilizing shore areas. Wetland vegetation and root systems have been shown to help stabilize such areas.

The extent to which restoration efforts would succeed at Crissy Field would be influenced by human activities in the area. Recreational activities could deter bird mating and nesting and destroy habitat and plant species at the edge of the wetland.

Lobos Creek and El Polin Spring/Tennessee Hollow. The 2-acre Lobos Creek drainage would benefit from restoration efforts, as would the 31-acre drainage from El Polin Spring through Tennessee Hollow to Crissy Field. This work would primarily involve the removal of artificial drainage culverts and the restoration of natural soil and watershed profiles; native species would be planted throughout to reestablish habitat and stabilize slopes and sensitive soils.

Conclusion

Restoration and protection of this and other wetlands within the Presidio would have a beneficial impact on water resources and would provide critical wildlife habitat and increase the diversity of plant and animal species in the area. The restoration of the El Polin Spring and Lobos Creek watersheds would enhance natural drainage patterns and add 33 acres of riparian habitat.

Cumulative Impacts

There are an estimated 170,660 acres of estuary wetlands in the Bay Area (San Francisco Estuary Project 1991). The restoration of a portion of the Presidio wetlands would have a minor but positive cumulative effect on projects to restore and maintain wetlands in the region.

Impacts on Native Plants Communities

The preservation of native plant habitat and the elimination of exotic plants are important management concerns. The restoration of native plant communities and revegetation of disturbed sites would be major components of the resource management program under alternative A.

Analysis

General. Approximately 145 acres at the Presidio are currently dominated by native plant species, including 15 acres of rare and endangered plants. Under alternative A these areas would be managed to protect and enhance native plant communities and to minimize the intrusion of exotic species. No adverse impacts are anticipated in these areas.

Native plant communities would also be reestablished on 140 acres throughout the Presidio, which would increase the biodiversity of the park. Native plants would cover about 285 acres of the Presidio when restoration was complete. Native plant restoration would be preceded by removal and control of exotic plant species.

Part of the native plant restoration would take place in areas where individual trees and groves of trees have escaped from the historic boundaries of the Presidio forest. These trees and groves would be removed, and native plants would be reestablished in their place. The removal of trees and restoration of native species on approximately 70 acres would have a positive impact on the number and diversity of native plant communities.

Infrastructure improvements and building rehabilitation might negatively affect native plant communities in work areas during construction. To minimize the impacts, site-specific revegetation plans would be prepared for each construction project following NPS policies and guidelines. Revegetation needs would be identified in time to establish seedlings and propagules from on-site plants and avoid contaminating the gene pool.

Revegetation of disturbed areas after construction or demolition would proceed as quickly as possible to reduce potential recolonization by exotic species. Techniques to control invasion would include removal of exotics by hand or with herbicides. The use of herbicides would be limited and would be in accordance with the NPS integrated pest management (IPM) policy (NPS 1988a).

Competition from nonnative tree species would continue to jeopardize nearby native plant communities; the threat of this encroachment would gradually decrease under the proactive NPS forest management program proposed in this alternative.

Golden Gate/Fort Point. Taking into consideration the cultural landscape of the Fort Point cliff area, exotic plants would be removed and native plants restored. These actions would have a beneficial effect on the sensitive serpentine outcrop and grassland habitat in this area, which contains a rare coast rockcress (*Arabis blepharophylla*) and Franciscan thistle.

Fort Scott. Management actions in the riparian area northeast of the recreation center (building 1331) would include removal of exotic species, and planting/seeding of native species These actions would benefit the native communities and



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rare plants in the area, including serpentine grassland, native perennial grassland, and the San Francisco gum plant (*Grindelia maritima*), a candidate species for endangered status. Protection and management of the riparian area between Kobbe Avenue, Highway 1, and the Fort Scott tennis courts would result in maximum species diversity in this area.

Public Health Service Hospital. At the Public Health Service hospital exotic species and trees in the sedge wetland and back dunes would be removed, and the areas reseeded and protected from vehicle use and sand mining. The state-listed endangered San Francisco lessingia (*Lessingia germanorum* ssp. *germanorum*) and its habitat would benefit from protection and enhancement programs such as exotic plant removal and public access restrictions.

Crissy Field. Restoration of 30 acres of native dune habitat and 20-80 acres of wetlands at Crissy Field would increase native plant habitat. Additional analysis and public review would be conducted during site planning for these areas.

Some impacts on native plants communities in the sand dunes at Crissy Field would result from heavy visitor use of the area. A restoration plan for Crissy Field would address methods to control visitor use, such as limiting crowd size for events, directing any large events to the least sensitive natural areas, and scheduling the events so that the native species were in a dormant rather than an active growth/flowering period.

El Polin Spring/Tennessee Hollow. Restoration of the drainages and riparian corridor from El Polin Spring through the main post to Crissy Field (31 acres) would have the positive impact of reestablishing native plant communities. This project would be examined in a detailed plan that would include additional analysis of impacts.

Presidio Hill. At Mountain Lake, exotic plant removal, protective fencing, and other protection and enhancement programs would benefit native riparian, aquatic, and coastal scrub communities. Removal of exotic species from the sand dune community north of Battery McKinnon-Stotsenberg would enhance populations of lessingia. Future management of lessingia would include seed collection and subsequent reseeding to increase resident populations.

Presidio Forest. At Inspiration Point, removal of exotic plants from the rare serpentine grassland community, additional planting of native species, and protection from trampling would benefit native communities and sensitive species. The state-listed endangered Presidio clarkia (*Clarkia franciscana*) would also be benefit from protection.

Lobos Creek. Restoration of the Lobos Creek drainage would result in an additional 2 acres of native plant habitat. This action would be subject to additional planning and environmental compliance. Specific techniques for removal of exotic vegetation, regrading to restore original soil contours, and stream channel restoration would be identified during subsequent planning. Visitor use in this watershed would be restricted to trails and stable soils in order to protect sensitive native plant habitats.

Coastal Bluffs. The coastal bluff area of the Presidio contains the greatest concentration of rare native plant species and communities in the Presidio. Restoration of 75 acres of native plant habitat, primarily coastal scrub, would increase the species diversity in this area. Restrictions on visitor access would minimize the impacts related to trampling and social trails. The removal of exotic plants would enhance populations of the rare San Francisco gum plant, coast rockcress, and the candidate species for endangered status, the San Francisco wallflower (*Erysimum franciscanum*). Native sand dune and dune scrub communities would also benefit from these actions.

Conclusion

The restoration of native species and the removal of exotic species from native habitat would have a beneficial impact on native plant preservation and biodiversity. Restoration of about 140 acres of native habitat within wetlands and riparian areas would stabilize sensitive soils, restore natural drainage patterns and influences, and enhance water quality in streams and drainages. The total land area restored to native plant habitat would be 285 acres. The threats to native plant communities posed by competition from nonnative tree species would gradually decrease under the proposed proactive forest management.

Cumulative Impacts

Native plant habitat is rapidly being lost in the Bay Area because of increasing development. The actions under this alternative would aid in perpetuating individual species and native plant communities and, together with other similar projects in the national recreation area, would have a small but positive cumulative effect on a regional scale.

Impacts on Wildlife

Analysis

Under alternative A, terrestrial and marine animal species would be inventoried, monitored, and protected and their habitats enhanced as part of the park's resource management program. The removal of about 300 buildings and restoration of 140 acres to natural conditions would increase available habitat for native wildlife. Open space, which also benefits wildlife by providing habitat, would increase by 205 acres to a total of 985 acres.

Marine Species. If implemented, water taxi service to and from Crissy Field could directly affect marine animals. A baseline inventory of marine species in the vicinity of the affected area would be conducted before the establishment of such service. The following are potential impacts related to water taxi service.

- Water taxi service could increase disturbance to marine species, including harbor seals, California sea lions, and feeding birds.
- The use of water taxis at the Coast Guard pier could increase the amounts of petroleum pollutants in what is now a relatively clean section of the bay. Localized adverse effects would be small compared to the overall self-cleansing capability of the bay through tides, currents, and winds. However, the productivity of marine organisms might decrease slightly in the wharf area as a result of petroleum leakage. Water taxi use would need to be regulated to ensure that impacts from noise, pollution, and general disturbance were minimized to the extent possible.
- Pier stabilization at torpedo wharf and the Coast Guard pier could temporarily disrupt marine animal activities in the proximity of the stabilization work.
- Dungeness crabs are frequently caught by individuals fishing along the bay at Crissy Field; the crabs' shoreline migrations might be disrupted by water taxis. The migratory corridor, once determined, would require protection.

Impacts on marine animals would also result from increased visitor use at Crissy Field, Fort Point, and the coastal bluffs. Anticipated impacts include unauthorized collecting of marine plants and animals from rocky, intertidal areas and an increase in fishing at Fort Point.

The improvement in water quality as a result of wetland restoration at Crissy Field would benefit Dungeness crabs, among other species. Restoration of the dune system there would promote the natural functions of the beach ecosystem and increase the attractiveness of the area to native species.

Migratory Species. Migratory birds that use marsh and open wetland habitat would benefit from the additional nesting sites and food sources on Crissy Field. A bird sanctuary of approximately 15 acres would be established between the Coast Guard pier and Fort Point, providing an area where birds would not be disturbed by boaters, jet skiers, or boardsailers. This action would also have a beneficial effect on wildlife by providing an area for undisturbed feeding and resting.

Native Terrestrial and Aquatic Species. Increased visitor use throughout the Presidio, but especially within existing native plant areas such as Baker Beach, would probably cause impacts on resident wildlife species. Designation of appropriate recreational uses and use areas would limit those impacts.

The noise and disturbance associated with trail construction might temporarily disturb nesting birds. Other animals less tolerant of disturbance might also temporarily abandon construction sites; however, the majority of species within the Presidio are adapted to the noises of the urban environment.

The removal of trees that have escaped the historic forest boundaries and the removal of hazardous trees throughout the Presidio would decrease the number of trees available for nesting birds.

Conclusion

Under alternative A, 140 acres would be restored to native plant habitat and 205 acres of additional open space would be created, which would benefit nesting birds, small animals, and other wildlife. Designation of appropriate recreational uses and use areas and establishment of a bird sanctuary would limit visitor impacts on wildlife populations.

If implemented, water taxi service could potentially cause adverse impacts on marine species, including harbor seals and California sea lions. Additional analysis would be conducted before the service was initiated.

Cumulative Impacts

Actions under this alternative would restore and expand wildlife habitat and, together with other similar projects in the national recreation area, would have a minor but positive cumulative effect on a regional scale.

Impacts on Threatened, Endangered, Rare, and Sensitive Species

Analysis

Plant Species. Under this alternative, the Raven's manzanita (*Arctostaphylos hookeri* var. *ravenii*), listed by the U.S. Fish and Wildlife Service as endangered, would receive full protection under the provisions of the Endangered Species Act; therefore, no negative impacts are anticipated. Species that are federal candidates for listing as threatened or endangered, that are listed by the state as rare or endangered, or that are listed as special status species by the California Native Plant Society would also be protected and enhanced. The Park Service would consult further with the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the California Native Plant Society concerning the protection of plant species considered sensitive. No negative impacts on these species are anticipated.

The major thrust of rare and endangered plant species management would be the protection, enhancement, restoration, and recovery of these plants and their communities, as described in the "Vegetation" section on a site-by-site basis. Detailed management actions for listed species are presented in the Golden Gate National Recreation Area *Natural Resources Management Plan* (NPS 1991b), which would be updated to include the alternative A proposals. The *Raven's Manzanita Recovery Plan* would be fully implemented to increase numbers and ensure the continued health of the population.

A Presidiowide inventory and monitoring program for rare and endangered species would also be established under this alternative. A native plant survey is currently underway, which would provide detailed information on the distribution and abundance of rare and endangered plants. Specific actions and techniques for protection, enhancement, and restoration of each species would be developed. Protective actions might include posting trail signs to warn visitors of sensitive plant habitat, fencing sensitive areas to restrict access, removing unwanted social trails, and closing areas to vehicle access.

Animal Species. Actions under alternative A are not anticipated to have any adverse effects on special status animal species. No listed or candidate threatened or endangered animal species are known to have critical habitat within the Presidio (USFWS 1991). Several species, including the federally listed California red-legged frog (*Rana aurora draytoni)* and the state-listed willow flycatcher (*Empidonax trailii*) have been recorded but are not known to use the area at this time. Three other species — the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), and brown pelican (*Pelecanus occidentalis*) — are transient in the area.

Under alternative A the possibility of reintroducing listed or candidate species, in particular amphibians, reptiles, and insects, would be investigated; if such species were reintroduced, it would increase the biodiversity of the Presidio as well as the long-term viability of the species that were reintroduced.

Two candidate endangered bat species could benefit from the expansion of habitat following restoration of Lobos Creek and the Tennessee Hollow drainages.

Conclusion

Under this alternative threatened, endangered, rare, and sensitive plant species would benefit from inventorying and monitoring and from the restoration and protection of critical habitat. Threatened, endangered, rare, and sensitive animal species would also benefit because of the monitoring of transient species, the restoration of native plant communities that provide critical habitat for species like the state-listed willow flycatcher, and the possible reintroduction of special-status species. No adverse effects on any species are anticipated.

Cumulative Impacts

This alternative would aid in perpetuating individual endangered, rare, and sensitive plant species and the integrity of their communities. It would also benefit threatened, endangered, rare, and sensitive animal species through restoration of habitat. There would be a positive cumulative effect on a regional scale.

Impacts on Topography and Soils

Methodology

For purposes of this analysis, calculations of disturbance were estimated from aerial photographs and drawings. Space for parking areas was calculated at 350 square feet per parking space, to account for space required for vehicle movement within a parking lot. Hiking/biking trails were assumed to be 10 feet wide. Roads were assumed to be 24 feet wide.

Analysis

General. Under alternative A, 348 acres of soils would be disturbed during building removal, native plant restoration, asphalt removal, new parking and road development, trail rehabilitation and development, and site and historic landscape restoration. The impacts would be minor and temporary, and the restoration of open space and native vegetation would have long-term positive effects on soil stabilization and reduced erosion. Trail construction would involve recontouring of soil surfaces in some areas. Runoff and soil erosion would be likely to increase on stretches of trail that were heavily used.

The majority of soils affected under this alternative have been previously disturbed by human use. Site-specific plans, including additional environmental compliance documentation for major soil-disturbing activities, would be developed before the initiation of work and would include in-depth assessment and quantification of the anticipated disturbances.

The restoration of natural drainages would require site disturbance, primarily from the use of heavy equipment to recreate natural contours, remove unwanted drainage culverts, and reestablish native habitat. Regardless of the care and environmental oversight taken during these operations, soil erosion and temporary deterioration of surface water quality could be expected before revegetation. Drainage restoration plans would be prepared that would contain prescriptions for monitoring of conditions before and after the completion of work and for immediate post-restoration site stabilization.

Main Post. About 43 acres of soils would be affected in this planning area. The main parade ground would be disturbed during the removal of pavement to restore the historic landscape. Other soil-disturbing actions would include construction of new parking areas around the two parade grounds; rehabilitation of the Montgomery Street landscape; removal of pavement and landscape restoration at the transit hub; new parking at the transit hub; vegetation clearing at Infantry Terrace; historic restoration along Funston Avenue; removal of parking and relandscaping at the officers' club; and removal of excess pavement along Halleck Street. When the commissary was removed, soils would need to be restored and the area revegetated.

The Tennessee Hollow drainage on the east side of Halleck Street and Funston Avenue would be restored to allow stormwater runoff and encourage the reestablishment of riparian vegetation. This would require that the drainage basin be regraded to as close to its original contour as possible.

Golden Gate/Fort Point. About 15 acres of soils would be disturbed in this planning area to construct visitor facilities and provide site improvements at the Golden Gate Bridge and Fort Point. Actions at the bridge plaza would include removal of asphalt at the east bridge plaza; construction of a new pedestrian plaza; construction of a 1,500-square-foot visitor facility; improvement of access and circulation for pedestrians and motorists; and parking. Pavement removal on the west side of the bridge plaza would also disturb soils.

Removal of the gravel parking at Battery Godfrey, west of Lincoln Boulevard near Fort Scott, and site restoration and conversion for walk-in picnicking and scenic viewing would disturb soils. Soil disturbance would also occur when 1,000 feet of trail were constructed between the plaza and Fort Point, an interpretive trail was established at the coastal batteries, and Battery East was relandscaped.

Establishing 1/2 mile of road from the Fort Point torpedo wharf to Crissy Field, constructing parking for 40 cars and 10 buses/RVs at the torpedo wharf, and rehabilitating 1-1/2 miles of the Golden Gate promenade would all disturb soils.

Fort Scott. Soil disturbance would total 13 acres at Fort Scott. The ballfield and lighting system at the north end of the parade ground would be removed, the pavement on the east side would be eliminated, and the parade ground would be restored, affecting soils. New paved parking and excess pavement removal next to buildings would cause some soil disturbance.

Letterman Complex. A total of 16 acres of soils would be affected in this planning area. Pavement would be removed from the parking area at Letterman courtyard; the Gorgas intersection would be improved; the historic landscape would be rehabilitated; and five deteriorated buildings would be removed.

Cavalry Stables. There would be 8 acres of soil disturbance in and around the cavalry stables. Soil-disturbing activities would include removal of pavement next to the stable buildings, construction of trails through the area, and construction of a corral for U.S. Park Police horses.

Public Health Service Hospital. A total of about 11-1/2 acres of soils would be disturbed in this planning area. Removal of the nonhistoric hospital buildings and parking lot and establishment of 3,300 linear feet of trail to Lobos Creek and Baker Beach would disturb soils in the area.

East Housing Area. A total of about 9 acres of soil disturbance would take place in this planning area. Removal of streets and other pavement, restoration of El

Polin Spring, and restoration of the three drainages in the vicinity would reduce soil erosion and compaction and improve soil conditions in these areas. Construction of a trail by the spring would have minor temporary impacts on soils. Removal of the asphalt on Lovers Lane and establishment of a new trail would also temporarily disturb soils.

Crissy Field. Crissy Field improvements would affect a total of about 94 acres of soils, depending on the size of the restored wetland. Most of this work would occur in areas previously covered with asphalt. Removal of the nonhistoric buildings and much of the pavement and reestablishment of new paved parking would be the major soil-disturbing activities at the east end of the field. The proposed 20-80 acres of wetland restoration in the east-central portion of the field would allow natural soil development processes to begin again.

Increase in dunes at Crissy Field could result in additional sand blowing over the area. However, preliminary information on wind direction suggests that sand movement would generally be restricted to the dune area and that sand removal from parking and other developed areas would probably not be substantial (LSA 1985).

At the west end of the field the removal of new Mason Street and the construction of the new 1/2-mile access road to Fort Point would temporarily disturb soils.

Presidio Hill. About 53 acres of soils would be disturbed in this planning area; most would subsequently be restored to more natural conditions. Soils would be disturbed over time as the Wherry and Washington Boulevard housing units were removed. Forest cover would eventually be reestablished in these areas according to the original design of the historic groves; replanting would also involve some soil disturbance.

Improvement of the golf course parking lot and construction of a new clubhouse would temporarily disturb soils.

National Cemetery. There would be no additional soil disturbance in this planning area.

Presidio Forest. About 10 acres of soils would be disturbed in the Presidio forest planning area. Some of the disturbance would be associated with the proposed removal of trees outside the boundaries of the original forest design. If large areas of forest were removed, regrading might be necessary as a part of site restoration and revegetation.

Construction of a new parking area at Julius Kahn Playground, construction of an amphitheater and three group campsites at Rob Hill, and landscaping of the site would cause temporary soil disturbance.

At Inspiration Point the reduction in parking would improve soil conditions in the area.

Lobos Creek. There would be a total of about 2 acres of soil disturbance in this planning area. Conversion of the Golden Gate Army Reserve center to an NPS maintenance facility, removal of the former ballfield next to the reserve center, alteration of parking at the water treatment plant and conversion to Baker Beach parking, and development of a trail from the Public Health Service hospital to Baker Beach would all temporarily disturb soils.

The restoration of the Lobos Creek watershed would reduce soil erosion and compaction. Some dredging might be required to remove fill and restore the original channel bed of the creek. Restoration would be subject to more detailed planning and environmental compliance that would document the soil disturbance involved in stream restoration and construction of the trail link to the Public Health Service hospital.

Coastal Bluffs. About 77 acres of soils would be affected by activities along the coastal bluffs. Restoring native species and replanting portions of the historic forest would temporarily disturb fairly large areas of soils. Disturbance in areas with native plant communities would be permitted only as necessary to protect and enhance these communities and would include activities such as species restoration, trail rehabilitation, and fence construction. Visitor access to the bluffs would be restricted to trails, and the focus of hiking activities would be the Coastal Trail above the bluffs.

Other soil disturbance in this planning area would occur on previously disturbed sites. Asphalt would be removed along Washington Boulevard, and the site restored.

Conclusion

A total of 351 acres of soils would be disturbed under this alternative. Most of the impacts would be short term and would involve the restoration of sites to more natural conditions. Minor recontouring might be associated with the demolition of structures, the removal of hazard trees and nonhistoric forest groves, the restoration of natural drainages, and the construction of trails. Best available practices would be applied throughout the Presidio to effectively eliminate any unacceptable or long-term resource damage associated with these activities.

Cumulative Impacts

A total of 351 acres of soils would be disturbed over the short term. In the long term soils and topography would be restored to a more natural condition; therefore, negative cumulative impacts associated with this alternative would be insignificant.

Impacts on Air Quality

Methodology

The analysis of air quality impacts is based on information in the 1993 *Presidio Transportation Planning and Analysis Technical Report* by Peccia & Associates. The assessment concentrated on the analysis of carbon monoxide (CO), the primary air contaminant generated by motor vehicles. CO is important because the emissions occur close to the ground, the emissions include constituents that combine to form ozone, and localized impacts might occur. Modeling procedures allowed baseline (1992) CO concentrations to be calculated and future CO levels to be predicted with the continuation of current uses and with proposed NPS uses; a 1% annual growth rate in regional traffic was factored into predictions for continuation of current uses. The predicted CO concentrations were compared to federal and state air quality standards for the pollutant.

The indirect source screening model contained in the Bay Area Air Quality Management District's *Air Quality and Urban Development: Guidelines for Assessing Impacts of Projects and Plans* (BAAQMD 1985, updated 1991) was used for estimating CO levels from motor vehicles. This model is based on the CALINE3 and CALINE4 models developed by the California Department of Transportation and scaled to agree with BAAQMD's findings from hot-spot analyses conducted under actual field conditions. The screening model presents CO emissions for "worst-case" meteorological conditions and can be used to estimate present and future CO levels at a variety of receptor locations and roadway configurations. Baseline and future motor vehicle emission rates (EMFAC7EP developed by the California Air Resources Board in 1991) are major elements of the screening model.

The BAAQMD guidelines recommend that the full CALINE 3 or CALINE 4 model be used for any project or planned development that would generate 10,000 or more vehicle trips per day. In this instance, the simplified CO screening model (the indirect source screening model) was used first, to identify locations where detailed computer modeling of CO was warranted.

Modeling to derive predicted levels of other air contaminants was not warranted for this project because air quality monitoring data for the Ellis Street station near downtown San Francisco shows few or no deviations of air quality standards for other vehicle-generated pollutants and the air quality at the Presidio is considerably better than downtown. However, emissions totals from motor vehicles for other pollutants of concern were derived and compared to the significant emissions levels set by the BAAQMD, using their recommended procedures.

Only alternative A was modeled in the air quality analysis because the variation in traffic generation between alternatives would be minor (less than 15%), and variations in air quality under other alternatives would be within the range of accuracy for predicting future air quality. Details of the modeling procedures employed and assumptions made in determining air quality impacts are included in appendix C.

Analysis

Predicted CO Levels Based on Screening Model. The sites used in the CO screening analysis were selected for one or more of the following reasons:

- The segment or intersection carries substantial traffic volumes.
- The site might be the location for future improvements to the road network.
- The site provides representative CO information for areas of the Presidio away from major travel corridors.

Table 36 summarizes the results obtained from the CO screening model for the selected intersections and road segments at the Presidio. The table presents predicted 1-hour and 8-hour model results for these sites based on 1992 traffic conditions and year 2010 traffic with current uses and proposed NPS uses at the Presidio. The following sections compare the predicted worst-case CO levels for these years with federal and state ambient air quality standards for CO.

Baseline (1992) CO Conditions — The screening model indicates that based on 1992 weekday p.m. peak-hour traffic conditions, none of the sites evaluated exceed the federal 1-hour CO standard of 35.0 ppm. However, three intersections (Highway 101 and Highway 1, Highway 101 and Merchant Road, and Lombard and Richardson) exceed or nearly exceed the California 1-hour CO standard of 20.0 ppm.

TABLE 36: PREDICTED CO LEVELS (PPM) AT SELECTED LOCATIONS

Location on Road Network	Baseline Conditions (1992)		Year 2010 Current Uses		Year 2010 NPS Alternative A	
	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour
Intersections						
Highways 101 and 1	21.0*	14.5*	15.8	10.9*	16.6	11.4*
Highway 101 and Merchant	19.9	13.4*	15.3	10.2*	15.5	10.3*
Lombard and Richardson	16.1	11.0*	13.2	8.9	13.2	9.0
Marina/Doyle/Lyon/Mason	11.9	8.2	9.8	6.6	10.1	6.9
Presidio and Pacific	12.5	8.5	10.7	7.2	11.1	7.5
Arguello and Jackson	10.5	7.0	9.8	6.6	10.3	6.9
Lake and 15th Street	8.3	5.6	6.9	4.6	7.2	4.8
Lincoln/El Camino Del Mar/25th	8.3	5.3	6.3	3.9	6.8	4.2
Arguello/Graham and Moraga	10.7	7.2	9.7	6.5	10.6	7.1
Lincoln and Halleck/Graham	13.1	8.8	10.7	7.2	11.0	7.4
Presidio and Lombard	12.8	8.7	10.8	7.3	11.7	7.9
Lincoln/McDowell/Park	8.0	5.4	6.8	4.6	7.1	4.8
Lincoln and Kobbe	7.4	4.7	6.4	4.0	6.5	4.1
Road Segments						
Highway 101 (Merchant to Highway 1)	16.3	10.9*	12.4	8.2	12.6	8.3
Highway 101 (Highway 1 to	14.8	10.1*	11.9	8.1	12.0	8.2
Highway 1 (south of 101)	12.3	8.4	9.8	6.7	9.8	6.7
Marina Boulevard (east of Richardson)	9.9	6.8	8.6	5.8	8.6	5.8

Federal/state ambient air quality standards for CO
Federal standard (1-hour) = 35 ppm
California standard (1-hour) = 20 ppm
Federal/California standard (8-hour) = 9 ppm

*Exceeds standards

The screening model also predicted that the federal and state 8-hour CO standards are currently exceeded at the following locations along state highways:

- Highway 101 and Highway 1
- Highway 101 and Merchant Road
- Lombard Street and Richardson Avenue
- Highway 101 (between Highway 1 and Merchant Road)
- Highway 101 (between Highway 1 and Richardson Avenue)

Year 2010 CO Conditions with Current Uses and a 1% Annual Growth Rate in Traffic — Simplified CO modeling indicated that none of the predicted CO levels at the intersections during the weekday p.m. peak hour would exceed federal or state 1-hour standards. The CO levels at two intersections (Highway 101 and Merchant Road and Highway 101/Highway 1) might exceed the federal and state 8-hour CO standard. Another site, Lombard Street and Richardson Avenue, would approach the 8-hour standard. The decrease in predicted CO levels compared to 1992 levels is primarily attributable to future reductions in vehicle emissions.

Year 2010 CO Conditions with an NPS Presence at the Presidio — Vehicle trip modeling was used to identify projected weekday p.m. peak-hour traffic volumes on the Presidio road network. The CO screening analysis focused on traffic conditions associated with alternative A because all other alternatives would result in similar levels of pollution. The assignment of external trips to and from the Presidio based on proposed activities under this alternative showed only minor increases in traffic — about 3,000 vehicles per day on Doyle Drive (Highway 101) and about 400 vehicles per day on Park Presidio Boulevard (Highway 1).

The results of the CO screening model for this future condition showed that federal and state 1-hour standards would not be exceeded at any of the selected sites. Federal and state 8-hour standards would be exceeded at the intersection of Highway 101 and Merchant Road and the Highway 101/Highway 1 interchange under alternative A traffic conditions. The CO dispersion modeling presented in the next section focuses on those two locations because the screening analysis indicates that federal and state 8-hour CO standards might be exceeded under all periods analyzed.

CO Dispersion. The CO dispersion model analyses were based on a 1-hour worst-case situation for both traffic and meteorological conditions at Highway 101 and Merchant Road and the Highway 101/Highway 1 interchange. The worst hour for CO production was assumed to occur during weekday p.m. peak-hour traffic, and the worst-case meteorological conditions were assumed to be very light winds (0.5 meters per second) and a temperature of 50°F. Background CO concentrations for the dispersion model were similar to those used in the CO screening model for each site.

Highway 101 and Merchant Road — Table 37 summarizes the worst-case CO concentrations for the receptors identified at Highway 101 and Merchant Road using the CALINE4 model for baseline and future conditions at the Presidio. The results of the CALINE4 modeling indicate that the federal 1-hour CO standard of 35 ppm is not currently exceeded and would not be exceeded under future traffic conditions. Predicted 1-hour CO levels at the receptors near the Highway 101 and Merchant Road intersection ranged from 8.4 ppm to 15.3 ppm under 1992 traffic conditions. Modeling shows that none of the receptor locations currently exceed the state 1-hour CO standard of 20 ppm during worst-case conditions.

Projected CO levels for the year 2010 with current uses and a 1% traffic growth rate and with proposed NPS uses at the Presidio showed notable decreases for all receptors at this site. The CALINE4 model results predicted that future traffic would not produce 1-hour CO levels that approached federal or state 1-hour standards.

The CO concentrations for an 8-hour period at this site can be estimated by applying a persistence factor of 0.7 to the 1-hour traffic-generated CO levels and adding the estimated 8-hour background CO level. This calculation shows that both the federal and state 8-hour standards would be equaled or exceeded at receptor locations 1, 4, and 9 under baseline conditions. Exceedances of the 8-hour CO standards are not predicted for the year 2010 at this time.

Highway 101 and Highway 1 — The intersection of Highway 101 and Highway 1 in the Presidio is a complex interchange consisting of four ramps. Traffic is not required to stop at any location at this site. Two ramps, the southbound Highway 1 ramp from westbound Highway 101 and the eastbound Highway 101 ramp from Highway 1, have sharp changes in alignment that restrict travel speeds to 20 mph and 25 mph, respectively.

TABLE 37: RESULTS OF CALINE4 "WORST-CASE" CO MODELING - HIGHWAY 101 AND MERCHANT ROAD

Receptor Number and Location	Predicted CO Concentration (parts per million)					
	Baseline Conditions*		Year 2010 Current Uses		Year 2010 NPS Alternative A**	
	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour
1. Near bridge roundhouse gift shop	15.3	10.2***	9.0	5.8	9.1	5.9
2. View/parking area NW of toll plaza	9.0	5.8	6.6	4.1	6.7	4.2
3. Next to Merchant Road north of 101	13.2	8.7	8.7	5.6	8.7	5.6
4. Near bridge maintenance building (GG 5)	14.0	9.3***	9.1	5.9	9.2	5.9
5. Near buildings 966/967	12.0	7.9	8.3	5.3	8.4	5.4
6. Outside 101 right-of-way southeast of Lincoln Boulevard	10.9	7.1	7.9	5.0	7.9	5.0
7. Near building 1659	10.6	6.9	7.0	4.8	7.7	4.9
8. Near intersection of Battery Cranston Road and Merchant Road	8.4	5.4	6.4	4.0	6.4	4.0
9. Near bridge administration building	13.5	9.0***	8.4	5.4	8.5	5.5
10. Near Building 1665	12.5	8.3	8.1	5.2	8.3	5.3

Federal 1-hour CO standard = 35 ppm, state 1-hour CO standard = 20 ppm
Federal and state 8-hour CO standard = 9 ppm

*Current traffic conditions were assumed to be 1992 p.m. peak hour traffic volumes and a 1-hour background CO level of 5.0 ppm at these locations. Projected CO levels were based on the emission factors calculated for 1990 by EMFAC7EP (California Air Resources Board, February 1991) based on standard vehicle mix and other default parameters.
**Future traffic on Highways 101 and 1 is projected to be similar under all NPS alternatives.
***Concentration would exceed federal or state CO standards.

Twelve receptors and 12 links were established at this intersection for CO modeling purposes. Table 38 summarizes the worst-case CO concentrations for the receptors using the CALINE4 model for baseline and future conditions. Predicted 1-hour CO levels at the twelve receptor locations ranged from 7.1 ppm to 15.2 ppm under baseline traffic conditions; 1-hour CO concentrations at the two receptors immediately adjacent to the highway (11 and 12) approached the 20 ppm state standard. Models for current uses continuing and for proposed NPS uses in the year 2010 show that 1-hour CO standards would not be approached or exceeded at any of the receptor locations around the interchange. Predicted 8-hour CO levels would exceed the federal and state standard of 9 ppm at receptors 11 and 12 under baseline traffic conditions and would approach the standard under future conditions; the standard would not be exceeded or approached at the remaining ten receptor sites.

TABLE 38: RESULTS OF CALINE4 "WORST-CASE" CO MODELING - HIGHWAY 101/HIGHWAY 1 INTERCHANGE

Receptor Number and Location	Predicted CO Concentration (parts per million)					
	Baseline Conditions*		Year 2010 Current Uses		Year 2010 NPS Alternative A**	
	1-Hour	8-Hour	1-Hour	8-Hour	1-Hour	8-Hour
1. North of 101 near building 1254 on Armistead Road	8.0	5.4	7.0	4.7	7.0	4.7
2. Between Highway 101 WB ramp and Armistead Road	7.8	5.3	6.9	4.6	6.9	4.6
3. Corner Armistead Road and Lendrum Court near building 1259	7.3	4.9	6.7	4.5	6.7	4.5
4. Between Highway 101 and Crissy Field Avenue near building 654	9.0	6.1	7.4	5.0	7.5	5.1
5. Cowles Street near building 650	7.9	5.3	6.9	4.6	7.0	4.7
6. East of Highway 1 near building 683	7.1	4.8	6.6	4.4	6.6	4.4
7. West of Highway 1 on Storey Avenue near building 1263	8.1	5.5	7.1	4.8	7.1	4.8
8. West of Highway 1 on Storey Avenue near building 1270	9.1	6.2	7.6	5.1	7.6	5.1
9. Playground between Storey Avenue and Battery Wagner Road	8.0	5.4	7.0	4.7	7.0	4.7
10. Southwest of interchange at buildings 1289-1290	7.9	5.3	7.0	4.7	7.0	4.7
11. Along north side of Highway 101 (roadside)	14.6	10.0***	10.6	7.2	10.8	7.4
12. Along north side of Highway 101 (roadside)	15.2	10.4***	10.8	7.4	11.0	7.5

Federal 1-hour CO standard = 35 ppm, state 1-hour CO standard = 20 ppm
Federal and state 8-hour CO standard = 9 ppm

*Current traffic conditions were assumed to be 1992 p.m. peak hour traffic volumes and a 1-hour background CO level of 6.0 ppm at these locations. Projected CO levels were based on the emission factors calculated for 1990 by EMFAC7EP (California Air Resources Board, February 1991) based on standard vehicle mix and other default parameters.

**Future traffic on Highways 101 and 1 is projected to be similar under all NPS alternatives.

***Concentration would exceed federal or state CO standards.

Total Emissions from Mobile Sources. Table 39 presents the total emissions for five vehicle-generated pollutants of concern for baseline and future traffic and land use conditions at the Presidio. The BAAQMD guidelines state that emissions levels for all mobile-source contaminants except carbon monoxide are considered to be significant whenever they equal or exceed the levels set by the agency to trigger best available control technology (BACT) requirements. The emissions levels in table 39 indicate that all vehicle-generated pollutants would exceed the BACT threshold levels of 0.075 tons per day each for hydrocarbons, nitrogen oxides, sulfur oxides, and particulates. (A BACT threshold level of 0.275 tons per day is established for stationary sources, but does not apply to mobile sources.)

It is notable that all of the mobile-source pollutant threshold levels are exceeded for current land uses and trip-generating characteristics. However, the bulk of the pollutants are generated by traffic on Highways 1 and 101 that is not related to activities at the Presidio.

TABLE 39: PROJECTED EMISSIONS FROM MOBILE SOURCES UNDER NPS MANAGEMENT ALTERNATIVE A (TONS/DAY)

Year/ Condition	Daily Emissions				
	Total Organics (HC)	Carbon Monoxide (CO)	Nitrogen Oxides (NO_x)	Sulfur Oxides (SO_x)	Particulates (PM_{10})
Presidio Baseline Condition (1992)	0.91	9.08	1.21	0.13	1.07
2010 – Continuation of Current Uses	0.59	6.98	0.94	0.10	0.74
2010 – Alternative A	0.96	10.92	1.63	0.18	0.68

NOTE: Vehicle emissions were calculated by use of the California Air Resources Board's URBEMIS 3 model recommended by BAAQMD.

Regional Air Quality Impacts. To assess the effects of proposed NPS uses at the Presidio on regional air quality, the estimated daily vehicle emissions of HC, CO, NO_x, SO_2, and particulates were compared with the projected daily totals of vehicle-generated emissions for such pollutants in the entire Bay Area air basin. The daily emissions of the pollutants shown in table 39 were compared with projections for the Bay Area air basin presented in the BAAQMD guidelines. The comparison showed that under baseline conditions (1992), vehicle emissions at the Presidio accounted for between about 1/3 of 1% (0.3%) to 1/6 of 1% (0.6%) of the individual daily vehicle-generated emissions of these pollutants in the air basin. Similar comparisons for future conditions suggested that the contributions of vehicle emission at the Presidio to the regional daily emissions might increase slightly for CO and NO_x but would not change substantially for others. Daily vehicle emissions of these pollutants would continue to account for 1% or less of the total vehicle emissions generated in the air basin. These projections would be true for all of the NPS management alternatives.

Conclusion

Although 1-hour CO levels currently approach or exceed the California standard at three locations (Highway 101/Merchant Road, Highway 101/1, and Lombard Street/Richardson Avenue), future reductions in vehicle emissions are expected to yield 1-hour CO levels below the state 1-hour standard at these sites. The screening analysis for sites at the Presidio indicated that localized 8-hour CO levels currently exceed the federal and state standard but that these conditions would improve in the future. The analysis also indicated that future traffic generated by activities associated with alternative A at other gateway or internal intersections would not produce year 2010 CO levels that exceeded federal or state standards.

The CALINE4 modeling for the Highway 101/Merchant Road and Highway 101/1 intersections indicated that the 1-hour and 8-hour CO standards would not be exceeded or approached in the future. The predicted year 2010 CO levels for these intersections due to traffic associated with alternative A would be only slightly higher than if current uses continued at the Presidio.

The emissions modeling indicated that levels of all mobile-source contaminants except carbon monoxide (hydrocarbons, nitrogen oxides, sulfur oxides, and particulates) would be significant based on measures of significance identified in the BAAQMD guidelines. However, the bulk of the pollutants would be generated

by traffic on Highways 1 and 101 that is not related to activities at the Presidio. Additional transportation measures implemented by other entities might reduce air quality impacts in the future.

Cumulative Impacts

Regional airsheds encompassing the Presidio currently do not meet air quality standards. The implementation of alternative A would have a minor (less than 1%) but adverse cumulative effect on this condition.

Impacts on Noise

Methodology

Two major sources of noise are analyzed in this section — noise related to construction and noise caused by traffic on major highways and internal roadways. The noise analysis is based on information in the 1993 *Presidio Transportation Planning and Analysis Technical Report* by Peccia & Associates. For information related to noise measurements, standards, and criteria, see appendix C.

Until the Presidio plan was fully implemented in 2010, construction activity would be a substantial source of noise. Construction-related noise was examined by assessing the impacts on land uses within the Presidio and in nearby neighborhoods. The San Francisco noise ordinance (part II, chapter VII, *San Francisco Municipal Code*) was used as a measure of impact. This ordinance limits construction noise between 7:00 a.m. and 8:00 p.m. to 80 dBA at 100 feet and construction noise between 8:00 p.m. and 7:00 a.m. to 5 dBA above the ambient noise levels at the property line.

Traffic-generated noise inside and outside the Presidio was also evaluated, and future noise-sensitive areas identified. Projected noise levels were evaluated using two compatibility standards: the Federal Highway Administration's (FHWA) noise abatement criteria (NAC) and the American National Standard Institute's *Sound Level Descriptors for Determination of Compatible Land Use* (ANSI S12 12.40-1990). The FHWA standards state that noise impacts from traffic are serious enough to warrant consideration of abatement when noise levels for the project approach or exceed the NAC or when they substantially exceed existing noise levels. "Substantially" is defined as a 10 dB increase by many state highway agencies.

Analysis

Data presented in the "Environmental Protection Element" of the city and county of San Francisco *Master Plan* (1988) indicates that background noise levels (L_{dn}) in the Presidio average less than 55 dB. This measurement indicates that existing noise levels are compatible, in general, with current and projected land uses at the Presidio according to the NAC and ANSI criteria. However, some areas of the Presidio along Highways 101 and 1 currently experience noise levels ranging between 70 and 80 dBA and might exceed NAC and ANSI guidelines. These areas are identified in the "Traffic Noise" section below; mitigating measures should be carried out in these areas to reduce interior noise levels.

Construction Noise. Construction activities under alternative A could be expected to continue on and off until the major proposals of the plan were implemented. During that period noise levels at the Presidio would vary according to the type of construction methods and equipment used. Table 40 shows the noise levels typical of various construction activities; these noise levels represent composite noise levels resulting from overlapping operation of multiple pieces of construction equipment. Within several hundred feet of a construction site, construction noise would be attenuated by distance, to ambient noise levels as shown on the table. At those distances, individual sources of noise from within construction sites would fade into background noise and could not be distinguished from it. Construction equipment contributing to the noise levels presented in table 40 is shown in table 41.

Under alternative A about 300 buildings would be demolished and removed. Noise generated by this activity could reach 84 dBA L_{eq}, but would be attenuated to a lower level by distance. Because all buildings to be removed would be at least 250 feet from the park boundary and nearby residences and facilities, the noise impacts on property owners would not be expected to be higher than 80 dBA L_{eq}. For example, the demolition and removal of the Public Health Service hospital wings would take place about 600 feet from the nearest neighborhoods, and noise levels would be below 65 dBA L_{eq}. The noise impacts from building removal on Presidio visitors and residents could be reduced below the 80 dBA L_{eq} level by closing an area of at least a 250-foot radius around the site. Some noises would be intrusive and would require mitigation by limiting construction to daytime hours. Actions proposed to reduce intrusions are discussed in the alternative A "Mitigating Measures" section.

TABLE 40: TYPICAL NOISE LEVELS DURING CONSTRUCTION OF LARGE BUILDINGS

Construction Activity	Noise Level at 50 Feet (dBA, L_{eq})[1]	Approximate Distance in Feet to Reduce Noise to Given Level (dBA, L_{eq})		
		60	65	70
Ground clearing	84	790	450	250
Excavation	89	1,400	800	450
Foundations	78	400	220	130
Erection	85	890	500	280
Finishing	89	1,400	800	450

SOURCE: Bolt, Beranek, and Newman, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, Report NTID300.1, for the U.S. Environmental Protection Agency, Office of Noise Abatement and Control, Washington, D.C., December 1971.

1. The noisiest piece of equipment is 50 feet from the receptor, and other equipment is 200 feet from the receptor. Noise levels at 100 feet from the noisiest piece of equipment would be about six dBA, L_{eq} lower than those shown above, assuming no noise attenuation by obstructions.

The infrastructure of the Presidio would be repaired under alternative A to meet applicable codes and standards. Construction and repair activities would increase noise levels to an estimated 85 dBA L_{eq} and have some impacts. However, the effects of noise levels could be reduced to below 80 dBA L_{eq} by restricting access within a 200-foot radius of any construction site (see the alternative A "Mitigating Measures" section).

Most remaining buildings at the Presidio would be rehabilitated. Noise levels related to these activities could be expected to be above 80 dBA L_{eq}, but their effects could also be lowered to below 80 dBA L_{eq} by restricting access within a 200-foot radius. Noise impacts would be different for each building. Much of the rehabilitation work would be conducted inside the facilities, which would reduce the effects of the noise outdoors.

Restoration of the Crissy Field wetlands and rehabilitation of the stream drainages along Tennessee Hollow and Lobos Creek would produce noise levels similar to those presented in table 40. Noise could reach 89 dBA L_{eq}, but probably could be attenuated to 70 dBA L_{eq} by keeping people away 250 feet from the site (see the "Mitigating Measures" section). Additional analysis would be conducted before these projects were completed. Because these sites are relatively isolated from commercial development and public review of the projects would be carried out, impacts would mainly be related to nearby uses, such as housing in the east housing and Lobos Creek areas and land uses near Crissy Field.

Noise analysis associated with Doyle Drive reconstruction would be analyzed by Caltrans at a later date, and the results included in another environmental document before the project proceeded. Noise impacts related to construction of a ferry/water taxi terminal on Crissy Field would also receive additional environmental analysis and public review and comment before implementation.

Traffic Noise. Noise levels presented in table 4 in the "Affected Environment" section provide a generalized measurement of $L_{eq}(h)$ and L_{dn} values for the noise measurement sites at the Presidio. It is reasonable to assume from the data that $L_{eq}(h)$ values would fall between the measured noise levels for each location.

From the noise data, it is also reasonable to assume the existing noise levels at the bridge plaza visitor center next to Highway 101 would exceed the NAC criteria for category C activities and land uses of 72 dBA. The high background and peak noise levels at location 5 (the 650 building near the Highway 101/Highway 1 interchange) suggest that the NAC (category C, 72 dBA) for this land use might currently be approached or exceeded.

Highways 1 and 101 — Because traffic on Highway 1 and 101 is the major source of noise and future NPS activities at the Presidio would contribute to traffic on these roadways, noise impacts would occur along their corridors. Several areas at the Presidio next to these highways are currently considered noise-sensitive and would need special consideration and monitoring under this alternative.

Noise-Sensitive Areas along U.S. Highway 1

- Officer family housing on Washington Boulevard and Kobbe Avenue
- Public Health Service hospital residential areas
- Enlisted family housing at Fort Scott
- Religious activities center

TABLE 41: TYPICAL NOISE LEVELS FROM SELECTED CONSTRUCTION EQUIPMENT

	Noise Level (dBA, L_{eq})		Approximate Distance To Reduce Noise to Given Equipment (dBA, L_{eq})		
Distance in Feet	**50**	**100**	**60**	**65**	**70**
Earthmoving					
Front loader	79	73	450	250	140
Backhoe	85	79	890	500	280
Bulldozer	80	74	500	280	160
Tractor	80	74	500	280	160
Scraper	88	72	1,260	710	400
Grader	85	79	890	500	280
Truck	91	85	1,800	1,000	560
Paver	89	83	1,400	800	450
Dredging	79	73	450	250	140
Materials Handling					
Concrete mixer	85	79	890	500	280
Concrete pump	82	76	630	350	200
Crane	88	82	1,300	710	400
Derrick	88	82	1,300	710	400
Stationary					
Pumps	76	70	320	180	100
Generator	78	72	400	220	130
Compressor	81	75	560	320	180
Impact Pile Driver[1]	100	95	5,600	3,200	1,800
Jack hammer	88	82	1,300	710	400
Rock drill	98	92	4,000	2,200	1,300
Pneumatic tools	86	80	1,000	560	320

SOURCE: Environmental Science Associates, Inc., using information from Bolt, Beranek, and Newman, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances,* Report Number NTID300.1, for the U.S. Environmental Protection Agency, Office of Noise Abatement and Control, Washington, D.C., December 1971, and Jack Golden et al., *Environmental Impact Data Book,* Ann Arbor Science Publishers Inc., Ann Arbor, Michigan, 1979.

*NOTE: Noise levels in this table are worst-case estimates for individual pieces of equipment; no obstructions between source and receptor or special noise attenuation methods for equipment were assumed.

1. The repetitive and intrusive nature of pile-driving noise generally is considered more disruptive than continuous or steady sounds of comparable level.

- Mountain Lake Park
- Presidio Golf Course

Noise-Sensitive Areas along U.S. Highway 101

- Enlisted family housing on Riley Avenue
- Officer family housing at Fort Scott (north of highway)
- Letterman complex
- Offices on Montgomery Street
- Main post exchange/commissary
- Harmon Hall USAR center
- San Francisco National Cemetery
- Office uses at the west end of Crissy Field

Traffic volumes on Highways 101 and 1 could be expected to slowly but steadily increase during the implementation period. NPS activities at the Presidio would add about 3,000 additional vehicles per day and about 400 vehicles per day to projected year 2010 traffic volumes for Highway 101 and Highway 1, respectively. Noise levels at sensitive areas next to the highways would not increase substantially above existing levels; however, the additional traffic on these roads might extend the period during which high noise levels occurred. Minor noise impacts would be monitored and mitigated where necessary. For example, residential areas with noise problems would be insulated to reduce noise levels and meet NAC and ANSI criteria.

Internal Roadways — Traffic volume increases on the internal road network might produce vehicle-related noise levels above background noise levels; however, these increases would not substantially exceed existing noise levels or the NAC and ANSI criteria. Internal roads where increases of 3,000 or more vehicles per day above current volumes are expected by the year 2010 include

- Lincoln Boulevard
- Old Mason Street
- Graham Street
- Presidio Boulevard
- Lombard Street
- Moraga Avenue (main post)

Areas that would be particularly sensitive to noise under alternative A include

- beachfront areas along the west and north perimeters of the site
- residential and ocean viewing areas along Lincoln Boulevard
- San Francisco National Cemetery
- Presidio Golf Course
- housing areas next to Highway 101 and Highway 1
- residential areas along Presidio Boulevard and Lombard Street
- Letterman complex
- Mountain Lake Park
- forested areas used for passive recreation

Noise levels would be periodically monitored in these areas, and mitigating measures instituted, if feasible, when they exceeded the NAC and ANSI standards.

Conclusion

Future noise levels in the Presidio would be minimally higher than at present but would not violate the San Francisco noise ordinance. During implementation, construction would be a source of increased noise on occasion, although this noise would be reduced to acceptable an acceptable level through mitigating actions. Noise would also increase as traffic to and from the Presidio increased. Park land uses and related internal traffic increases would not have significant impacts on noise.

Cumulative Impacts

There would be short-term cumulative impacts on noise levels as a result of Presidio construction projects and Caltrans reconstruction of Doyle Drive. Long-term cumulative impacts would primarily result from traffic on Doyle Drive (Highway 101) and Park Presidio Boulevard (Highway 1).

Impacts on Interpretation and Education

Analysis

Under alternative A visitors would benefit from expanded educational opportunities at the Presidio. Major projects would include a Presidio visitor/interpretive center at the main post, a conference and training facility at Fort Scott, a residential education center at the former Public Health Service hospital, life and earth science research and education at the Letterman complex, and a variety of programs to acquaint visitors with the Presidio's historical, cultural, and natural environment.

To ensure that visitor experiences were as safe and enjoyable as possible during the transition from military post to park, interpretive, educational, and access improvements would be completed early in implementation phasing to accommodate increased demands.

Main Post. The Presidio visitor/interpretive center would provide an easily accessible central location where visitors could get information about the park, its significance, and opportunities for learning and recreation. Because most visitors would go to the center and it would be the only destination for some of them, it would be heavily used and a critical part of interpretation. The programs and services provided there would have a major beneficial effect on visitor experiences.

The main post would also be the site of a variety of public educational and cultural programs. Museums, exhibits, and special events here would greatly expand opportunities for education and interpretation.

Fort Scott. Under this alternative a campuslike setting would be established at Fort Scott that would be used for conferences, seminars, and research and training programs expected to draw as many as 200 attendees for day-long, overnight, and extended stays (Peccia & Associates 1993). In addition, a National Park Service employee development and training center would house about 100 employees and trainees.

The establishment of a conference and training facility at Fort Scott would benefit the Park Service, the participants, and the organizations and communities they represent. Research and training in the fields of natural resource preservation and management, cultural resource preservation and management, and innovative technology would generate knowledge and practices that could be applied within the Presidio and in national park system areas nationwide; this information could potentially affect the nature and effectiveness of park management worldwide. The center would serve the global community, drawing international visitors and attendees, and would further the National Park Service's objective of resource stewardship.

Letterman Complex. Conversion of the Letterman complex from Army medical use to a park partner-operated research and education facility would provide new opportunities for San Francisco residents and visitors to attend educational programs and learn about advances in health and science.

Cavalry Stables. The stables would be renovated and reused as workshop space and classrooms for educational programming. Emphasis would be placed on preservation skills training and applications and the development and demonstration of innovative technology. One of the stables would be adapted to interpret the history of the cavalry in this area. All programs and activities at the stables would be open to the public and would provide opportunities for learning and participation.

Public Health Service Hospital. As an international school, conference center, or job training center, the Public Health Service hospital would offer a variety of educational programs and would attract national and international participants. It would house about 50 staff and 200 people attending conferences or training programs (Peccia & Associates 1993). The activities at this facility would generate new knowledge and would benefit participants and the larger community.

All hazardous substance remediation and building safety measures would be completed before the Public Health Service hospital complex was occupied (see the "Impacts on Human Health, Safety, and the Environment" section).

Crissy Field. A number of actions to be taken at Crissy Field would expand interpretive and educational opportunities for visitors. A portion of the maintenance area at the west end would be adapted as an aviation museum where people could learn about the history of flight and of past activities at the airfield. The Coast Guard lifesaving station would be rehabilitated to provide education programs focusing on marine ecology. Programs would be provided in the open space areas of the field, particularly the restored wetlands, to increase knowledge and understanding of the functioning of natural systems and their importance to the health of the environment.

East Housing Area, Presidio Hill, Presidio Forest, Lobos Creek Valley, and Coastal Bluffs. Programs in other open space areas would expand interpretive and environmental education opportunities for visitors. The El Polin Spring and the Tennessee Hollow drainages, Mountain Lake and Lobos Creek, large areas of the Presidio forest, and the sensitive coastal bluff ecosystems would all be restored, protected, and opened for both structured programs and individual appreciation.

Conclusion

Alternative A would increase educational opportunities for visitors throughout the Presidio. Conferences, seminars, training, demonstrations, interpretation, and environmental education at the main post, Fort Scott, the Letterman complex, the cavalry stables, the Public Health Service hospital, Crissy Field, and other open spaces areas would encourage learning, attract national and international visitors, and contribute to National Park Service stewardship through environmental education.

Cumulative Impacts

Programming at the Presidio and Golden Gate National Recreation Area would contribute to regional and national efforts to expand interpretive and educational opportunities for the public. Additional educational resources would be available for Bay Area residents and visitors.

Impacts on Recreation

Analysis

Alternative A would expand opportunities for public recreation throughout the Presidio. In general, existing recreational facilities such as the golf course, tennis courts, pools, and gyms would be maintained and opened to the public. A few facilities would be removed to expand natural habitat and enhance the cultural landscape. Improvements such as new trails, including the Bay Area Ridge Trail and Juan Bautista de Anza National Historic Trail, would be designed and constructed to improve bicycle and pedestrian circulation and connect the Presidio trail system to the existing regional network. A total of 11 miles of hiking trails would be established, an increase of 5.5 miles; 11 miles of bicycle routes would be designated on existing roads. Specific recreational improvements and their impacts are summarized below by planning area.

Main Post. New visitor opportunities and services would be offered at the main post. Recreational facilities, including the gymnasium, movie theater, bowling alley, and tennis courts, would be opened to the public. A pedestrian district would be created by establishing a network of pathways to link buildings and public outdoor spaces. Seating, drinking fountains, and night lighting would be included to make the area safer, more comfortable, and more convenient to people on foot. Cultural activities would provide opportunities for visitors to participate in celebrations of cultural diversity and of the contributions of individuals and groups to the American heritage and culture.

First-time visitors and tourists would benefit from the establishment of the main post visitor/interpretive center, which would provide orientation to the diverse recreational opportunities on the site and in Golden Gate National Recreation Area.

Golden Gate/Fort Point. Proposed design changes at the Golden Gate Bridge and Fort Point would benefit sightseers and recreational users in particular. Parking and viewing areas would be developed on the east and west sides of the bridge plaza after the existing maintenance facility was removed. The hiking trail between the Golden Gate promenade at Fort Point and the bridge plaza and Coastal Trail would be improved to provide easier access and better resource protection. A pedestrian walkway would be established along one side of the Marine Drive roadway to separate pedestrians and motorists traveling to Fort Point. Access for fishing would be improved, and a "warming hut" with food service established, in the torpedo wharf area.

Fort Scott. The historic ballfield at the north end of the Fort Scott parade ground would no longer be available to the public. The field would be maintained in its historic configuration for use by people attending Fort Scott training, conferences, and seminars, but the associated lighting system and other nonhistoric features would be removed. The nearest ballfield open to the public would be the Pop Hicks facility in the east housing area. The gymnasium and tennis courts at Fort Scott would also be available for use by people attending programs; they would not be open to the general public.

Letterman Complex. The two tennis courts, gymnasium, and indoor swimming pool would be opened to park visitors. These facilities would provide additional recreational opportunities.

East Housing Area. A number of improvements would benefit recreationists in the east housing area. Existing trails and facilities that support hiking, interpretation, and picnicking would be upgraded, and new facilities provided. A trail would be developed along the restored riparian corridor between El Polin Spring and Crissy Field (about 4,000 feet). Trailhead parking would be established at Quarry Road to provide access the trail system in the area. Lovers Lane, the historic path that traverses Tennessee Hollow east of Funston Avenue, would be rehabilitated. The Pop Hicks ballfield off Quarry Road would be improved for public use.

Crissy Field. Visitors would benefit because of services and facilities established to support popular recreational activities at Crissy Field — walking, running, bicycling, boardsailing, and picnicking. The Golden Gate promenade would be realigned, resurfaced, and made a continuous route from Marina Gate on the east to Fort Point on the west. Access to the water would be channeled along designated paths. Bike lanes would be established on adjacent roadways to separate speed biking from slower recreational use. Restrooms, bicycle racks, picnic tables, and benches would be provided at key locations. Beach access would be established at the east end of the promenade for sailboarders, and freshwater washdown hoses and showers would be provided.

The development of wetlands and expansion of dunes would make Crissy Field more sensitive to disturbance by crowds of people. As a result, large events like the 4th of July celebration would be phased out. This action has been recommended by GGNRA staff, Army Presidio staff, and the Golden Gate National Park Association (NPS 1988b); however, it might disturb people accustomed to attending such events at the field. Additionally, some bicyclists, joggers, and walkers might be inconvenienced or annoyed because use of the path along the beach would be restricted to prevent random access into sensitive environments.

Presidio Hill. Opening of the 18-hole golf course for public use would provide additional opportunities for recreational golfing. Mountain Lake would continue to provide opportunities for outdoor recreation and nature study.

Presidio Forest. The upgraded and expanded trail system through the Presidio forest would provide new opportunities for hikers and other recreationists. This system would link natural and cultural sites within the Presidio and would connect to the Bay Area Ridge Trail and other regional trails. The Rob Hill camping area would be upgraded for group campers and Julius Kahn Playground would continue to provide recreational facilities for group campers and neighborhood residents.

Lobos Creek Valley. The 3,000-foot trail that runs from the Public Health Service hospital north of the Army Reserve center to Baker Beach would be upgraded, benefitting hikers in the southern part of the Presidio. Visitor access to Lobos Creek would be provided from the Baker Beach parking lot, but access beyond the water treatment plant would be restricted. The unmaintained ballfield next to the reserve center would be removed; neighborhood residents who currently use the ballfield would no longer have access to this facility.

Coastal Bluffs. Hikers and visitors interested in nature study would enjoy benefits of improved access and trail design in the coastal bluffs area. A trailhead at Baker Beach would provide access to and an overview of the Coastal Trail; improvements would be made to reduce overflow parking problems; and additional interpretation would be provided at appropriate locations.

Conclusion

Under alternative A most existing recreational programs and facilities would be opened to the public, and additional hiking trails (5.5 miles), biking routes (11 miles), picnic areas, and other recreational amenities would be provided. The overall increase in recreational opportunities would benefit both out-of-town and local visitors. The removal of one ballfield and restricted use of another would have a short-term adverse effect on current users; however, other facilities would be available for these types of activities.

Cumulative Impacts

The provision of open space and facilities for the public at the Presidio and Golden Gate National Recreation Area would have a small but positive cumulative effect on recreational opportunities in the Bay Area.

Impacts on Scenic Viewing

Methodology

The scenic resources of the Presidio are a product of varied topography, extensive and diverse vegetation, and distinct visual units or unified architectural districts. Views of the Presidio are available in the surrounding region, at the site perimeter, along travel routes through the Presidio, and from architectural

districts within the boundary. The following factors were considered in analyzing potential visual impacts:

- visibility of the proposed landscape changes from major viewpoints (would the changes be seen and would they be visually conspicuous)
- compatibility of landscape changes with the existing cultural landscape (would changes be in keeping with the historic character of the area)

The potential visual impacts of alternative A are summarized below by planning area.

Analysis

This alternative would provide for maximum protection of cultural and natural resources and for enhancement or restoration of many landscape features. In general, landscape changes would be in keeping with the historic character of the area and would provide significant additional opportunities for scenic viewing.

Main Post. Restoration of the main parade ground, removal of 29 buildings, clearing of trees at Infantry Terrace, and restoration of the riparian corridor in this area would be compatible with the existing landscape character and would have a positive effect on the visual unity of the main post. The development of a transit hub at the north end of the main parade ground would create visual order in an area now dominated by parking, a mix of architectural styles, and spotty landscaping. Site design detailing and landscaping would improve the site's scenic qualities.

Golden Gate/Fort Point. Fort Point, currently a landmark and scenic viewing area, would not be significantly affected under alternative A. The removal of nonhistoric maintenance structures on the west side of the Golden Gate Bridge plaza would enhance scenic and historic vistas and have a positive effect on the visual quality of this gateway area. Proposed relocation of the parking area and new scenic viewpoints would also improve access and viewing opportunities at the coastal batteries west of the plaza.

Fort Scott. The visual integrity of the Fort Scott area would be enhanced. Removal of the nonhistoric lighting at the ballfield, restoration of the historic parade ground, gardens, and landscaped areas, and removal of 13 nonhistoric buildings would enhance the visual continuity of the historic landscape and maintain the inward-focused views of the Fort Scott area. Existing scenic vistas toward the bay and Golden Gate would also be maintained and improved by landscaping north of Lincoln Boulevard.

Establishing additional parking areas at Fort Scott would somewhat diminish the visual integrity of the site; however, these areas would be dispersed and would be designed and sited to reduce impacts.

Letterman Complex. The Letterman complex is not high in scenic quality. Some improvements in the area's setting would result from removal of pavement and six buildings, restoration of the courtyard area behind the former administration building, and relandscaping.

The 10-story modern hospital building would be demolished and removed. This would enhance the visual integrity of the Letterman complex and greatly improve views from many vantage points within the Presidio.

Cavalry Stables. The natural setting and visual integrity of this site would be preserved and enhanced. Three buildings and a large amount of exotic vegetation would be removed, permitting restoration of some of the historic vistas toward Crissy Field. New parking north of the stables might diminish the visual integrity of the area, but proper design and siting would reduce its impact.

Public Health Service Hospital. This complex, on the Presidio's southern boundary, is physically and visually distinct from other areas in the Presidio. Although not high in visual quality, the complex, particularly the south-facing facade of the modern addition, is visible from some regional viewpoints. Removal of the hospital addition, as proposed in alternative A, would enhance the visual continuity of the 1930s structure and result in a visual scale more appropriate to the surrounding neighborhoods. In addition, removal of five nonhistoric buildings would increase the integrity of the historic setting.

East Housing Area. The unity and scenic quality of the east housing area would be improved after removal of 37 nonhistoric buildings in the El Polin Spring area and restoration of the riparian corridor. This area, which is partially visible from the neighborhoods to the east, has views out to San Francisco Bay from the historic residences. These views would be enhanced by actions proposed in alternative A.

Crissy Field. Crissy Field provides outstanding regional views. The removal of 61 buildings along the bayfront would open up views of the bay and reinforce the

unity of the flat, open landscape. Thirty acres of dune restoration and 20-80 acres of wetland restoration would also enhance the area's scenic qualities. Views from Highway 101 across Crissy Field to the bay would improve.

Presidio Hill. Much of the Presidio Hill area is highly visible from regional viewpoints. The character of the golf course and views from this facility would be unaffected by alternative A. The eventual removal of the Wherry housing area (141 buildings), which contrasts sharply with its surroundings, would improve views from Lincoln Boulevard and other regional viewpoints and would visually unify the Presidio Hill area. Short-term visual impacts would occur during structure removal and before revegetation.

Expansion of the golf course parking area and possible construction of a new clubhouse could increase visual impacts if vegetation was removed and the site became visible from the adjacent neighborhood.

National Cemetery. The national cemetery, a historic designed landscape, would be unaffected by proposals in alternative A. Regional views from the cemetery landscape to the north and west would also be unaffected by proposals.

Presidio Forest. The Presidio forest is currently one of the most highly visible areas in the Presidio and a character-defining component of the site. Extensive management and replanting of the mature forest of Monterey pine, Monterey cypress, and eucalyptus would preserve and enhance the visual qualities of this area. Redesign of the Inspiration Point scenic viewpoint and management of view corridors would increase the number and diversity of regional views from this point.

Tree removal and revegetation with native plants to restore historic forest boundaries in some areas would cause short-term visual impacts. In the long term, however, scenic vistas would be reestablished and scenic viewing would improve.

Lobos Creek Valley. Restoration of riparian and dune habitats within the Lobos Creek valley would improve the visual qualities of this generally enclosed space. The Army Reserve center would continue to be screened by existing vegetation. However, from some vantage points, the maintenance yard and facilities would intrude on views along Lincoln Boulevard and in nearby neighborhoods.

Coastal Bluffs. The coastal bluffs would be managed to retain "wild coast" character. Visual quality would be generally unaffected or would be improved through landscape reclamation and revegetation. Regional views to and from the coastal bluffs would also be unaffected.

Regional Visibility. Little change would occur in areas with high regional visibility, including the Presidio forest, national cemetery, and coastal bluffs. In these areas, which include stands of trees visible from distant viewpoints, the historic forest would be maintained and managed. In the Presidio Hill area, some buildings would be removed and the areas replanted with native and historic forest species. At Crissy Field, building removal and bayfront dune/wetland restoration would enhance regional views from the north. The removal of the 10-story Letterman hospital building would also improve these views.

Perimeter Views. Views into the Presidio from the surrounding neighborhoods (to the south and east) would be virtually unaffected under alternative A. Management of the existing vegetation along the Presidio's east and south sides would maintain the visual quality of current perimeter views into the Presidio.

Highway Views. Three main highways traverse the Presidio and provide limited views into the site. Views from Lincoln Boulevard, Park Presidio Boulevard, and Doyle Drive would generally be unaffected. In most areas vegetation would be managed to maintain the current visual screening by roadside trees. Building removal at Crissy Field and in the Wherry housing area would improve scenic views from Doyle Drive and Lincoln Boulevard, respectively. Future improvements to Doyle Drive could have both positive and negative visual impacts on the Presidio and internal views.

New Construction. New construction at Fort Scott, the golf course, and potentially the Letterman complex could have impacts on the historic scene. Careful design and siting would integrate new construction to ensure compatibility with the historic setting and preservation of scenic views.

Conclusion

This alternative would have positive effects on scenic viewing opportunities and the visual qualities of the Presidio. Major restoration at Crissy Field and in Tennessee Hollow and Lobos Creek, selected removal of trees and groves of trees, and removal of 301 buildings would significantly enhance scenic viewing within the Presidio.

Cumulative Impacts

Actions under alternative A and other resource management actions at Golden Gate National Recreation Area would have a positive cumulative effect on scenic vistas and viewing in the region.

Impacts on Human Health, Safety, and the Environment

Analysis

As described in the "Affected Environment" section, the Army is currently negotiating a federal facility site remediation agreement with Cal EPA that will establish procedures and timetables for the cleanup of hazardous substances, pollutants, and contaminants (including underground storage tanks) at the Presidio. Although the agreement is not finalized, the Army is in the process of implementing these procedures. This DEIS does not analyze the cleanup process that the Army and Cal EPA will implement; it does, however, provide information regarding the currently known extent of contamination, as determined by the Army. When site investigations now in progress are completed, the Army will propose a cleanup plan that will be subject to public and regulatory agency review.

Hazardous Substances, Pollutants, and Contaminants. Risks to human health, safety, and the environment at the Presidio are largely due to releases of hazardous substances, pollutants, and contaminants. Table 42 summarizes the study areas identified by the Army, contaminated media, and health and safety risks. The Army has detected hazardous substances at the Presidio, and these substances are identified in the Hazardous Substance Study Areas map.

Salinity. Groundwater in the 900 series buildings area is brackish, with 45 times the maximum permitted conductivity in California drinking water. Under proposed amendments to the *Ground Water Basin Plan* (Regional Water Quality Control Board [RWQCB] 1992), groundwater that exceeds 3,000 ppm total dissolved solids (levels this high are mainly salt) would not be regulated as potential drinking water supplies. Groundwater at Crissy Field would not be used for drinking water or irrigation.

Underground Tanks. The Army has developed an underground storage tank management plan to remove about 236 tanks at the Presidio. Of these, 22 are active and at least 162 are inactive. Forty-seven are of unknown status.

During phase 1 of the plan, 91 underground storage tanks are scheduled for removal; the balance of the tanks would be removed under the next two phases of the plan. Nineteen storage tanks are scheduled to remain active after the completion of all phases of removal program. These 19 tanks would be upgraded or removed and replaced with tanks meeting existing regulatory standards.

The cleanup and remediation of underground storage tanks could delay the implementation of portions of the proposed action. To protect the public from exposure to health hazards, public access to affected areas would be restricted. Final cleanup levels have not yet been determined for the various sites; therefore, long-term exposure risks are unknown at this time. However, all cleanup levels would be approved and enforced by Cal EPA. The Army has also stated that its cleanup actions would be protective of human health and the environment.

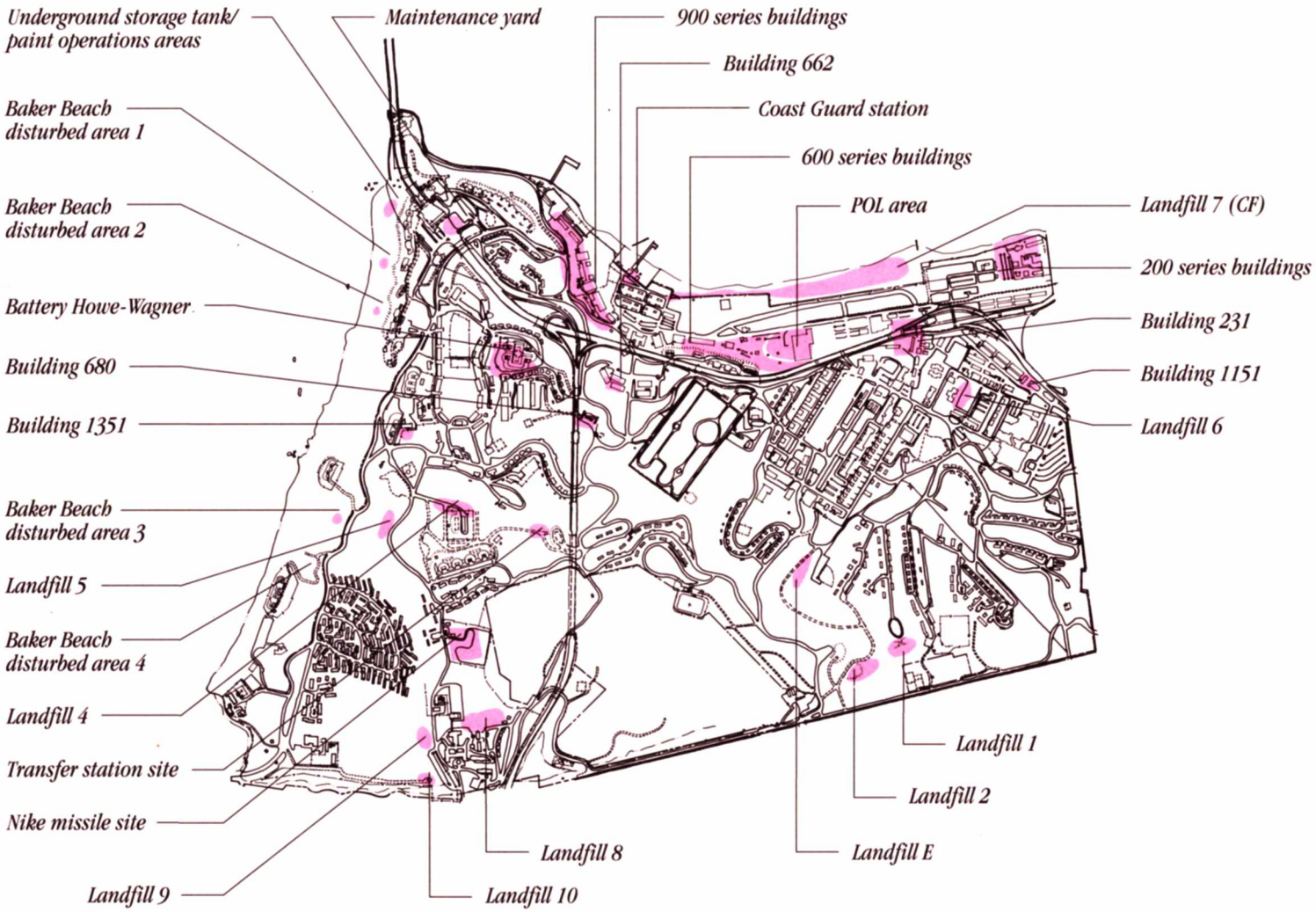
Conclusion

Sites with the highest calculated cumulative cancer risks for recreational and residential land uses have been identified by the Army and are listed in table 43. The cumulative cancer risks estimated for recreational use of land near buildings 283, 924, 925, 929, 930, 931, 933, 935, and 937 and landfills 2, 3, and 9 are low because they do not include the effects of carcinogenic PAHs in the soil. Army consultants indicated that the information necessary for such calculations was unavailable. Sites with the highest noncancer risks are shown in table 44.

The Army's cleanup of the areas identified in table 43 might pose unknown short-term risks. In addition, local contamination of groundwater might preclude its use for drinking water or irrigation.

Building rehabilitation or demolition under this alternative might pose potential health risks because of exposure to lead and asbestos. Other short-term risks might result from grading to develop new roadways, trails, etc., which could cause dispersal of contaminated dust. However, implementation of mitigating measures would reduce these risks to acceptable levels.

The long-term impacts on human health and the environment from hazardous substances, pollutants, and contaminants are uncertain because the Army has not yet finalized cleanup plans and has not yet completed all cleanup activities that are required.



Hazardous Substances Study Areas

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

TABLE 42: HEALTH, SAFETY, AND ENVIRONMENTAL RISKS RELATED TO HAZARDOUS SUBSTANCES, POLLUTANTS, AND CONTAMINANTS

Substance	Known Sites	Contaminated Media	Health/Environmental Effect
Antimony	Building 937; landfill 2	Groundwater, soils	Poisonous; accumulates in some plants; groundwater would not be used for drinking water or irrigation.
Arsenic	Main post; 600 and 900 series buildings; landfill 1; disturbed area E; Lobos Creek	Soils, well water, groundwater, sediments	Causes cancer and other ailments; potential threat to wetlands organisms; accumulates in some plants and animals; well water and groundwater would not be used for drinking or irrigation.
Asbestos	About 80% of buildings	Buildings, serpentine soils and rock	Causes asbestosis, lung cancer, and mesothelioma.
Benzene	Buildings 937, 979	Groundwater	Causes cancer, specifically leukemia and lymphoma; may alter ecological balance; groundwater would not be used for drinking water or irrigation.
Cadmium	Buildings 900, 930-931, 950, 937; landfill 9	Soils, storm drain sediments, groundwater	Causes lung cancer and kidney damage; accumulates in people, animals, and fungi; ecological balance may be altered.
Chromium	POL area; buildings 926, 937, 1351	Groundwater, some soils	Causes lung cancer; is toxic to plants; accumulates in some trees.
Copper	Buildings 110, 637, 638, 924, 926, 930-931, 937; 900 series building area	Soils, storm drain sediments, buildings, groundwater	Causes vomiting, dizziness, exhaustion, and damage to red blood cells, nervous system and kidneys; bioaccumulated by and toxic to some plants and animals.
DEHP (bis[2-ethylhexyl]phthalate, dioctylphthalate)	Buildings 283, 937, 1351; 900 series building area; landfill 3	Storm drain sediments, groundwater, soil	Causes cancer and birth defects; bioconcentrated by some animals and plants; groundwater would not be used for drinking water or irrigation.
1,4-Dichlorobenzene (paradichlorobenzene)	Buildings 930-931, 932	Soil	Causes kidney and liver cancer and other ailments.
1,2-Dichloroethane (1,2-dichlorathylene, ethylene dichloride)	Buildings 640, 937	Storm drain sediments, groundwater	Causes cancer; toxic to some wildlife; water would not be used as drinking or irrigation water.

TABLE 42: HEALTH, SAFETY, AND ENVIRONMENTAL RISKS RELATED TO HAZARDOUS SUBSTANCES, POLLUTANTS, AND CONTAMINANTS

Substance	Known Sites	Contaminated Media	Health/Environmental Effect
1,1-Dichloroethene (vinylidene chloride)	Buildings 937, 979	Groundwater	Causes cancer and damage to the liver, kidneys, and reproductive system; toxic to wildlife; groundwater would not be used for drinking or irrigation.
trans-1,2-Dichloroethene	Buildings 937, 979	Groundwater	Has neurological effects; groundwater would not be used for drinking or irrigation.
2,4-Dimethylphenol (2,4-xylenol)	Buildings 283, 937	Buildings, groundwater	Causes cancer; is toxic to fish; groundwater would not be used for drinking or irrigation.
Lead	Buildings 268, 283, 637, 638, 643, 662, 737, 924, 925, 926, 929, 930-931, 933, 935, 937, 950, 973, 1351; 900 series building area; disturbed area E; landfills 2, 3, 4, 7, 9; Lobos Creek; Coast Guard station; POL area	Soils, storm drain sediment, building surfaces, groundwater, water	Is a neurotoxin that particularly affects the brains of children, causing decreased intelligence, impaired decision making, lapses in concentration, kidney, lung, and bone cancer, anemia, central and peripheral nervous system damage, fetal damage, prematurity, decreased birth weight, and high blood pressure; accumulates in bone and some plants; hazardous for birds, animals, and some plants.
Manganese	Buildings 637, 643, 926, 937, 1351; 900 series building area; landfills 3, 4, 5, 7, 9;	Soils, storm drain sediments, groundwater	Causes neurological damage; accumulates in some plants; alters ecological balance.
Mercury	Buildings 638, 933, 937, 950; 900 series building area; landfills 2, 3, 9; disturbed area E	Soils, storm drain sediments, groundwater	Causes damage to kidneys, nerves, and chromosomes; accumulated by kidneys and fetuses; may cause cerebral palsy and mental retardation.
Methylene chloride	Buildings 929, 930-931, 933, 935, 937	Soils	Causes cancer; has central nervous system effects; is toxic to some wildlife.
2-Methyl naphthalene	Buildings 937, 979; landfills 3, 9	Soils, groundwater	Is bioaccumulated by fish.
Nickel	Buildings 929, 937, 1351; 900 series building area; landfills 1, 3; POL area; consolidated motor pool area	Soils, groundwater	Is accumulated by and toxic to many plants; water would not be used for drinking.

TABLE 42: HEALTH, SAFETY, AND ENVIRONMENTAL RISKS RELATED TO HAZARDOUS SUBSTANCES, POLLUTANTS, AND CONTAMINANTS

Substance	Known Sites	Contaminated Media	Health/Environmental Effect
Pesticide - Aldrin	Building 293; landfills 3, 4; Mountain Lake sediments	Soils	Causes liver cancer; is accumulated by mollusks; is toxic to fish and crabs.
Pesticide - Chlordane	Building 293; landfill 4	Soils	Causes lymphoma and damage to liver, nervous system, and reproductive system; is toxic to insects and fish.
Pesticide - pp'DDD	Building 293; landfills 3, 4, 5	Soils	Is bioaccumulated by and toxic to wildlife.
Pesticide - pp'DDE	Landfills 3, 4, 5, 7; commissary parking lot	Soils	Is a mutagen and carcinogen; is bioaccumulated by and toxic to wildlife.
Pesticide - DDT	Building 293; landfills 3, 4, 5; commissary parking lot	Soils	Causes lymphoma; is toxic to fish and other wildlife.
Pesticide - Dieldrin	Building 293; landfills 3, 4, 5, 7; commissary parking lot	Soils	Causes liver cancer; is a teratogen; kills sensitive fish and marine life; is bioconcentrated by some animals.
Pesticide - Endrin	Buildings 293, 979; landfills 3, 4, 7, 9	Soils	Causes cancer; is bioaccumulated by some marine animals; is toxic to insects and fish.
Pesticide - Endosulfan	Building 293; landfills 3, 4	Soils	Is bioaccumulated by and toxic to fish.
Pesticide - Heptachlor	Building 293; landfills 3, 4, 5; Mountain Lake water	Soils, water	Causes liver cancer; is bioaccumulated by and toxic to fish and other wildlife; is persistent.
Pesticide - Lindane	Building 293; landfills 3, 4, 5; Mountain Lake sediments	Soils, lake sediments	Suspected to cause leukemia; kills sensitive fish and other wildlife.
Polyaromatic hydrocarbons (PAHs)	Buildings 640, 643, 979; Nike missile site; landfills 3, 8, 10; disturbed area E; 900 series area	Soils, storm drain sediments	Causes cancer; inhibits sperm formation; has immune system effects; is bioconcentrated by some marine animals.
Polychlorinated biphenyls (PCBs)	Buildings 228, 231, 680, 1151; Coast Guard station	Soils	Causes cancer, skin rashes, and liver enzyme changes.
Tetrachloroethene (perchloroethylene)	Buildings 930-931, 937	Soils, groundwater	Causes cancer, damage to liver, kidneys, and reproductive system, and nervous system effects; is toxic to fish.

TABLE 42: HEALTH, SAFETY, AND ENVIRONMENTAL RISKS RELATED TO HAZARDOUS SUBSTANCES, POLLUTANTS, AND CONTAMINANTS

Substance	Known Sites	Contaminated Media	Health/Environmental Effect
Total petroleum hydrocarbons	Buildings 638, 937, 950; series 900 building area; POL area	Groundwater, sediments, soils	Has neurological effects; is toxic to wildlife.
Trichlorethene (TCE)	Buildings 937, 979	Groundwater	Causes cancer; is toxic to plants and animals; water would not be used for drinking or irrigation.
Vanadium	Buildings 637, 643; landfills 3, 5, 9	Soils	Is hazardous to mammals and toxic to plants.
Vinyl chloride	Buildings 937, 979; Crissy Field	Groundwater, storm drain sediments	Causes cancer; water would not be used for drinking or irrigation.
Zinc	Buildings 268, 638, 924, 926, 929, 930, 931, 933, 935, 937, 950, 1351; 900 series building area; landfills 2, 3, 4, 5, 9; disturbed area E	Soils, storm drain sediments, buildings, dust, groundwater	Bioaccumulates in various plant and animal organs, including the mammalian eye and the prostate gland; is toxic to some plants and small mammals; groundwater would not be used for drinking or irrigation.
Salinity	900 series building area	Groundwater	Groundwater would not be used for drinking.

NOTES: Building numbers indicate general locations; they do not mean that the hazardous material is in a specific building.
Health/environmental effects listed are those generally associated with the relevant substance; all of these effects may not occur at the Presidio.

TABLE 43: HIGH-RISK CANCER SITES FOR RESIDENTIAL LAND USE

Site	Cancer Risk
Nike facility	5 in 10,000[1]
Building 1151	3 in 10,000
Coast Guard station	3 in 10,000[2]
Building 680	2 in 10,000
Building 228	2 in 10,000[3]
Building 231	2 in 10,000[3]

1. Watkins-Johnson Environmental, Inc., et al. 1993
2. Not calculated in the 1992 risk analysis because of a decision that residential use was unlikely.
3. Watkins-Johnson Environmental, Inc., et al. 1993 shows zero risk on the grounds that there are "no chemicals of concern for this exposure pathway [soil] and scenario."

TABLE 44: SITES WITH NONCANCER RISKS

Site	Land Use
Building 228	Residential
Building 231	Residential
Building 293	Recreation
Building 1351	Residential
Landfill 1	Residential
Landfill 2	Residential
Landfill 4	Residential
Disturbed area E	Residential

Cumulative Impacts

The specific cumulative impacts of hazardous substance remediation (including underground storage tanks) at the Presidio are unknown at this time because the Army has not fully characterized the extent of the contamination and because cleanup plans have not been finalized. However, if the Army fully remediates the identified contamination, there would be a beneficial cumulative impact on human health, safety and the environment. Over the long term, the removal of asbestos and lead-based paint in buildings would also have a beneficial cumulative impact.

Impacts on Energy Consumption

Methodology

Given the extent of the proposed building rehabilitation at the Presidio and variables involved in types of buildings, design of buildings, and construction materials, an analysis of energy consumption at a British thermal unit (Btu) level is complex. Much of the following discussion is based on a comparison to conditions at the existing military post and on NPS *Energy Conscious Planning Guidelines* (1991) and existing NPS requirements.

Analysis

The energy requirements under alternative A would be similar to those of a small community. The Presidio would have 3,600 residents and 5,900 employees in 2000; these numbers would decrease to 1,400 residents and 5,500 employees in 2010. However, NPS control of the planning and design of future infrastructure changes would significantly reduce actual energy consumption. During rehabilitation of structures, numerous energy design requirements would be stipulated. The removal of about 300 buildings under this alternative would also significantly reduce energy needs at the Presidio. Many of these buildings are energy-inefficient.

The use of water conservation devices and techniques for all structures would significantly reduce the amount of water needed, thus reducing the amount of power needed to pump both water and sewage. Such conservation devices would include restricted-flow shower heads and faucets and low-volume flush toilets. Use of reclaimed water for irrigation, up to 1 million gallons per year, would reduce the overall need for potable and nonpotable water from Lobos Creek.

One of the major uses of energy at the Presidio would be fuel consumption, primarily by Presidio shuttle buses. Visitor shuttles are expected to travel about

40,000 miles per year around the site. Assuming that the 30-passenger shuttles averaged 10 miles per gallon, they would use about 4,000 gallons of fuel. The shuttles would be alternative-fuel vehicles. Public transit use would reduce gas consumption by eliminating some automobile trips. Additionally, the Park Service vehicle fleet would consist of alternative fuel vehicles to the extent possible.

Conservation Measures

In accordance with the energy conservation requirements of Executive Orders 11912 and 12003, alternative A would provide for an aggressive energy conservation program. The Park Service would expand the energy conservation public education activities previously carried out by the Army, develop a comprehensive energy conservation plan, and develop specific measures to minimize building energy use for each building to be renovated.

Conclusion

Because of the number of buildings to be removed, the use of reclaimed water, and the increased efficiency of rehabilitated buildings, energy consumption would be expected to decrease at the Presidio under this alternative.

Cumulative Impacts

Energy-reducing measures at the Presidio and Golden Gate National Recreation Area would have a minor but positive effect on energy conservation in the region.

Impacts on NPS Management and Operations

Methodology

To assess the impacts on park management and operations, the fiscal and staffing requirements related to site development, infrastructure repair, transportation services, housing removal and reuse, and annual operations were determined, and their effects on future services were evaluated. The potential effects of concession revenues were also considered.

Site Development. Site development includes all activities required to achieve the design goals under this alternative, including building removal, repair and rehabilitation of remaining buildings, road, intersection, and parking improvements, landscaping, and natural habitat restoration. The fiscal impacts on park management related to proposed site development activities under this alternative were analyzed.

Infrastructure Rehabilitation. Infrastructure rehabilitation costs were developed by assessing the deficiencies of the current systems and developing a program for future repair. These infrastructure costs are described in *Subagreement #3, Base Operations Expenses* (U.S. Army and Department of the Interior 1992). Future water, sewage, and electrical demands were estimated and compared to current conditions to determine potential impacts.

Transportation Services. The potential for and costs of internal shuttle bus service and ferry service were analyzed, and cost estimates generated.

Operations and Staffing. Personnel and budgets needs for operating the Presidio were analyzed by reviewing the current Army budgets and staff levels of the Presidio and projecting staffing and funding levels needed by the year 2000. It was assumed that full staffing would be needed by the year 2000 and that it would be the same in 2010. Projected staff levels were derived based on resource programs proposed and projected visitation levels.

Concession Revenues. The potential concession revenues for food and beverage, lodging, and retail visitor services were analyzed. The portion of the revenues that might be returned to the park was not estimated, because there is no standard percentage rate provided in the most current release of *NPS-48, Concessions Management Guideline* (NPS 1992h). Concession contracts are currently negotiated on a park-specific basis, and returns to the park are anticipated from franchise fees, building use fees, and contributions to capital improvements or the general fund.

Analysis

Site Development. Site development, including building rehabilitation, and associated planning activities for full implementation of alternative A are expected to cost about $777 million. Approximately $470 million would be borne by future tenants, $111 million by the military, and $196 million by the National Park Service.

Infrastructure. Repair and rehabilitation of infrastructure systems — water, sewer, storm drain, electrical — has been initiated at the Presidio. Once completed, the infrastructure would meet applicable local, state, and federal regulations and laws.

Water Supply and Distribution System — No major changes in water supply and distribution facilities are anticipated beyond repair and rehabilitation of the

current deficiencies, including the widespread lack of adequate fire flow noted in the "Affected Environment" section. To correct deficiencies in water supply and distribution would cost $15.4 million.

Total demand for water under Army use in 1992 was estimated at 1.8 million gallons a day (Swanson 1993). Projected demands for potable water under alternative A are estimated at 529,000 gallons per day in the year 2000 and 375,000 gallons in the year 2010. An additional 1.0 million gallons per day for irrigation would be needed, primarily for the golf course, cemetery, and parade grounds.

Lobos Creek, a surface water supply, provides most of the potable water for the Presidio. The surface water treatment regulations of the state of California (*California Administrative Code*, title 22) require that all surface water supplies be filtered by July 1993. The Park Service has established a process for upgrading the water treatment plant to meet state regulations.

The city and county of San Francisco is now in the process of developing a water reclamation plan. Alternative A calls for the use of up to 1 million gallons per day of reclaimed water for irrigation at the Presidio in the year 2000. Once the reclaimed water system was completed and connected to the Presidio, the Presidio should be able to beneficially use reclaimed water from the city. Rates would cover the costs of city services provided to the Presidio. Lobos Creek water now used for irrigation would be available for natural resource protection and other uses. Water system improvements related to connecting to the San Francisco reclamation plant would be subject to further environmental analysis.

Storm Drainage System — Under alternative A the Park Service would own, maintain, and operate the entire storm drainage system at the Presidio, which is separate from the sewage system. The cost of repairing and rehabilitating the system is estimated at $8.1 million; funds have been appropriated to upgrade the system in 1994. No additional demands or impacts on this system are anticipated.

Sanitary Sewer System — Under this alternative the Park Service would own, maintain, and operate the Presidio sewer collection system. Wastewater would be fed into the city of San Francisco wastewater system for treatment and disposal.

Most of the existing sanitary sewers suffer from flow restrictions, usually because of tree root infiltration. Failure to address the existing problem would result in a worse situation, because the roots would continue to grow and the obstructions would ultimately lead to sewage overflow and attendant health risks. The repair of the sewer system is currently funded and underway.

Sewage would continue to be discharged into the sewers of the city and county of San Francisco for conveyance to the city's treatment facilities. The load on the city's facilities would increase from 250,000 gallons per day (1992) to about 450,000 gallons per day in 2000 and 320,000 gallons per day in 2010. This additional sewage discharge could be handled by the existing city sewage system (see the "Impacts on City Services" section).

Electric Power Distribution — Pacific Gas and Electric Company currently owns about 20% of the Presidio's electric power distribution system. The Park Service wants the company to take over the entire distribution system. This would require all facilities to be brought up to PG&E standards. If the proposal is approved, PG&E is expected to take over the system and start rehabilitation in 1993. There could be a delay in opening some of the Presidio grounds until necessary work was done. The cost of repairing the electrical distribution system is estimated at $22 million.

Transportation Services. Transportation services might require subsidy for the first few years of operation; a phased implementation strategy is recommended to increase service as demand increases. Preliminary internal shuttle bus service and ferry operation analyses recommended that services be funded in part by concession fees, parking fees and fines, and/or tenant fees collected at the Presidio. Legislation would be needed to allow fee revenues to be used to support transportation improvements and operations.

A shuttle bus system would be established to provide transit service within the Presidio to areas that are not now conveniently served and to connect with local and regional transit service. On weekdays shuttles would operate with 5- to 10-minute headways between the main post transportation hub and other major activity areas. On weekends service would also be provided on a second route connecting open space areas and recreation sites with activity areas. This service would operate on 20-minute headways. Shuttle bus operation for the recommended routes is estimated to cost $2.6 million in capital investment (for nine buses, maintenance equipment, and installation of transit system information at the main post and Golden Gate Bridge) and $1.3 million in annual operating costs (Peccia & Associates 1993).

Numerous ferry service options were suggested for further analysis; pier rehabilitation cost estimates would be needed in addition to capital and operating costs. A waterfront water taxi would require about $2 million in initial capital investment to purchase two suitable vessels. Annual operating costs for the service are estimated at $1.5 million for a route to Fort Mason that terminates at Fisherman's Wharf or $1.8 million for a route extending to the Ferry Building. User fees would cover about half of the estimated operating costs with a ridership of 400,000 people annually, assuming a $2 fare each way and 10-hour service each day. Ridership would be expected to be about 33% commuter and business-related and about 67% recreational, depending on connections and schedules.

An Angel Island ferry would require about $500,000 in initial capital investment and would cost about $820,000 per year to operate. It would become self-supporting from user fees with a fare of $3 and a ridership of 150,000 people per year, assuming a 10-hour schedule during peak seasons and a reduced schedule during the rest of the year.

Operations and Staffing. The 1992 operating base at Golden Gate National Recreation Area was $9.8 million, and 183 full-time-equivalent staff were employed. Under alternative A an estimated staff of 347 and an annual budget of $38 million ($24 million would be recovered from tenant revenues) would be required to carry out operations at the Presidio. Staffing would include 97 maintenance personnel, 70 law enforcement and public safety personnel, 35 fire and emergency/rescue personnel, 35 visitor services personnel, 44 resource management personnel, 31 administration personnel, and 35 staff members to work with the federally chartered institution.

The National Park Service would have primary law enforcement responsibility at the Presidio through the U.S. Park Police; the Park Police is currently responsible for law enforcement within national recreation area, including parts of the Presidio under special permit. In 1992 staffing levels for the Park Police were authorized at 60 full-time employees. An additional 30 commissioned seasonal and permanent law enforcement park rangers are available to support Park Police at special functions and during emergency situations such as search and rescue (Jones & Jones 1993a).

Under alternative A a projected 70 additional law enforcement staff would be needed at the national recreation area to support the Presidio, including 38 commissioned personnel assigned to the patrol function. As reported in the base closure EIS, the Army has a complement of 70 commissioned officers and 11 civilian personnel; approximately 35-40 are involved in active patrols (USACE 1991). Comparing current military staffing levels with proposed staffing levels under alternative A, no negative impacts on operations or services are anticipated. Patrol and other law enforcement functions would be at approximately the same levels as under the Army.

The Presidio Fire Department, which provides fire protection and emergency medical services, was reported in the 1991 base closure EIS to have a staffing level of 35 employees. Because the staffing level under alternative A would be similar for fire and emergency medical services, no negative impacts on these services are anticipated.

Centralized (911) dispatching for Presidio police services would be handled by the Park Police or personnel of the NPS law enforcement ranger division. These individuals would also provide dispatching for the fire department and its associated emergency medical services. No impacts on the dispatching service are expected.

The impacts on the city of San Francisco related to police, fire, and emergency medical services are discussed in the "Impacts on City Services" section.

Concessions Revenues. Under alternative A the Presidio would generate about $29.5 million in 2000 and more than $35 million in 2010 in visitor service and overnight lodging revenues (Jones & Jones 1993a). A portion of the concession revenues would be returned to the park through stipulations in the concession contracts.

Additional concession revenues could be expected from recreational facilities like the golf course. Such revenues were not projected for the DEIS, but they could be substantial. Future concessions analysis would address potential revenues and NPS profit-sharing.

The possibility of adding visitor services at Crissy Field would be analyzed as tenant programs were developed and water taxi service was implemented. This might result in additional revenues for the Presidio from retail and food and beverage concessions (Jones & Jones 1993a).

Conclusion

Substantial increases in funding and personnel would be required for full implementation of this alternative. An estimated $666 million would be required for site development activities, including demolition of nonhistoric structures and restoration of native plant habitat and natural watershed conditions. Fees collected from concessions, parking, and/or tenants would be used to implement shuttle bus and

ferry service operations once legislation authorizing this was enacted; however, these concessions might require initial subsidies. Approximately $38 million ($24 million would be recovered from tenant revenues) and an additional 347 full-time employees would be required for annual Presidio operations. No negative impacts on law enforcement, fire, or emergency medical operations and services are anticipated with projected staffing levels.

Under this alternative the Presidio would generate about $29.5 million in 2000 and $35 million in 2010 in visitor service and overnight lodging revenues. Of these revenues, a portion would be returned to the park, as determined through the concession contracting agreement process. Additional concession revenues could also be anticipated from recreational facilities like the golf course.

Cumulative Impacts

The actions and fiscal responsibilities under this alternative would have both beneficial and adverse cumulative impacts on NPS management and operations nationwide. The project would generate revenues for the federal treasury, but would also result in increased operational costs to the Park Service.

Unavoidable Adverse Effects

The impacts that follow are those for which there are no mitigating measures or those that could not be mitigated to a level of insignificance.

Alternative A would change land uses within the Presidio. In particular, about half of the housing would eventually be replaced with open space, and some parking and recreation space would be replaced with restored wetlands. Establishment of these land uses would preclude other uses that might be desirable. In particular, the removal of housing and restoration of open space would most likely preclude the provision of housing in these areas in the future.

Thirty-seven historic buildings would be removed under this alternative. Most of these structures are at Crissy Field in the Directorate of Engineering and Housing complex at the east end and the World War II barracks area at the west end. All of the historic structures to be removed are identified in appendix B.

Additional recreational use and employment under this alternative would result in increased use of all forms of transportation — bicycle, pedestrian, transit, and automobile. Mitigating measures would reduce some otherwise significant transportation effects; however, some minor cumulative effects on regional traffic would be unavoidable by the year 2010.

Increased travel to and from the Presidio would contribute cumulatively to vehicle emissions within the air basin and to the frequency of air quality standard violations for pollutants. At the Presidio, projected emissions for air pollutants, hydrocarbons, nitrogen oxides, sulfur oxides, and particulates would exceed threshold levels of 0.075 tons/day for mobile sources on a daily basis.

Growth-Inducing Impacts

The Presidio under National Park Service management could have the following growth-inducing impacts on the region as the local economy and community respond to Presidio activities.

- **New Jobs** — About 5,900 jobs would be generated at the Presidio in the year 2000 and 5,500 in 2010, compared to about 5,500 jobs (2,000 Army and 3,550 civilian) under Army use.

  Impacts:

- New jobs at the Presidio would increase the demand for housing for employees in surrounding areas. Some of this demand would replace the demand of civilian employees under Army use. Onsite housing would only meet about 35% of the housing demand by Presidio employees. The new net regional housing demand created by Presidio employees would be about 438 housing units in the year 2010. Of this, about 40%, or 175 housing units, would be in San Francisco.
- New employee households would create increased demands for goods and services in areas surrounding their homes and throughout the Bay Area. This could result in indirect population and housing growth because of an increase in service jobs.
- New employment could lead to an increase in expenditures for business-related and personal goods and services (ranging from office supplies and major equipment to daily lunches) in areas near the Presidio. This could result in the growth of businesses in areas along the western end of Lombard and Chestnut streets and in commercial districts near the Presidio's southern entrances as well as throughout the Bay Area in

general. This growth could indirectly result in increases in building sizes, infill on vacant lots, and traffic and pedestrian activity in areas near the Presidio.

- **New Tourism** — The Presidio could draw up to an estimated 7.9 million visitors per year, compared to the 3.5 million visitors at present (Peccia & Associates 1993) — an increase of 125%.

Impacts:

- Increased tourism at the Presidio would increase the demand for lodging, restaurant, and other tourist-oriented services in surrounding areas, especially to the east, south, and southeast in the Marina and Richmond districts and perhaps Cow Hollow and Pacific Heights. The Lombard Street area, which already includes hotel and motel uses and is zoned C-2 (community business) would likely be the focus of increased tourism because it is on one of the main access routes to the Presidio. Other areas that might experience growth are the commercial portion of Chestnut Street west of Van Ness Avenue and possibly the commercial districts near the Presidio's southern entrances. In these areas building up to the limits of zoning codes and pressures for changes in allowable uses would be likely. It is also possible that some of the residential areas south of the Presidio and in the western end of the Marina district would experience pressures from people interested in developing bed-and-breakfast-type uses, where these uses are or could be permitted under the San Francisco planning code. Such changes would be subject to existing city and county of San Francisco planning and zoning regulations. Tourist-related business growth could result in indirect growth in population and housing demand in the city and the region.
- **Utility Upgrades** — Infrastructure improvements would not encourage additional growth outside of the Presidio because these improvements are only for onsite services.
- **Roadway Improvements** — To the extent that the planned traffic circulation and safety improvements could increase the capacity of affected transportation networks beyond that needed to accommodate Presidio traffic and transit services, they could promote additional growth in other areas served by the same traffic network. This could result in indirect population and housing growth.

Relationship of Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

Restoration and protection of 20-80 acres of wetlands and 30 acres of dunes at Crissy Field, 285 acres of native plant habitat, and the riparian corridors at El Polin Spring and along Tennessee Hollow and Lobos Creek would enhance the long-term productivity of the Presidio environment. These actions would preclude other uses such as recreation and parking, unless the flooded areas were refilled, dunes removed, and the habitats returned to previous conditions.

Alternative A would involve the removal and remediation of hazardous substances, pollutants, and contaminants at the Presidio. Cleanup activities would be carried out by the Army in compliance with federal and state laws and regulations. When these cleanup activities were completed, it is possible that certain areas of the Presidio could be restored to more natural conditions, thereby potentially increasing long-term productivity.

Recreational uses would not have significant effects on long-term productivity.

Irreversible and Irretrievable Commitments of Resources

Under the proposed action all archeological sites would be avoided where possible. Where this was not possible, disturbance would be mitigated through recovery of cultural information and significant artifacts. However, some losses of archeological objects and cultural information would likely occur because of vandalism, collecting, or construction activities. These losses would be irreversible.

The 37 historic buildings removed under the proposed action would be an irreversible loss. Mitigating measures would be conducted before removal to fully document the structures according to NPS policy and standards.

Although most developed areas could be restored to previous conditions over time, the use of land, construction materials, energy, and financial resources to implement the proposed action would, in the practical sense, be an irretrievable commitment of resources.

Alternative B: No Action (Minimum Requirements)

Impacts on the Regional Economy and Employment

Analysis

Employment and Payroll Related to Park Use. Table 12 at the beginning of the "Environmental Consequences" section shows direct employment and payroll estimates under alternative B. Under this alternative about 7,420 people would be employed at the Presidio by the year 2000, an increase of 32% over the 1991 baseline condition. As in alternative A, the largest amount of employment would be in the office and medical land use categories, with 4,300 and 2,050 jobs respectively; in addition, there would be more than 400 industrial and 300 retail jobs and about 100 jobs each in the dormitory, institution, and warehouse categories. Year 2010 employment under alternative B would be essentially the same as in 2000 because the areas available for use would not change.

Of the four alternatives, alternative B would have the highest direct employment payroll in the year 2010, estimated at about $175 million; this would be an increase of about $105 million over the baseline condition. Unlike the other three alternatives, there would not be any decline in payroll between 2000 and 2010 because the total space available would remain constant.

Secondary employment in the seven industry sectors represented at the Presidio is expected to generate about 3,220 jobs in the city of San Francisco in both 2000 and 2010, as shown in table 13; these jobs are estimated to raise the annual payroll by about $149 million. Secondary employment is projected to add about 6,450 jobs in the Bay Area in 2000 and 2010, which would raise the annual regional payroll by about $298 million (table 14).

Total Presidio employment, in all sectors except construction, is estimated to add about 10,640 jobs in San Francisco in 2000 and 2010 (table 15); this would raise the annual payroll by $324 million. In the same years total Presidio employment is expected to generate about 13,870 jobs in the Bay Area, increasing the annual regional payroll by $473 million (table 16).

The effects on employment and earnings from closing the military base versus converting it for park use are compared in table 17. The closure of the military base is estimated to cause a decline of 3,150 jobs and $66 million in income in the Bay Area (USACE 1991). In contrast, reuse of the Presidio under alternative B is estimated to increase San Francisco employment by more than 10,640 jobs and earnings by more than $324 million. Additionally, park conversion is estimated to increase Bay Area employment by nearly 13,900 jobs and Bay Area earnings by about $473 million.

None of the changes in employment and earnings are expected to cause a large disruption in the regional labor market. The increase in Presidio-related jobs represents only a 0.4% (4/10 of 1%) gain in regional employment; the increase in Presidio-related earnings represents only a 0.37% gain in regional income. Nevertheless, these changes should provide a boost to San Francisco's economy. Much of the employment and income gain is expected to occur within the city and county of San Francisco. Conversion of the Presidio is estimated to increase city employment by 1.16% and city payroll by about 1.88%.

Construction-Related Employment and Payroll. The construction period at the Presidio is expected to continue from year 1994 to year 2010 and be most intense between 1994 and 2000. Direct employment related to construction activities is estimated to be about 1,815 jobs in 2000 and 660 jobs in 2010 (see table 18). The annual construction payroll is expected to be about $50 million annually between 1994 and 2000 and about $18 million annually between 2001 and 2010.

Secondary construction activities are expected to generate about 1,175 jobs annually in the city and county in 2000 and 430 jobs in 2010. Secondary construction activities are estimated to raise the annual payroll in San Francisco by $44 million annually between 1994 and 2000 and by $16 million annually between 2001 and 2010. About 2,350 jobs are expected to be generated annually in the region between 1994 and 2000, and about 860 jobs annually between 2001 and 2010. Annual payroll in the region is estimated to increase by $89 million in 2000 and $32 million in 2010.

Total (direct and secondary) construction activities related to the Presidio conversion are expected to generate about 2,990 jobs in 2000 and 1,090 jobs in 2010 in San Francisco; annual payroll would be raised by $94 million annually between 1994 and 2000 and by $34 million annually between 2001 and 2010. In

the region, total construction activities are expected to generate about 4,165 jobs in 2000 and about 1,520 jobs in 2010 and to raise annual payroll by $139 million annually between 1994 and 2000 and $50 million between 2001 and 2010.

State Sales and Use Tax. Based on estimated commercial activities at the Presidio under alternative B, an additional $2.2 million in state sales and use tax revenues would be generated in both 2000 and 2010. BART would collect about $202,000 in sales tax revenues in both years. All tax revenues would be new because military uses are exempt from state taxes.

Resident, Employee, and Visitor Expenditures. Under alternative B residents, employees, and visitors would generate about $21 million in the year 2000 and nearly $28 million in the year 2010 in revenues for services and overnight lodging. Sales volumes per square foot would be below the acceptable range for retail operations in 2000 and at the low end of the acceptable range for food and beverage operations; food and beverage sales would raise to acceptable levels by the year 2010, and retail sales would raise to the low end of the acceptable range. Sales projections are summarized in table 45.

A few visitor services might be advantageous at Crissy Field to increase future revenues for Presidio retail and food and beverage concessions. Such services would be analyzed as tenant programs were developed and ferry service was implemented.

Conclusion

Under alternative B there would be some positive effects on employment opportunities and on the local and regional economy, including indirect effects on local businesses and tax revenues. More than 7,400 jobs related to park use would be created at the Presidio by the year 2010 (5,180 of these would be new jobs), and the annual payroll would increase by about $105 million to about $175 million ($122.5 million attributable to new jobs). Total employment in construction and other employment sectors in the city and the Bay Area would increase to about 11,730 jobs and 15,390 jobs, respectively; of this, about 8,210 jobs would be new to the city and 10,775 jobs would be new to the region. Total earnings in the city and the region would increase to $358 million ($250 million attributable to new jobs) and $523 million ($366 million attributable to new jobs), respectively. Park conversion would generate enough jobs and earnings in the region to more than offset jobs and income lost because of the substantial reduction in the Sixth Army presence at the Presidio. Nevertheless, anticipated jobs and earnings would only be a small percentage of existing jobs and earnings in the city and Bay Area.

By 2010, state sales and use tax revenues from the Presidio would increase by about $2.4 million annually. About $21 million in 2000 and nearly $28 million in 2010 would be generated in service and overnight lodging revenues.

TABLE 45: SUMMARY OF FOOD, BEVERAGE, AND RETAIL SALES – ALTERNATIVE B

	2000	2010
Presidio Sales Summary		
Total Food and Beverage Sales	$ 7,773,000	$ 9,523,000
Total Retail Sales	12,049,000	16,249,000
Total Guest Room Revenues	1,160,000	1,776,000
Total Revenues	**$20,982,000**	**$27,598,000**
Presidio Sales by Square Footage		
Food and Beverage	$119.55	$147.23
Retail	$114.18	$153.98

Cumulative Impacts

Conversion of the Presidio into a national park system area would have a minor but positive cumulative effect on local and regional employment and income and on state tax revenues. Resident, employee, and visitor expenditures at the Presidio would contribute a small percentage to the regional economy.

Impacts on City Services

Cost Analysis

The provision of public safety services would be the same as under alternative A. The city of San Francisco would not be significantly affected because primary responsibility for these services would rest with the National Park Service.

Under this alternative the Presidio boundaries would not be adjusted to include the Public Health Service hospital site. The provision of water, wastewater, and storm drainage services would be the same as under alternative A, except that the Park Service would not assume responsibility for maintenance of the water and wastewater systems and provision of water service to the Public Health Service hospital site. About 50,000 gallons per day of city of San Francisco water would be required for special uses; estimated water costs would be $22,000 per year. Sewage discharge would be reduced under this alternative because of reduced consumption of potable water; charges would be about $966,000 in 2000 and $1,030,000 in 2010 to dispose of about 422,000 and 450,000 gallons of sewage per day, respectively (Jones & Jones 1993a).

No improvements in the MUNI bus system or the roadway network outside the Presidio are proposed under this alternative, so there would be no additional costs to the city.

Revenue Analysis

City revenues under alternative B could total $5,027,000 from all sources for both the years 2000 and 2010 (Jones & Jones 1993a) if all taxes were applicable. These would be new city tax revenues because military base uses are exempt.

Table 46 presents individual sources of tax revenue for alternative B in 2000 and 2010. If applicable, property tax would account for the largest share of revenue. Because many of the revenue sources are dependent on the square footage used for different business activities, there would be no variance between the two periods because the square footage available would remain the same.

TABLE 46: CITY REVENUES – ALTERNATIVE B

Revenue Source	2000 and 2010
Property Tax**	$2,334,000
Sales Tax	$708,000
Business Tax	$643,000
Hotel Tax	$174,000
Other	$1,168,000
Total	**$5,027,000**

*All revenues are expressed in constant dollars.
**This tax may not be applicable.

Public School Enrollment Analysis

About 360 schoolchildren living at the Presidio would be enrolled in San Francisco public schools in 2000 and 2010. This would be 0.56% (1/2 of 1%) of the total San Francisco school enrollment and less than half of the 1990 demand on San Francisco schools by the Army. The reduction in the number of Presidio schoolchildren enrolled in public schools would slightly reduce the demand on existing school facilities. There would be about 1,275 school-aged dependents attending schools in the region, or about 42% of the dependents enrolled in schools under Army use.

Conclusion

Under alternative B the city would benefit from an estimated $5 million increase in revenues from taxes and user fees, if all taxes were applicable. The city would be reimbursed $22,000 per year for the provision of water and $1,030,000 per year for sewage services by the year 2010; user fees would cover the costs of these services. No water and sewer services would be required at the Public Health Service hospital. There would be few demands on city public safety services because most services would be provided by the Park Service. No transportation-related improvement costs would be incurred by the city.

Presidio schoolchildren would constitute a very small percentage of the total San Francisco school enrollment.

Cumulative Impacts

The Presidio would contribute in a minor way to the tax revenues currently being generated in the city and would have a minor cumulative impact on city revenues. The demand for city services at the Presidio would be small; therefore, the cumulative impact would be insignificant.

Impacts on Housing

Analysis

Housing Stock Use. Under alternative B, all of the 1,173 housing units at the Presidio would remain; park, tenant, and U.S. Army staff would use 1,114 of the units, and 59 would be reserved for guest accommodations. Of the 1,415 existing dormitory beds, 708 would be removed or converted for other uses, 634 would be used by park and tenant staff, and 73 would be available for short-term guest lodging.

Housing Demand Estimates. About 74% of the housing demand generated by the Presidio could be accommodated onsite. A new net regional housing demand would not be created; in fact, 322 Presidio housing units would in effect be added to the regional supply, allowing more employee relocation to the Presidio. Since no housing units would be removed, the regional housing stock would not decrease.

Conclusion

Under alternative B, 1,114 housing units and 634 dormitory beds would be available for park, tenant, and Sixth Army employees in 2000 and 2010; about 74% of the employee housing demand could be accommodated onsite. In addition, 59 housing units and 73 dormitory beds would be reserved as guest accommodations. No housing units would be removed; 708 dormitory beds would be converted or removed. No impacts on housing are anticipated as a result of this alternative.

Cumulative Impacts

Because no impacts on housing are anticipated, there would be no cumulative impacts as a result of this alternative.

Impacts on Health Care and Medical Research

Analysis

Letterman Army Medical Center and Letterman Army Institute of Research. Under alternative B the LAMC and LAIR buildings would be leased to a partner organization or the military for continued use as a hospital and research facility. The impacts of possible military reuse are described in alternative D.

If LAIR was reused as a research facility, the impacts would be the same as under alternative A. If LAMC was reused as a hospital, the impacts would depend on the type of medical care provided and whether the institution was an existing San Francisco institution or a health care provider new to San Francisco. As mentioned in the "Affected Environment" section, San Francisco and the Bay Area have an oversupply of acute care hospital beds. Average Bay Area hospital occupancy in 1991 was 54%; in San Francisco it was estimated at 50% (State of California 1991).

If the LAMC tenant was an existing health care institution in San Francisco, the reuse might not significantly add beds to the San Francisco supply if adjustments or reductions were made at the parent institution and the service area for the medical specialty was expanded to the western U.S. or greater Bay Area.

To illustrate the potential impacts, a *Call for Interest* (NPS 1992a) response is used as an example. The University of California at San Francisco (UCSF) proposes to relocate its clinical pediatric programs to LAMC to provide both inpatient and ambulatory care using about 250 acute and critical care beds. The proposed UCSF center could provide expanded and specialized care for children. Patients would likely come not only from San Francisco and the Bay Area but from the western U.S. and other countries. However, such specialized pediatric care is now available at other regional hospitals, and this facility could cause increased competition.

If the LAMC tenant was an institution new to San Francisco, there would likely be an increase in the existing surplus of beds and the already highly competitive situation. This could lead to higher medical costs as well as the elimination or further consolidation of other medical programs. The impacts would depend on the type of medical specialties that the new hospital included.

Public Health Service Hospital. Alternative B would not include the Public Health Service hospital area within Golden Gate National Recreation Area jurisdiction, and it is assumed that the city might exercise its lease option to use the site as a long-term chronic care facility. The park boundary would remain as currently designated. The property would be surveyed and conveyed by the Government Services Administration (GSA) according to the Federal Surplus Property Act. The impacts would be described in a separate environmental analysis as part of the redevelopment process. Impacts would depend on the type of reuse.

Conclusion

The impacts of providing health care at LAMC would depend on the type of service offered. If the service was chronic health care, such as AIDs care, there would be beneficial impacts. If the service was one that is not in short supply, it could add to the existing oversupply of hospital beds in the Bay Area and could cause economic problems for other institutions, increased health care costs, and consolidation or closure of other programs. If adjustments or reductions were made at the sponsoring institutions or cooperative services between institutions were set up at LAMC, the impacts would be negligible or beneficial. The general impacts of reuse of the Public Health Service hospital would be determined at the time reuse proposals were analyzed for the facility.

Cumulative Impacts

If LAIR was reused as a research facility, it would contribute to medical, life, and earth science knowledge and discovery in the Bay Area. Adverse cumulative impacts might result if uses of LAMC duplicated already adequate areawide acute care services; beneficial cumulative impacts would result from its use as a chronic care facility. If LAMC was not used by the military, there would be an adverse cumulative impact on health care for military retirees because of other recent closure (e.g., Oak Knoll Hospital) in the Bay Area.

Impacts on Medical Aid Incidents

Under alternative B the total number of medical aid incidents requiring hospital care is estimated to increase to 180 in 2000 and 249 in 2010. This would be an increase of 22 incidents in 2000 over the baseline year (1992) of 158 incidents, and an increase of 91 incidents in 2010 over the baseline year. The Letterman facility might continue to be a hospital under lease arrangement; if so, the hospital could provide the needed emergency services. Also, the existing hospital emergency medical care system throughout the city could adequately provide the needed services.

Conclusion

The increase in the number of medical aid incidents would amount to about one additional medical aid incident requiring hospital care every sixth day by 2000 and one every fourth day by 2010. This increase would not be significant, and cases would be distributed among area hospitals and possibly LAMC.

Cumulative Impacts

The increase in medical aid incidents requiring hospitalization would have an insignificant impact on hospital services in the region.

Impacts on Traffic and Transportation Systems

Analysis

Impacts on Presidio Traffic and Roadways. Alternative transportation use, traffic volumes, parking changes and improvements, and Doyle Drive reconstruction would cause the following impacts on traffic levels and patterns within the Presidio. Presidio traffic volumes do not include Highway 1 and 101 traffic. The baseline (existing conditions) year used for comparison was 1988.

Impacts of Alternative Transportation Use — Alternative B calls for no major transit improvements and no transportation system management (TSM) techniques. About 3.5 miles of additional hiking trails would be developed, and 11 miles of biking routes would be designated on existing roadways.

Transportation mode use estimates for alternative B reflect the effects of growth without transit improvements (see table 26 at the beginning of the "Environmental Consequences" section). Year 2000 projected weekday travel into and out of the Presidio is estimated at 94,100 person trips per day. Of these, about 75,100 person trips would be by auto, 8,700 on transit, and 10,300 by bicyclists and pedestrians. The mode share would be 79% person trips by auto, 9% on transit, and 12% by bicycle or on foot; this reflects a mode split about equal to that under the 1988 baseline condition.

Year 2000 weekend travel into and out of the Presidio is estimated at 93,300 person trips per day. About 68,100 person trips would be by auto, 5,100 on transit, and 20,100 by bicycle or on foot. The expected mode split would be 73% auto, 5% transit, and 22% bicycles and pedestrians.

Year 2010 projected weekday travel into and out of the Presidio is estimated at 111,000 person trips per day. About 88,500 person trips would be by auto, 9,900 on transit, and 12,600 by bicycle or on foot. The projected modal split would be similar to 2000 conditions, with 80% of person trips by auto, 9% on transit, and 11% by bicycle or on foot.

Year 2010 weekend travel into and out of the Presidio is estimated at 110,900 person trips per day. Of these, 80,700 trips would be by auto, 5,700 on transit, and 24,500 by bicycle or on foot. The expected mode split would be 73% auto, 5% transit, and 22% bicycles and pedestrians.

The projected trip estimates indicate that the number of trips by each travel mode would increase by the year 2010. An additional 1,000-3,000 transit trips daily and 5,000 bicycle/pedestrian trips daily could be expected. Overall transit use would increase 43% on weekdays and 34% on weekend days; total pedestrian and bicycle use would increase by 55% on both weekdays and weekend days. However, additional transit use would not reduce automobile use. Because of limited improvements to transit service and facilities for transit, bicycle, and pedestrian use, these travel modes would grow less than auto traffic.

Impacts of Traffic Volumes — Table 27 shows the projected entrance volumes by vehicle trips under alternative B. Average daily traffic (ADT) totals through the major Presidio entrances in the year 2000 are projected at 64,700 vehicles per day (vpd) on weekdays and 59,900 vpd on weekends. These traffic volumes reflect an increase of about 28% over pre-base closure conditions on weekdays and weekends. Projected entrance traffic volumes for continued military use (the No NPS scenario) would amount to 13% of the growth that would occur without any of the proposed changes. This indicates that proposed land use changes related to park uses would be responsible for the remaining 15% of projected growth.

In the year 2010, the Presidio's gateway ADTs are projected to be 75,100 vpd on weekdays and 69,700 on weekends. The traffic volumes reflect an increase of 49% over existing weekday and weekend conditions. Projected gateway traffic volumes for continued military use would amount to 24% of the growth that would occur without any of the proposed changes. This indicates that proposed land use changes related to park uses would be responsible for the remaining 25% of projected growth.

Alternative B models indicate roadway capacity problems similar to those of alternative A. Some of these problems would continue to exist in the future, because only minimum safety improvements would be made.

Impacts of Parking Changes — Alternative B calls for minimum changes to the existing parking system, essentially limited to safety improvements. Alternative B would not include any of parking restrictions or removals; more parking would be available, and the parking supply would substantially exceed demand. As in alternatives A, C, and D, some overflow parking from the main post would be diverted to Crissy Field.

Under alternative B, the parking supply would be reduced from about 13,000 spaces to about 11,335 spaces; this would be a reduction of only 13% of the existing parking supply. Parking areas would be reconfigured and parking spaces added and removed, for a net reduction of 1,665 in the parking supply. Based on projected parking demand under this alternative, a surplus of more than 3,000 spaces could be anticipated under average conditions.

Limited parking system changes under this alternative would reduce the number of accidents related to parked or parking vehicles. The total number of parking spaces would decrease only slightly from current levels, generally providing more spaces than would be required. As a result, parking spaces would be easy to find, providing no incentive for alternate mode travel.

Impacts of Doyle Drive Reconstruction — The impacts of Doyle Drive reconstruction would be the same as under alternative A. Short-term impacts would include potentially serious traffic congestion at and near construction sites, increased noise and air pollution, increased traffic volumes on Presidio roadways from shortcutting, and the use of Presidio land for staging equipment. Long-term effects would include the irretrievable commitment of land for the right-of-way, the probable removal of some historic buildings, and continuing air and noise pollution.

Impacts on the Local and Regional Transportation Network. The local and regional transportation network would also be affected by future Presidio-generated traffic and by changes to Doyle Drive.

Increased travel demand under alternative B would affect intersections within the Presidio and around its perimeter in much the same way as alternative A. However, only safety improvements would be made under this alternative, so many of the expected intersection capacity problems would not be addressed. It is assumed that the city would not improve intersections outside the Presidio to correct capacity problems related to city, regional, and Presidio traffic. If improvements were not made, four of the nearby intersections (Mason/Marina/Doyle, Lombard/Richardson, Presidio/Pacific, and Lincoln/25th) would be at level of service F in the year 2010; the Gorgas/Francisco/Lyon intersection would be level of service D, and the Arguello/Jackson and 15th/Lake intersections would be level of service B.

New traffic generated by the Presidio as well as regional traffic growth under alternative B would also affect roadway corridors within the Presidio, around the Presidio's boundaries, and on regional travel corridors serving the Presidio. Anticipated traffic levels would be slightly higher than under alternative A, with similar gateway distributions. As a result, impacts on local and regional traffic would be similar to those of alternative A.

Traffic on roadways within the Presidio and on roadways through its gateways extending several blocks outside the Presidio would be busier than under existing conditions, with noticeably increased congestion at key intersections. Increased Presidio traffic would also cause minor traffic volume increases on regional routes such as Highway 101 and 19th Avenue.

The impacts of Doyle Drive reconstruction on the local and regional transportation network would be the same as under alternative A.

Conclusion

Proposed land use changes at the Presidio would result in increased travel to, from, and within the site. No improvements would be made to reduce the share of trips into and out of the Presidio by auto or increase the share of trips made on transit. Existing transit, bicycle, and pedestrian shares would decline, resulting in a higher share of travel by auto and corresponding environmental and infrastructure costs. Only about 3,000 person trips would be added daily on MUNI, Golden Gate Transit, and other transit providers by the year 2010. This growth would not be large enough to have significant impacts on fare box revenues or transit system capacities. Up to 5,000 additional bicycle and pedestrian trips would also take place each day. This growth would have little or no impact on the Presidio or surrounding areas.

Auto trips into and out of the Presidio would increase by about 25% in the year 2010 because of proposed land uses under this alternative. Few of the negative impacts attributable to traffic growth would be avoided because there would be no improvements to the roadway system or to public transit. Capacity and congestion problems would increase. Potential impacts would primarily occur within the Presidio and near its boundaries. Some of the increased auto travel would occur on regional routes, resulting in slight increases in auto-related impacts on these routes. The correction of dangerous traffic conditions at several Presidio intersections would reduce safety hazards within the park.

Because of projected increases in auto trips, there would be increased demands for parking at the Presidio. The retention of most parking spaces and minor improvements to the parking system would address these demands, resulting in no negative impacts.

The impacts of Doyle Drive reconstruction would be the same as under alternative A.

Cumulative Impacts

Traffic increases generated by the Presidio would have a negative cumulative effect on regional traffic growth and related congestion. By the year 2010 regional automobile traffic is expected to grow by 49% over existing levels in the vicinity of the Presidio; 25% of projected growth would be attributable to Presidio land uses. Presidio traffic increases on Doyle Drive, Highway 1, and the Golden Gate Bridge would also have a minor cumulative effect on congestion. If use of the Public Health Service hospital increased outside NPS jurisdiction, there could be additional cumulative effects. The cumulative effects of Doyle Drive reconstruction would be addressed by Caltrans and other affected agencies in future environmental analyses; the cumulative effects of projects other than Doyle Drive reconstruction are not known at this time.

Impacts on Land Use, the Presidio Community, and Surrounding Neighborhoods

Analysis

Land Use. The land use pattern would be similar to existing conditions. Many buildings would be used for governmental administrative office purposes. Public recreational use would predominate in existing open areas, including Crissy Field,

the coastal bluffs, the Presidio forest, and the golf course, but there would be no increase in the amount of open space (see table 28). The Golden Gate Bridge District maintenance area would be expanded at the toll plaza site. The Public Health Service hospital site would be a city-zoned property and would probably be used for institutional purposes. Built space would decrease by 7% because the hospital would not be included within the park boundary. The total building square footage would be about 5.9 million.

Under alternative B, building and land uses would change minimally. The percentage breakdown of the total building square footage by use, shown in table 11, would be residential (33%), office (22%), medical research (13%), warehouse (10%), dormitory (6%), industrial (6%), and retail institutions, military defense structures, and infrastructure (each 3% or less). Overall land uses would reflect existing conditions. The land use breakdown would be as follows: recreation/open space (779 acres; 54%), residential (285 acres; 19.7%), commercial/office (160 acres; 11%), industrial (102 acres; 7.1%), special (79 acres; 5.5%), and institutional (39 acres; 2.7%), as shown in table 28 and on the Land Use – Alternative B map.

Land uses in the neighborhoods surrounding the Presidio are primarily residential. These areas are densely developed, and proposed Presidio uses are not expected to have any significant effects on residential development or population growth. However, use of the Presidio entirely as a government office center would introduce a commercial office area in a residential part of the city. The Presidio's conversion would contribute little to the demand for additional housing in the city, especially because a large amount of housing would be available within the park area (see the "Impacts on Housing" section).

Generally, Presidio land uses along or near the boundary would not change dramatically from existing conditions and would include open space, residential, and institutional uses; therefore, no significant impacts on park neighbors are anticipated. The exception is the Public Health Service hospital site, which has been vacant for about a decade. Future use of this site under alternative B is not known because it would not be part of the park. It is expected that city planning and zoning controls would regulate future use at the site.

Population. Under alternative B the population would not decline between 2000 and 2010. Essentially all of the space present in 2000 would remain, and the residential population would remain at about 3,500 persons, with an additional 230 guests.

Community Support Services. The community at the Presidio would be a mixture of employees of the various public agencies that rent space from GSA and a smaller park staff. To support the community and reduce traffic, the housing would be made available to employees, and limited overnight lodging would be available to visitors. Community facilities would be available on a fee basis. Commercial services would be similar to or greater than alternative A, depending on the needs of the lessees. No impacts are anticipated.

Within a few blocks of the Presidio are several small-scale commercial districts in the Marina area to the east and the Richmond and Pacific Heights areas to the south. Farther east is the moderate-scale Lombard Street district, and farther south the moderate-scale Geary Boulevard district (CCSF 1988). Much of the property in these districts is already developed, and any addition or intensification of commercial use would be subject to San Francisco planning and zoning regulations. Because commercial services within the Presidio would be tailored to meet basic visitor and community needs only, no significant negative impacts on businesses in these districts are anticipated. Presidio employees, residents, and visitors would purchase goods and services from local businesses, including specialty services, but not in sufficient quantity to encourage the growth of competing enterprises. See the "Impacts on the Regional Economy and Employment" section for additional information.

Conclusion

This alternative reflects few land use changes from existing conditions. There would be no increase in recreation/open space use, a decrease in institutional use, and a small increase in commercial/office use. Because the Public Health Service hospital would not be included in the boundary, total land area would be reduced by 37 acres (7%), and total building square footage managed by GSA for the National Park Service would be about 5,960,000 square feet. No building demolition would occur.

The population of the Presidio would be similar to that under existing conditions. Additional services might need to be provided to support the more intensive use of the Presidio as office space. The use of the Presidio primarily as office space for government functions would introduce a new commercial office area into a residential part of the city.

The potential for additional residential or commercial development in areas near the park is limited under existing land use controls, except on undeveloped or

underdeveloped lots. The addition or intensification of land uses in these areas would be subject to San Francisco planning and zoning regulations, and no significant changes are anticipated under existing controls. Employee, resident, and visitor spending would benefit local businesses but would not be great enough to induce the growth of competing businesses.

Cumulative Impacts

This alternative reflects few land use changes from existing conditions; therefore, the cumulative land use effects on the Presidio and surrounding neighborhoods would be insignificant.

Impacts on the National Historic Landmark District

Analysis

Presidio Historic Buildings. Of the 870 buildings at the Presidio, 510 are listed on the National Register of Historic Places. The entire Presidio is listed as a national historic landmark district. Under alternative B, 494 of the 510 historic buildings in the landmark district would be inside the park boundary. Appendix B lists the 510 buildings and their proposed treatment under each of the management alternatives. Table 47 summarizes the treatment of buildings under alternative B. Treatment categories are stabilization/preservation, rehabilitation, restoration, and removal

Under alternative B the overall impact on historic buildings would be beneficial. Of the 494 landmark buildings within the park boundary, 376 would be rehabilitated to provide for new uses. Some buildings would have to be altered to accommodate these uses, which could have an effect on historic building fabric or materials; however, in general the impacts of rehabilitation treatment would be positive. The remaining 118 historic buildings, primarily batteries and infrastructure facilities, would be stabilized, preserved, and in some cases made accessible for interpretation. Some of the coastal defense structures would be rehabilitated for uses such as storage.

TABLE 47: SUMMARY OF BUILDING TREATMENTS – ALTERNATIVE B

Treatment	Historic	Nonhistoric	Total
Stabilize and Preserve	118	77	195
Rehabilitate	376	278	654
Restore	0	0	0
Remove	0	0	0
Excluded from Park	16	5	21
Total	**510**	**360**	**870**

An operations and maintenance agreement similar to the one now in effect at Golden Gate National Recreation Area would have to be negotiated by GSA with the California state historic preservation officer, the Advisory Council on Historic Preservation, and the National Park Service. The Park Service would retain ownership of the buildings, and GSA would manage them. The Park Service would be part of any programmatic agreement for management of historic structures.

Presidio Cultural Landscape. Cultural landscape restoration would be limited, and only minor effects are anticipated. There would be no significant impacts on the historic forest; it would be preserved in its present configuration but would not be restored. Site improvements would be made to accommodate new park uses within the Fort Point, Golden Gate Bridge plaza, and coastal bluffs areas. Actions might include providing informational kiosks and recreational amenities such as wayside exhibits. The introduction of new landscape elements would have a minor effect on the integrity of the landmark district, but proper siting and the use of compatible materials would reduce that effect.

Historic roads and paths and their character-defining features would be preserved and rehabilitated. Some existing roads might be converted to nonvehicular traffic only. Circulation system improvements to eliminate safety hazards might have some effects on the landmark district; however, these effects would be minor.

New construction could have negative impacts on the cultural landscape. Such construction would only be permitted if existing buildings and improvements did not meet essential management needs. Every reasonable consideration would be given to using existing buildings for park purposes compatible with their preservation and public appreciation. Alterations and additions might need to be made to historic buildings to accommodate new uses. Any new construction, including individual buildings and additions, would be compatibly designed and sited in keeping with the character-defining elements of their settings following *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. The Park Service would develop Presidio design guidelines to encourage the design of new buildings to be compatible in scale, color, material, and character with the historic landmark district.

Planning Areas. Because no boundary change would be sought to include the Public Health Service hospital site within the park, the National Park Service would have no control over actions affecting the 16 historic buildings in this area.

Conclusion

Actions under alternative B would not adversely affect any historic buildings within the park boundary. All buildings or structures determined to be contributing to the national historic landmark district would be retained.

Rehabilitation and continued use of historic buildings in the Presidio would provide for their preservation. The cultural landscape would receive limited treatment, and there would be few beneficial effects. No adverse effects would be occur under this alternative.

Cumulative Impacts

There has been a continuing loss of historic buildings regionally, included those related to military history. Because the buildings and cultural landscape within the national historic landmark district would be rehabilitated and preserved under this alternative, it would have a positive cumulative effect on regional efforts to preserve such resources and their settings.

Impacts on Archeology

Analysis

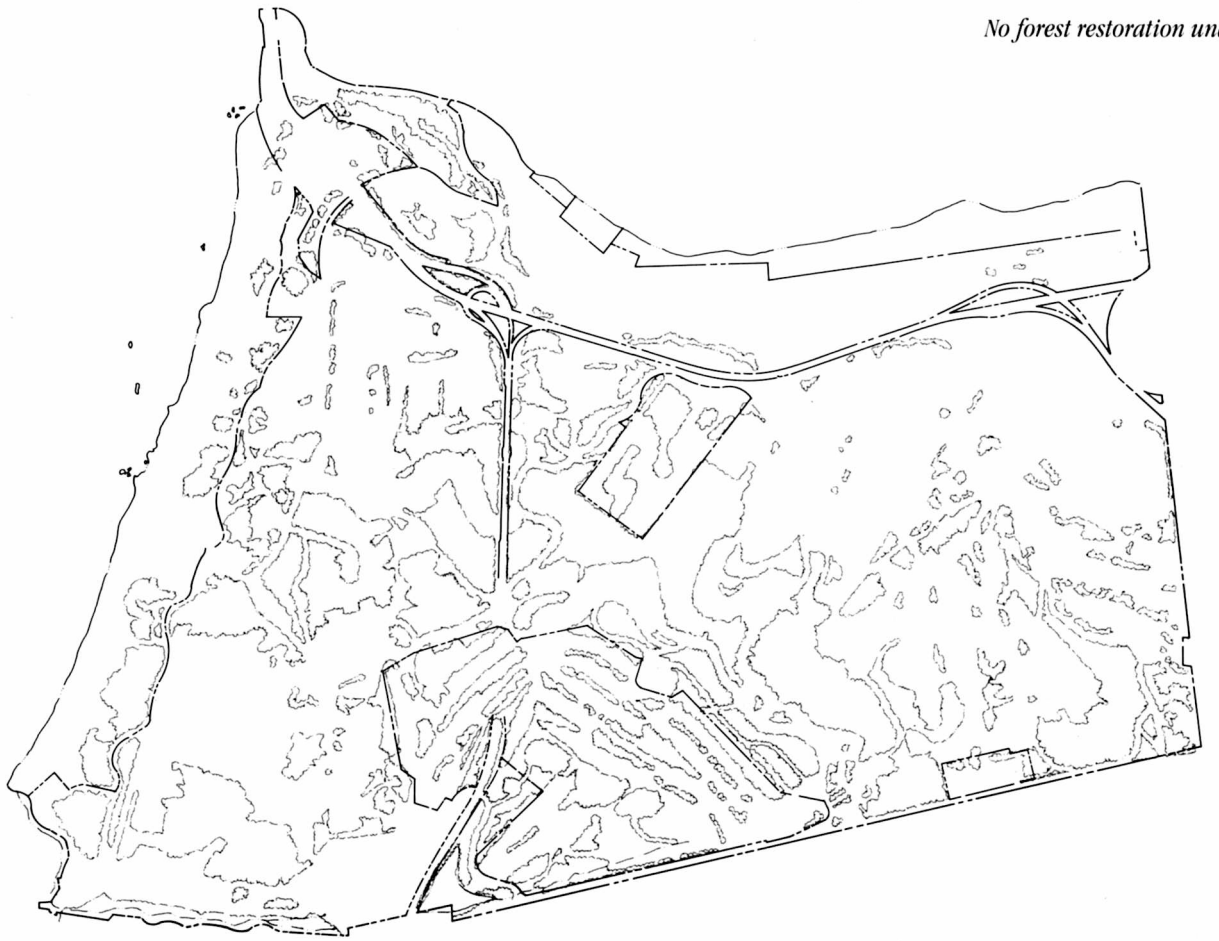
Based on archeological discoveries within San Francisco, it is possible that potentially significant subsurface prehistoric archeological sites are present within the Presidio. The 200 years of use suggests that historic archeological remains would also be found. Any work undertaken might disturb potential archeological resources. There is one state-recorded archeological site on the Presidio.

Any ground-disturbing work undertaken in the park would have the potential to affect undiscovered archeological sites and resources. Until exact locations were selected and preliminary designs were available for specific projects, it would not be possible to accurately project effects. Direct effects would be avoided to the extent possible through consultation between designers and the park's archeology office. Should avoiding sites be impossible, mitigating measures, including excavation and recording of sites, would be carried out in consultation with the state historic preservation officer. Should previously unknown resources be uncovered during construction, work would be stopped in the discovery area, and the National Park Service would consult according to section 800.11, title 36, of the *Code of Federal Regulations*.

Direct impacts would vary and be closely related to specific kinds of proposed actions. The proposed upgrading and ongoing maintenance of buildings, roads, and all utilities at the Presidio would require ground disturbance of various types, as would the remediation of hazardous substances, pollutants and contaminants. This alternative does not call for building removal; thus, no negative impacts would occur from removal or site restoration.

Improvements to bring the water treatment plant into compliance with drinking water standards could have a negative effect on archeological resources in the Lobos Creek drainage. New construction, well drilling, and diversions could all affect the drainage, which is a probable site for both prehistoric and historic resources.

New construction on any part of the Presidio might also have an adverse effect on archeological resources. For example, construction surrounding the improvements to Doyle Drive might have an impact on known prehistoric archeological sites in the Crissy Field area as well as historical archeological resources.



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Historic Forest Removal/Restoration – Alternative B

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Because the Public Health Service hospital site would not be added to the area through congressional legislation, protection of archeological resources, such as the cemetery, within the 36-acre site would not be the responsibility of the National Park Service. Future impacts cannot be determined.

No known sacred sites have been identified in consultation with Native American groups (NPS 1993b).

Conclusion

Direct impacts on archeological sites cannot be analyzed at the present time because sites have not been identified. Many of the actions required to make utilities and other infrastructure safe and/or in compliance with current standards might affect unknown archeological resources. New construction as well as repair and maintenance of existing buildings, roads, and other features would increase the likelihood of inadvertent damage to sites. Measures implemented by the Park Service would avoid or mitigate any adverse impacts to sites.

Cumulative Impacts

Cumulative impacts on known archeological sites and resources on known sites are not anticipated to be adverse; cumulative impacts on unknown sites would not be significant because mitigating measures would be implemented by the Park Service as described in the "Alternative B" section.

Impacts on Wetlands and Stream Drainages

Analysis

Under this alternative, wetland and riparian habitat would continue to be in small isolated areas dominated by exotic plants rather than native vegetation. No management actions would be taken that would increase wetland or stream habitat or cause a reduction or deterioration of wetlands.

Conclusion

No actions would be taken that would increase or reduce deterioration of wetlands or stream drainages; therefore, this alternative would have no significant impacts, either positive or negative.

Cumulative Impacts

Because no actions would be taken that would increase or reduce deterioration of wetlands or stream drainages, there would be no cumulative impacts associated with this alternative.

Impacts on Native Plant Communities

Analysis

Biological diversity would not increase significantly under this alternative. No native plant communities would be restored, and the total land area where native plants predominate would continue to be about 145 acres, with 15 acres of rare plants. The portions of the Presidio managed by GSA would be dominated by nonnative plants, and new alien species might be introduced as part of landscaping and revegetation projects. As a result, the proportion of nonnative plants would remain high, and the reduction of native plant species would likely continue. Nonnative forest trees would continue to encroach on native plant habitat.

Conclusion

Areas dominated by native plants (145 acres, including 15 acres of rare plants) would be protected, but no restoration of native plant habitat would take place. Areas managed by GSA would continue to be a source of colonization and invasion by nonnative plant species.

Cumulative Impacts

Efforts to protect native plants would continue, but no new restoration would take place; therefore, there would be no significant cumulative impacts on native plant communities.

Impacts on Wildlife

Analysis

Under alternative B, marine, migratory, and terrestrial animal species would be protected as part of the park's resource management program. However, because no native plant communities or open space would be restored, no additional benefits to wildlife could be expected. There would continue to be about 780 acres of open space, including 145 acres of native plant habitat, for use by wildlife.

Marine Species. Impacts on marine organisms from recreational use of Crissy Field would be similar to those described under alternative A. Pier stabilization at the Coast Guard pier and torpedo wharf might temporarily disrupt marine mammals in nearby waters; however, there would be no long-term adverse impacts on marine species in these areas. No water taxi service would be established, so there would be no impacts associated with this development. Disturbance of seabirds by jet skiers, boaters, and other recreationists would continue.

Migratory Species. Migratory species would benefit from the protection of dune habitat at Crissy Field and other open space areas that provide critical feeding and resting sites.

Native Terrestrial and Aquatic Species. There would be no restoration of open space, native plant communities, or wetland and riparian areas to benefit animal populations. The limited replanting and protection of native plants at Crissy Field would have a long-term positive effect on wildlife by providing additional habitat.

Increased visitor use throughout the Presidio, but especially within existing native plant areas such as Baker Beach, would probably cause impacts on resident wildlife species. Designation of appropriate recreational uses and use areas would limit those impacts.

The noise and disturbance associated with facility construction might temporarily disturb nesting birds. Other animals less tolerant of disturbance might also temporarily abandon construction sites; however, the majority of species within the Presidio are adapted to the noises of the urban environment.

The removal of hazardous trees throughout the Presidio would decrease the number of trees available for nesting birds.

Conclusion

Because no open space or native plant communities would be restored under this alternative, there would be no additional benefits to wildlife. Some disturbance to native species might result from construction and recreational activities.

Cumulative Impacts

There would be minimal changes to habitat under this alternative; therefore, cumulative impacts on wildlife would be insignificant.

Impacts on Threatened, Endangered, Rare, and Sensitive Species

Analysis

Under alternative B federally listed and candidate threatened and endangered plant species would be protected as required by law (see appendix A). The *Raven's Manzanita Recovery Plan* (USFWS 1984) would be implemented. However, there would not be a comprehensive program of restoration and enhancement to benefit special status species.

Actions under alternative B are not anticipated to have any adverse effects on special status animal species. No listed or candidate threatened or endangered animal species are known to have critical habitat within the Presidio (USFWS 1991). Several species, including the federally listed California red-legged frog (*Rana aurora draytoni)* and the state-listed willow flycatcher (*Empidonax trailii*) have been recorded but are not known to use the area at this time. Three other species — the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), and brown pelican (*Pelecanus occidentalis*) — are transient in the area.

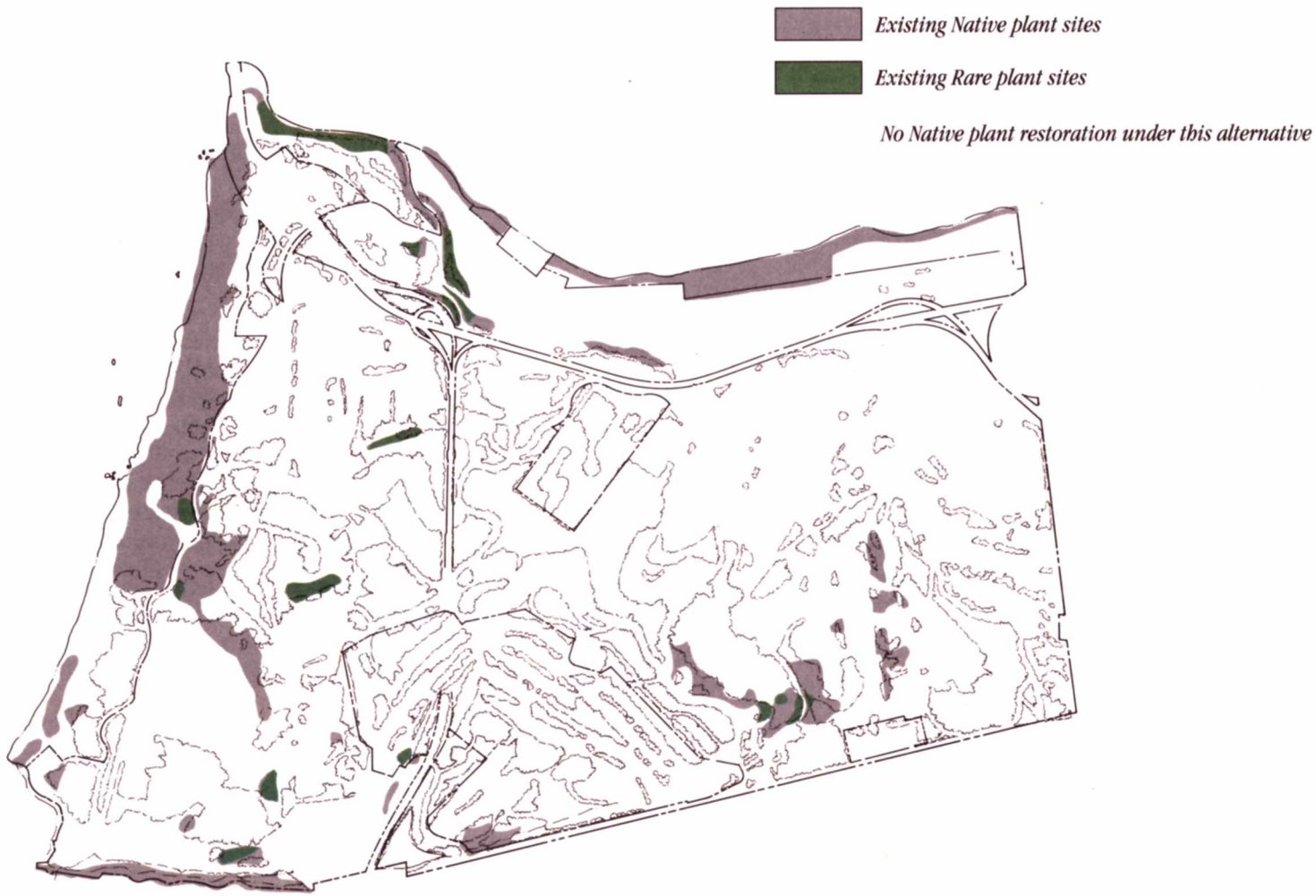
Under this alternative there would be no comprehensive program to inventory, enhance, and monitor special status animal species. The possibility of reintroducing species would not be investigated. Therefore, no beneficial effects on these species would result.

Conclusion

Threatened, endangered, rare, and sensitive plant and animal species would benefit from the protection required by law, and no negative impacts are anticipated. No comprehensive inventorying, enhancement, and monitoring program would be implemented that might have long-term beneficial effects on special status species.

Cumulative Impacts

Threatened, endangered, rare, and sensitive plant and animal species would continue to be protected, but would not benefit from habitat enhancement programs. Cumulative impacts would be insignificant.



Native Plant Habitat Restoration – Alternative B

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Impacts on Topography and Soils

Analysis

Only 39 acres of soils would be affected under this alternative. Disturbance of topography and soils would result primarily from the development or expansion of visitor services and from access and circulation improvements intended to correct safety hazards.

The following site development actions would have some effect on soils: dune expansion and Golden Gate promenade rehabilitation at Crissy Field; parking removal at Bowley Street in the coastal bluffs area; removal of pavement and rehabilitation of the landscape for park maintenance at Fort Scott; construction of new parking at the Fort Point/Golden Gate overlook and the torpedo wharf; removal of asphalt around the existing clubhouse and construction of a new clubhouse at the Presidio Hill golf course; and construction of a transit hub at the main post.

No actions would be taken to prevent or reduce soil erosion under this alternative. Surface runoff across parking lots and other paved areas within the main post, Fort Scott, and the Letterman complex would continue. Long-term sheet erosion of severely disturbed soils left unrestored could be expected to continue, resulting in annual soil loss and deterioration of water quality within natural drainages. Failure to stabilize and or restore the Presidio trail system would further promote rill and gully erosion and might result in unsafe conditions for recreational use.

The short-term impacts of soil loss and deteriorating water quality associated with native habitat restoration and removal of nonhistoric buildings would be minimal under this alternative.

Conclusion

A total of 39 acres of soils would be disturbed under alternative B. Fewer short-term and post-restoration impacts would occur because little site restoration is proposed. In the long term, there would be negative impacts on site characteristics; natural drainage and soil formation processes would not be restored and would continue to be subject to human influences and uses.

Cumulative Impacts

Soils would be minimally affected under this alternative; no soils or topographic features would be restored. Therefore, cumulative impacts on topography and soils would be insignificant.

Impacts on Air Quality

Analysis

Predicted CO levels by intersection under 2010 conditions with NPS activities and with current uses continuing were described in alternative A. Computer modeling results indicated that future reductions in vehicle emissions would yield CO levels that would not exceed the state 1-hour standard or the federal and state 8-hour standard. Alternative A was used for analysis because it represents the "worst case" for air quality impacts related to traffic — an equal or greater number of future trips as compared to the other alternatives.

The computer modeling results presented in table 48 show the impacts of alternative B on the production of major vehicle emissions — total organics (relative hydrocarbons), carbon monoxide, nitrogen oxides, and particulates. The predicted emission levels would exceed the threshold levels of 0.075 tons per day for hydrocarbons, nitrogen oxides, sulfur oxides, and particulates. These emission levels would have a significant negative impact on air quality.

It is notable that all of the mobile-source pollutant threshold levels are exceeded for current land uses and trip-generating characteristics. However, the bulk of the pollutants are generated by traffic on Highways 1 and 101 that is not related to activities at the Presidio.

Conclusion

The impacts on air quality would be similar to those of alternative A. CO levels in the year 2010 would not exceed 1-hour or 8-hour standards. The levels of all mobile-source contaminants except carbon monoxide (hydrocarbons, nitrogen oxides, sulfur oxides, and particulates) would be significant because these levels are already exceeded; however, the bulk of the pollutants would be generated by traffic on Highways 1 and 101 that is not related to activities at the Presidio.

Cumulative Impacts

Regional airsheds encompassing the Presidio currently do not meet air quality standards. The implementation of alternative B would have a minor (less than 1%) but adverse effect on this condition.

Impacts on Noise

Analysis

The impacts would be similar to those of alternative A, except for the following.

In general, construction noise would be limited to repairs to infrastructure and building rehabilitation. Building removal and major natural area restoration would not be conducted; therefore, no impacts would result.

Traffic noise would be the same as under alternative A, except that no major road modifications of road systems, except Doyle Drive, would occur. Limited transportation improvements would be made to address safety problems but not to increase the amount of traffic within the Presidio.

Noise levels associated with vehicle and pedestrian access would be expected to exceed existing levels, but would be slightly less than under alternative A. Traffic noise on Highways 1 and 101 would increase to a similar level as under alternative A.

Conclusion

Future noise levels in the Presidio would be minimally higher than at present but would not violate the San Francisco noise ordinance. During implementation, construction would be a source of increased noise and related impacts, although the noise would be reduced to an acceptable level through mitigating actions. Noise would also increase as traffic to and from the Presidio increased. Park land uses and related internal traffic increases would not have significant impacts on noise.

Cumulative Impacts

There would be short-term cumulative impacts on noise levels as a result of Presidio construction projects and Caltrans reconstruction of Doyle Drive. Long-term cumulative effects would primarily result from traffic on Doyle Drive (Highway 101) and Park Presidio Boulevard (Highway 1).

TABLE 48: PROJECTED EMISSIONS FROM MOBILE SOURCES UNDER NPS MANAGEMENT ALTERNATIVE B (TONS/DAY)

Year/ Management Alternative	Daily Emissions				
	Total Organics (HC)	Carbon Monoxide (CO)	Nitrogen Oxides (NO_x)	Sulfur Oxides (SO_x)	Particulates (PM_{10})
Presidio Baseline Condition (1992)	0.91	9.08	1.21	0.13	1.07
2010 – Continuation of Current Uses	0.59	6.98	0.94	0.10	0.74
2010 – Alternative B	0.95	10.99	1.58	0.18	0.84

NOTE: Vehicle emissions were calculated by use of the California Air Resources Board's URBEMIS 3 model recommended by BAAQMD.

Impacts on Interpretation and Education

Analysis

Other than a visitor center and an orientation site at the Golden Gate Bridge plaza, alternative B would provide few new opportunities to learn about the Presidio's historical, cultural, and ecological values. This alternative would not fully meet the objectives for education and interpretation because programs and developments would be limited to Crissy Field, Fort Point, and existing open spaces such as Presidio forest, coastal bluffs, and Lobos Creek. The visitor center in the former commissary would provide some additional interpretive and educational programming.

Opportunities for interpretation might also be lost or not fully realized because large numbers of buildings would be occupied by other agencies and organizations that do not provide interpretation or education for the general public to the extent that the National Park Service does. However, these organizations would most likely provide some educational opportunities and have some positive and beneficial effects.

No conference, research, or training programs would be provided at Fort Scott, the Letterman complex, the east housing area, the cavalry stables, or the Public Health Service hospital.

Conclusion
This alternative would have few beneficial effects on educational and interpretive activities. Organizations occupying the buildings would not be required to provide programs and events for the public, although they would likely offer some learning opportunities as part of their functions.

Cumulative Impacts
Any interpretive and educational activities provided under this alternative, when combined with the educational programming at Golden Gate Recreation Area, would have a positive cumulative effect on education in the region.

Impacts on Recreation

Analysis
Alternative B would provide additional facilities for recreation but would not expand recreational opportunities. Outdoor recreation would continue to be primarily concentrated in open space areas at Crissy Field, Fort Point, and Presidio forest. An additional 3.6 miles of trails (total 9.1) would provide new hiking opportunities.

Existing indoor recreational facilities would be used for leisure pursuits by the public; because they would be privately operated, there might be use restrictions such as limited hours. However, these additional facilities would have a beneficial impact on recreational opportunities.

Within the Fort Point, Presidio forest, Crissy Field, Golden Gate plaza, and coastal bluffs areas, new visitor services (informational kiosks and site amenities) would enhance recreational use. The visitor center in the former commissary would offer information on recreational opportunities in the Presidio.

The golf course and other outdoor recreational facilities such as tennis courts would become public facilities managed by private entities. Julius Kahn Playground would continue to be operated by the city of San Francisco. No tennis courts or ballfields would be removed.

This alternative would provide limited benefits for recreationists. Because no facilities would be removed, no adverse effects are expected.

Conclusion
Under this alternative existing recreational facilities would be made available to the public, but improvements would be limited and opportunities would not be fully realized.

Cumulative Impacts
The provision of recreational opportunities for the public at the Presidio and Golden Gate National Recreation Area would have a minor but positive cumulative effect on recreational opportunities in the city and Bay Area.

Impacts on Scenic Viewing

Analysis
Under alternative B no building removal or major site restoration would take place, so there would be no significant impacts on scenic resources or viewing. Some minor impacts are described below by planning area.

Fort Scott. The maintenance facility for the park would be near the Battery Dynamite area and might require new construction. When converted to a larger maintenance facility, the area would continue to be screened by existing vegetation. However, from some vantage points the maintenance yard and facilities would diminish views.

Crissy Field. The former commissary would become the visitor center under this alternative. Traffic would increase at Crissy Field, and parking areas would be used by arriving park visitors. From the shoreline and other areas of Crissy Field, the additional traffic and the heavily used parking areas would have a detrimental effect on scenic viewing. However, the impacts of this new use would be offset by the benefits derived from effectively conveying the park story to large numbers of visitors and reducing traffic and noise at the main post.

Conclusion
This alternative would not significantly affect vistas or scenic viewing in a positive or negative way. Some minor impacts might occur at Crissy Field and Fort Scott because no actions would be taken to improve these areas.

Cumulative Impacts
Because only minimal changes would occur under this alternative, cumulative impacts on vistas and scenic viewing would be insignificant.

Impacts on Human Health, Safety, and the Environment

Analysis
The impacts of alternative B would be similar to those of alternative A except for the following.

This alternative would involve the greatest risk of exposure to lead and asbestos in buildings because no buildings would be demolished. Appropriate mitigating measures would be implemented to reduce this risk. Fewer visitors would accidentally be exposed to hazardous substances, pollutants, and contaminants than under alternative A because there would be fewer attractions to bring people to the Presidio.

There would be no risk of exposure to hazardous substances at Crissy Field as a result of soil grading to restore wetlands. The risk of chemical exposure associated with grading of contaminated soils along roadways would be minimal.

Conclusion
The impacts on human health and the environment from hazardous substance remediation would be the same as those under alternative A. The risk of residents and occupants being exposed to lead paint and asbestos inside buildings would be greater because no buildings would be removed. However, there would be no risk of exposure to lead and asbestos during building demolition.

Cumulative Impacts
The specific cumulative impacts of hazardous substance remediation (including underground storage tanks) at the Presidio are unknown at this time because the Army has not fully characterized the extent of the contamination and because cleanup plans have not been finalized. However, if the Army fully remediated the identified contamination, there would be a beneficial cumulative impact on human health, safety and the environment. There would be a greater risk of exposure to lead paint and asbestos inside buildings than under the other alternatives; however, over the long term, the removal of these substances would have a beneficial cumulative impact.

Impacts on Energy Consumption

Analysis
In accordance with the energy conservation requirements of Executive Orders 11912 and 12003, an appropriate conservation program would be developed.

The energy requirements of the Presidio under alternative B would be similar to those of a small community, with 3,600 residents and 7,400 employees in 2000 and 2010. However, with GSA control of the rehabilitation of structures, many design stipulations could be required to reduce energy consumption.

The use of water conservation devices and techniques for all structures would significantly reduce the amount of water needed, thus reducing the amount of power needed to pump both water and sewage. Such conservation devices include restricted-flow shower heads and faucets and low-volume flush toilets. Use of reclaimed water for irrigation, up to 1 million gallons per year, would reduce the overall need for potable and nonpotable water from Lobos Creek.

Conservation Measures
The Park Service and GSA would expand the public education activities related to energy conservation that were previously carried out by the Army. They would also develop a comprehensive energy conservation plan and specific measures to minimize energy use for each building to be renovated.

Conclusion
Because of the use of reclaimed water and the increased efficiency of rehabilitated buildings, energy consumption would be expected to decrease at the Presidio under this alternative.

Cumulative Impacts
Energy-reducing measures at the Presidio and Golden Gate National Recreation Area would have a minor but positive effect on energy conservation in the region.

Impacts on NPS Management and Operations

Analysis

Site Development. Site development, including building rehabilitation, and associated planning activities for full implementation of alternative B would cost about $898 million. Approximately $730 million would be borne by future tenants, $88 million by the National Park Service, and $80 million by D.O.D.

Infrastructure Rehabilitation. The impacts on infrastructure would be the same as for alternative A except for the following.

Water Supply and Distribution — Under alternative B, which would retain all housing, projected demands for potable water are estimated at 496,000 gallons per day in the year 2000 and 529,000 gallons per day in the year 2010 (Jones & Jones 1993a). An additional 1.0 millions gallons a day for irrigation would be needed primarily for the golf course, cemetery, and parade grounds. Water consumption would be reduced because the former Public Health Service hospital would not be added to Golden Gate National Recreation Area.

Storm Drainage System — The impacts would be the same as for alternative A.

Sanitary Sewer System — The impacts would be the same as for alternative A except that the load on the city's facilities would increase from 250,000 gallon per day (1992) to about 422,000 gallons per day in 2000 and 450,000 gallons per day in 2010. This sewage discharge estimate does not include the former Public Health Service hospital, which would not be legislatively transferred to Golden Gate National Recreation Area under this alternative.

Electric Power Distribution — The impacts would be the same as for alternative A except that no repair or rehabilitation of the electrical system would be carried out at the former Public Health Service hospital. There would be limited fiscal savings for the federal government.

Transportation Services. No shuttle bus or ferry transportation services would be provided.

Staffing and Operations. Under alternative B the impacts on law enforcement, fire, and emergency services would be similar to those of alternative A. A total of 288 full-time staff members and an annual operating budget of $43 million ($22 million would be recovered from tenants) would be required. Staffing would include 77 maintenance personnel, 70 law enforcement and public safety personnel; 35 fire and emergency/rescue personnel; 35 visitor services personnel; 42 resource management personnel; and 29 administration personnel.

Concession Revenues. Under alternative B the Presidio would generate about $21 million in 2000 and nearly $28 million in 2010 in visitor service and overnight lodging revenues (Jones & Jones 1993a). A portion of the concession revenues would be returned to the park through stipulations in the concession contracts.

Additional concession revenues could be expected from recreational facilities like the golf course. Such revenues were not projected for the DEIS, but they could be substantial. Future concessions analysis would address potential revenues and NPS profit-sharing.

The possibility of adding visitor services at Crissy Field would be analyzed as tenant programs were developed. This might result in additional revenues for the Presidio from retail and food and beverage concessions (Jones & Jones 1993a).

Conclusion

Substantial increases in funding and personnel would be required for full implementation of this alternative. An additional $817 million would be required for site development activities. Approximately $43 million ($22 million would be recovered from tenants) and an additional 288 full-time employees would be required for Presidio annual operations.

Under this alternative the Presidio would generate about $21 million in 2000 and nearly $28 million in 2010 in visitor service and overnight lodging revenues. Of these revenues, a portion would be returned to the park, as determined through the concession contracting agreement process. Additional concession revenues could also be anticipated from recreational facilities like the golf course.

Cumulative Impacts

The actions and fiscal responsibilities under this alternative would have both a beneficial and adverse cumulative impacts on NPS management and operations nationwide. The project would generate revenues for the federal treasury, but would also result in increased operational costs to the Park Service.

Unavoidable Adverse Effects

The impacts that follow are those for which there are no mitigating measures or those that could not be mitigated to a level of insignificance.

Alternative B would only minimally change land uses within the Presidio. Establishment of these new land uses would preclude other uses that might be desirable.

Additional recreational use and employment under this alternative would result in increased use of all forms of transportation — bicycle, pedestrian, transit, and automobile. Mitigating measures would reduce some otherwise significant transportation effects; however, some minor cumulative effects on regional traffic would be unavoidable by the year 2010.

Increased travel to and from the Presidio would contribute cumulatively to vehicle emissions within the air basin and to the frequency of air quality standard violations for pollutants. At the Presidio, projected emissions for air pollutants, hydrocarbons, nitrogen oxides, sulfur oxides, and particulates would continue to exceed threshold levels of 0.075 tons/day for mobile sources on a daily basis.

Growth-Inducing Impacts

The Presidio under National Park Service management could have growth-inducing impacts on the region, as the local economy and community respond to Presidio activities.

- **New Jobs** — About 7,400 jobs would be generated at the Presidio in the year 2010, compared to about 5,500 under Army use.

  Impacts:

  Under alternative B there would be no new net increase in housing demand. Onsite housing would meet about 74% of the housing demand by Presidio employees.

  New employee households would create increased demands for goods and services in areas surrounding their homes and throughout the Bay Area. This could result in indirect population and housing growth because of an increase in service jobs.

  New employment could lead to an increase in expenditures for business-related and personal goods and services (ranging from office supplies and major equipment to daily lunches) in areas near the Presidio. This could result in the growth of businesses in areas along the western end of Lombard and Chestnut streets and in commercial districts near the Presidio's southern entrances as well as throughout the Bay Area in general. This growth could indirectly result in increases in building sizes, infill on vacant lots, and traffic and pedestrian activity in areas near the Presidio.

- **New Tourism** — The Presidio could draw up to an estimated 6.9 million visitors per year, compared to the 3.5 million visitors at present (Peccia & Associates 1993) — an increase of 97%.

  Impacts:

  Increased tourism at the Presidio would increase the demand for lodging, restaurant, and other tourist-oriented services in surrounding areas, especially to the east, south, and southeast in the Marina and Richmond districts and perhaps Cow Hollow and Pacific Heights. The Lombard Street area, which already includes hotel and motel uses and is zoned C-2 (community business) would likely be the focus of increased tourism because it is on one of the main access routes to the Presidio. Other areas that might experience growth are the commercial portion of Chestnut Street west of Van Ness Avenue and possibly the commercial districts near the Presidio's southern entrances. In these areas building up to the limits of zoning codes and pressures for changes in allowable uses would be likely. It is also possible that some of the residential areas south of the Presidio and in the western end of the Marina district would experience pressures from people interested in developing bed-and-breakfast-type uses, where these uses are or could be permitted under the San Francisco planning code. Such changes would be subject to existing city and county of San Francisco planning and zoning regulations. Tourist-related business growth could result in indirect growth in population and housing demand in the city and the region.

- **Utility Upgrades** — Infrastructure improvements would not encourage additional growth outside of the Presidio because these improvements are only for onsite services.

- **Roadway Improvements** — To the extent that the planned traffic circulation and safety improvements could increase the capacity of affected transportation networks beyond that needed to accommodate Presidio traffic and transit services, they could promote additional growth in other areas served by the same traffic network. This could result in indirect population and housing growth.

Relationship of Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

Alternative B would involve the removal and remediation of hazardous substances, pollutants, and contaminants at the Presidio. These cleanup activities would be carried out by the Army in compliance with federal and state laws and regulations. When these cleanup activities were completed, it is possible that certain areas of the Presidio could be restored to more natural conditions, thereby potentially increasing long-term productivity.

Recreational uses would not have significant effect on long-term productivity.

Irreversible and Irretrievable Commitments of Resources

Under alternative B all archeological sites would be avoided where possible. Where this was not possible, disturbance would be mitigated through recovery of cultural information and significant artifacts. However, some losses of archeological objects and cultural information would likely occur because of vandalism, collecting, or construction activities. These losses would be irreversible.

Although most developed areas could be restored to previous conditions over time, the use of land, construction materials, energy, and financial resources to implement the proposed action would, in the practical sense, be an irretrievable commitment of resources.

Alternative C

Impacts on the Regional Economy and Employment

Analysis

Employment and Payroll Related to Park Use. Table 12 shows direct employment and payroll estimates under alternative C. Direct employment in the year 2000 is estimated at 4,500, dropping to about 4,100 in 2010 because of the removal of additional buildings. Employment under this alternative would be lower than under the other three alternatives because the Letterman complex would be excluded from the park boundary; although the medical land use category for alternative C shows zero space and employment, this use would exist just outside the boundary and would probably generate a large amount of employment. Within the park boundary the largest employment category would be office, with nearly 3,200 employees in the year 2010; the industrial and retail categories would provide more than 360 and 280 jobs, respectively.

Direct payroll under alternative C would also be less than under the other alternatives because the Letterman complex would be outside the park. Payroll within the park would total about $91 million in 2000 and $82 million in 2010; the 2010 payroll would be an increase of about $12 million over the baseline condition.

Secondary employment in the seven industry sectors represented at the Presidio is expected to generate about 1,810 jobs in the city of San Francisco in 2000 and 1,620 jobs in 2010, as shown in table 13; these jobs are estimated to raise annual payroll by about $79 million and $72 million, respectively. Secondary employment is projected to add about 3,620 jobs in the Bay Area in 2000 and 3,240 jobs in 2010, which would raise the annual regional payroll by more than $158 million in 2000 and $143 million in 2010 (table 14).

Total Presidio employment, in all sectors except construction, is estimated to add about 6,310 jobs in San Francisco in 2000 and 5,700 jobs in 2010 (table 15); this would raise the annual payroll by $170 million and $154 million, respectively. In the same years total Presidio employment is expected to generate about 8,120 jobs and 7,320 jobs in the Bay Area, increasing the annual regional payroll by $249 million and $226 million (table 16).

The effects on employment and earnings from closing the military base versus converting it for park use are compared in table 17. The closure of the military base is estimated to cause a decline of 3,150 jobs and $66 million in income in the Bay Area (USACE 1991). In contrast, reuse of the Presidio under alternative C is estimated to increase San Francisco employment by more than 6,000 jobs and earnings by more than $162 million. Additionally, park conversion is estimated to increase Bay Area employment by about 7,720 jobs and Bay Area earnings by about $237 million.

None of the changes in employment and earnings are expected to cause a large disruption in the regional labor market. The increase in Presidio-related jobs represents only a 0.2% (2/10 of 1%) gain in regional employment; the increase in Presidio-related earnings represents only a 0.19% gain in regional income. Nevertheless, these changes should provide a boost to San Francisco's economy. Much of the employment and income gain is expected to occur within the city and county of San Francisco. Conversion of the Presidio is estimated to increase city employment by 0.65% and city payroll by about 0.94%.

Construction-Related Employment and Payroll. The construction period at the Presidio is expected to continue from year 1994 to year 2010 and be most intense between 1994 and 2000. Direct employment related to construction activities is estimated to be about 1,290 jobs in 2000 and 480 jobs in 2010 (see table 18). The annual construction payroll is expected to be about $35 million annually between 1994 and 2000 and about $13 million annually between 2001 and 2010.

Secondary construction activities are expected to generate about 834 jobs annually in the city and county in 2000 and 310 jobs in 2010. Secondary construction activities are estimated to raise the annual payroll in San Francisco by $31 million annually between 1994 and 2000 and by $12 million annually between 2001 and 2010. About 1,670 jobs are expected to be generated annually in the region between 1994 and 2000, and about 620 jobs annually between 2001 and 2010. Annual payroll in the region is estimated to increase by $63 million in 2000 and $23 million in 2010.

Total (direct and secondary) construction activities related to the Presidio conversion are expected to generate about 2,120 jobs in 2000 and 790 jobs in 2010 in San Francisco; annual payroll would be raised by $67 million annually between 1994 and 2000 and by $25 million annually between 2001 and 2010. In

the region, total construction activities are expected to generate about 2,960 jobs in 2000 and about 1,100 jobs in 2010 and to raise annual payroll by $98 million annually between 1994 and 2000 and $37 million between 2001 and 2010.

State Sales and Use Tax. Based on estimated commercial activities at the Presidio under alternative C, an additional $2.1 million in state sales and use tax revenues would be generated in 2000 and $1.8 million in 2010. BART would collect about $192,000 in sales tax revenues in 2000 and $168,000 in 2010. All tax revenues would be new because military uses are exempt from state taxes.

Resident, Employee, and Visitor Expenditures. Under alternative C residents, employees, and visitors would generate about $23 million in the year 2000 and more than $28 million in the year 2010 in revenues for services and overnight lodging. Sales volumes per square foot would be below the acceptable range for food and beverage operations in both 2000 and 2010, which might require an adjustment in services; the low end of retail sales would be well within the acceptable range by the year 2010. Sales projections are summarized in table 49.

A few visitor services might be advantageous at Crissy Field to increase future revenues for Presidio retail and food and beverage concessions. Such services would be analyzed as tenant programs were developed and ferry service was implemented.

Conclusion

Under alternative C there would be positive effects on employment opportunities and on the local and regional economy, including indirect effects on local businesses and tax revenues. About 4,100 jobs related to park use would be created at the Presidio by the year 2010 (2,870 of these would be new jobs), and the annual payroll would increase by about $12 million to $82 million ($57 million attributable to new jobs). Total employment in construction and other employment sectors in the city and the Bay Area would increase to about 6,490 jobs and 8,420 jobs, respectively; of this, about 4,545 jobs would be new to the city and 5,895 jobs would be new to the region. Total earnings in the city and the region would increase to $179 million ($125 million attributable to new jobs) and $262 million ($183 million attributable to new jobs), respectively. Park conversion would generate enough jobs and earnings in the region to more than offset jobs and income lost because of the substantial reduction in the Sixth Army presence at the Presidio. Nevertheless, anticipated jobs and earnings would only be a small percentage of existing jobs and earnings in the city and Bay Area.

TABLE 49: SUMMARY OF FOOD, BEVERAGE, AND RETAIL SALES - ALTERNATIVE C

Presidio Sales Summary		
	2000	**2010**
Total Food and Beverage Sales	$ 7,064,000	$ 7,584,000
Total Retail Sales	12,228,000	14,661,000
Total Guest Room Revenues	3,717,000	6,165,000
Total Revenues	**$23,009,000**	**$28,410,000**
Presidio Sales by Square Footage		
Food and Beverage	$90.04	$96.68
Retail	$160.51	$191.50

By 2010, state sales and use tax revenues from the Presidio would increase by about $2 million annually. About $23 million in 2000 and more than $28 million in 2010 would be generated in service and overnight lodging revenues.

Cumulative Impacts

Conversion of the Presidio into a national park system area would have a minor but positive cumulative effect on local and regional employment and income and on state tax revenues. Resident, employee, and visitor expenditures at the Presidio would contribute a small percentage to the regional economy.

Impacts on City Services

Cost Analysis

The provision of services would be the same as in alternative A. The city of San Francisco would not be significantly affected because primary responsibility for these services would rest with the National Park Service.

The Presidio boundary would not be adjusted to include the Public Health Service hospital site. Also, LAMC and LAIR would be excluded from the park. The provision of water, wastewater, and storm drainage services would be the same as under alternative A except that the city of San Francisco would retain responsibility for maintenance of the water and wastewater systems at the Public Health Service hospital and would assume new responsibility for providing these services to LAMC and LAIR. This alternative would result in no demand for water from the city of San Francisco for special uses in the Presidio. Sewage discharge would also be reduced because of reduced consumption of potable water; sewage disposal charges would be about $951,000 in 2000 and $577,000 in 2010 to dispose of about 415,000 and 252,000 gallons of sewage discharge per day, respectively (Jones & Jones 1993a).

Under alternative C the MUNI trolley would be extended by the city for a capital cost of $1,687,000 and annual operating costs of $68,600. Extension of MUNI lines 29 and 43 would increase annual operating costs by $5,000 and $36,000, respectively. Intersection improvements would be implemented at eight locations, as needed, to eliminate problems and safety hazards related to regional and Presidio traffic increases. Total cost would be $2,400,000; initial safety and traffic flow improvements would cost $2,130,000, and second-phase improvements at two intersections would cost $270,000. The National Park Service would assist in seeking funding for these improvements (Peccia & Associates 1993).

Revenue Analysis

City revenues for alternative C could total $4,778,000 from all sources for the year 2000 and $3,101,000 by the year 2010 if all taxes were applicable. These would be new city tax revenues because military base uses are exempt.

Table 50 presents individual sources of tax revenue for alternative C. If applicable, property tax revenue would account for the largest share of revenue in years 2000 and 2010. Because many of the revenue sources would depend on the square footage used for different business activities, there would be a decrease between the two periods as available square footage was reduced.

TABLE 50: CITY REVENUES - ALTERNATIVE C

Revenue Source*	2000	2010
Property Tax**	$2,159,000	$1,256,000
Sales Tax	$670,000	$588,000
Business Tax	$542,000	$489,000
Hotel Tax	$346,000	$346,000
Other	$1,061,000	$422,000
Total	$4,778,000	$3,101,000

*All revenues are expressed in constant dollars.
**This tax may not be applicable.

Public School Enrollment Analysis

About 440 schoolchildren living at the Presidio would be enrolled in San Francisco public schools in the year 2000; as the population decreased by 2010, only about 100 children would be enrolled. This would be 0.67% (2/3 of 1 percent) of the total San Francisco school enrollment in 2000 and 0.15% in 2010. The short-term demand would be less than half of the Presidio Army demand in 1990; the long-term demand would be 11% of the 1990 demand. The reduction in the number of Presidio schoolchildren enrolled in public schools would slightly reduce the demand on existing school facilities. There would be about 774 school-aged dependents in 2000 and 701 dependents in 2010 attending schools in the region, or about 25% of the dependents enrolled in regional schools under Army use.

Conclusion

Under alternative C the city would benefit from an increase in tax revenues of about $3.1 million in 2010, if all taxes were applicable. Presidio use of sewer services would decrease because the Public Health Service hospital, LAMC, and LAIR would not be included in the boundary; user fees would cover costs of providing these services. No city water would be required for special uses. There

would be few demands on city public safety services because most services would be provided by the Park Service. Transportation-related improvements would have one-time capital costs of $4,087,000 and annual operating costs of $68,600. Tax levies and fare revenues would help support these improvements.

Presidio schoolchildren would constitute a very small percentage of the total San Francisco school enrollment.

Cumulative Impacts

The Presidio would contribute in a minor way to the tax revenues currently being generated in the city and would have a minor cumulative impact on city revenues. The demand for city services at the Presidio would be small; therefore, the cumulative impact on those services would be insignificant.

Impacts on Housing

Analysis

Housing Stock Use. Under alternative C, housing would be used by persons employed on the Presidio — NPS staff, nonprofit partners, and Sixth Army staff — and 85 units would be reserved for guest lodging. About 150 housing units would be reserved for Sixth Army personnel. A total of 836 units would be available for park and partner employees until the year 2000; that number would be reduced to 70 units by 2010. In addition, 205 staff and 276 guests would use dormitory space. Presuming the phase out of housing units between 2000 and 2010 was timed to coincide with lease arrangements and employee turnover, no families would be displaced. Only a limited number of Sixth Army personnel would live at the Presidio; therefore, federally owned housing available for active duty personnel in the Bay Area would be reduced.

Under this alternative 102 units would be removed by 2000, and an additional 766 units would be phased out from 2000 to 2010; a total of 305 housing units would remain by 2010. Housing to be removed would include the Wherry housing area, east housing area, and the officers' family housing area on Washington Avenue. A total of 934 dormitory units would be removed or converted to other uses. The 868 housing units removed by 2010 would reduce the Bay Area housing stock by 0.03% (3/100 of 1 percent) over the 1990 level and the San Francisco housing stock by 0.26% (1/4 of 1 percent) over the 1990 level.

Housing Demand Estimates. The percent of employee households (including Sixth Army households) desiring Presidio housing that could be accommodated on site would decrease from 83% in 2000 to 33% in 2010. In the year 2000 there would not be a new net regional housing demand; by 2010 a regional housing demand of 359 housing units would be expected, including 144 units in San Francisco (equal to about 1% of new house construction in the city between 1980-1990), 129 units in the North Bay, and about 87 units in the Peninsula and East Bay.

Conclusion

Under alternative C, 83% of employee housing demand could be accommodated in 2000, dropping to 33% by 2010. A total of 102 housing units would be removed by 2000 and another 776 units by 2010, for a total reduction of 868 housing units; 1,071 housing units would remain in 2000 and 305 units in 2010. About 774 dormitory beds would be available for staff and guest use; more than 900 dormitory beds would be removed or converted to other uses. A new net regional housing demand of about 360 residential units would be created by Presidio employees. When compared to the housing stock of the Bay Area and city of San Francisco, the employee housing demand and the reduction of housing would not be significant effects.

Cumulative Impacts

The Presidio housing demand would be a small portion of the employment-related housing demand increase in San Francisco and the Bay Area. Similarly, the reduced Presidio housing stock would be a small portion of the total housing stock in the city and region. However, given the short supply of affordable housing in the city, there would be an adverse cumulative impact from removing comparatively affordable housing stock at the Presidio.

Impacts on Health Care and Medical Research

Analysis

Letterman Army Medical Center and Letterman Army Institute of Research. Under alternative C the park boundary would be changed to exclude LAMC and LAIR; the historic portion of the Letterman complex, built in 1924, would remain inside the boundary. The excluded property would be surveyed and conveyed by the Bureau of Land Management according to government surplus

property procedures. The uses of the LAMC and LAIR buildings would be determined at that time, and further analysis would be needed to determine the impacts of those uses. If LAIR was used as a research facility, the impacts would be similar to those described in alternative A. If LAMC was used as a health care facility, the impacts would be similar to those described in alternatives B and D.

Public Health Service Hospital. Alternative C would not include the Public Health Service hospital area within Golden Gate National Recreation Area jurisdiction, and it is assumed that the city might exercise its lease option to use the site as a long-term chronic care facility. The park boundary would not be adjusted to include this property. The property would be surveyed and conveyed by the Government Services Administration (GSA) according to the Federal Surplus Property Act. The impacts would be described in a separate environmental analysis as part of the redevelopment process. Impacts would depend on the type of reuse.

Conclusion

The future uses of the LAMC, LAIR, and Public Health Service hospital facilities under this alternative are unknown at this time. Further environmental analysis would be required before reuse of the properties.

Cumulative Impacts

If LAIR was reused as a research facility, it would contribute to medical, life, and earth science knowledge and discovery in the Bay Area. Adverse cumulative impacts might result if uses of LAMC duplicated already adequate areawide acute care services; beneficial cumulative impacts would result from its use as a chronic care facility. If LAMC was not used by the military, there would be an adverse cumulative impact on health care for military retirees because of other recent closures (e.g., Oak Knoll Hospital) in the Bay Area.

Impacts on Medical Aid Incidents

Analysis

The total number of medical incidents requiring hospital care is estimated to increase to 196 in 2000 and 223 in 2010. This would be an increase of 38 incidents in 2000 over the baseline year (1992) of 158 incidents and an increase of 65 incidents in 2010 over the baseline year. Letterman might continue to be a hospital outside NPS jurisdiction; if so, the hospital could provide the needed emergency services. Also, the existing hospital emergency medical care system throughout the city could adequately provide the needed services.

Conclusion

The increase in the number of medical aid incidents would amount to about one medical incident requiring hospital care every sixth day by 2000 and one every fourth day by 2010. This increase would not be significant, and cases would be distributed among area hospitals and LAMC.

Cumulative Impacts

The increase in medical aid incidents requiring hospitalization would have an insignificant cumulative impact on hospital services.

Impacts on Traffic and Transportation Systems

Analysis

Presidio Traffic and Roadways. Alternative transportation use, traffic volumes, parking changes and improvements, and Doyle Drive reconstruction would cause the following impacts on traffic levels and patterns within the Presidio. Presidio traffic volumes do not include Highway 1 and 101 traffic. The baseline (existing conditions) year used for comparison was 1988.

Impacts of Alternative Transportation Use — Alternative C calls for facility and service improvements and implementation of TSM incentives to encourage nonauto travel. The physical improvements include extending MUNI lines 41 and 45 to the main post, developing transit hubs on the Presidio, establishing a park shuttle system, improving sidewalks and bike paths, and providing other improvements to encourage walking, bicycling, and transit use. About 4 miles of hiking trails would be added (for a total of 9.5 miles), and 11 miles of biking routes would be designated on existing roadways. These measures are assumed to become effective after the year 2000, so they do not affect the year 2000 estimated mode splits. Alternative C mode use estimates do not include traffic to LAMC and LAIR because they would be outside the park boundary; however, estimates in the traffic volume impacts section do include LAMC and LAIR traffic because people using these facilities would go in and out of Presidio gates.

Transportation mode use estimates for alternative C are presented in table 26 at the beginning of the "Environmental Consequences" section. Year 2000 projected weekday travel into and out of the Presidio is estimated at 82,000 person trips per day. Of these, 65,000 person trips would be by auto, 7,400 on transit, and 9,600 by bicycle and on foot. Modal shares would be 79% auto, 9% transit, and 12% bicycles and pedestrians.

Year 2000 weekend travel into and out of the Presidio is estimated at 94,500 person trips per day, with 66,900 person trips by auto, 5,300 on transit, and 22,300 by bicyclists and pedestrians. The mode split would be 71% auto, 6% transit, and 23% bicycles and pedestrians.

Year 2010 projected weekday travel into and out of the Presidio is estimated at 105,700 person trips per day. About 77,800 person trips would be by auto, 14,300 on transit, and 13,600 by bicyclists and pedestrians. The mode split would be 74% auto, 13% transit, and 13% bicycles and pedestrians.

Year 2010 weekend travel into and out of the Presidio is estimated at 121,700 person trips per day, with an expected 78,600 person trips by auto, 13,100 on transit, and 30,000 by bicyclists and pedestrians. The mode split would be 65% auto, 11% transit, and 24% bicycles and pedestrians.

The projected auto, transit, and bicycle and pedestrian daily trip estimates indicate that the number of trips by each travel mode would increase by the year 2010. However, transit's share of the total trips would increase, while the auto share would decrease and the bicycle/pedestrian share would remain about the same as under existing conditions. An additional 8,000-9,000 transit trips daily and 5,500-14,500 bicycle/pedestrian trips daily could be expected. Overall transit use would increase 106% on weekdays and 208% on weekend days; total pedestrian and bicycle use would increase by 68% on weekdays and 90% on weekend days. The additional growth in transit ridership would replace about 2,400 potential auto trips each weekday, and about 3,500 auto trips each weekend day.

Because of the shift in the mode split, auto-related congestion and noise and air pollution would not increase as quickly or as much as it would otherwise. The reduced growth in auto traffic would also tend to delay the need for roadway, intersection, and parking system improvements. Increased transit ridership would result in corresponding increases in fare box revenues. Because of the additional demand for transit, peak period ridership would be closer to capacity, resulting in increasingly crowded conditions on some buses. In cases where the increased demand could not be accommodated by existing transit service, additional service might be needed.

Impacts of Traffic Volumes — Table 27 shows the projected entrance volumes by vehicle trips under alternative C. In the year 2000 the average daily traffic (ADT) through Presidio gateways is projected to be 64,100 vehicles per day (vpd) on weekdays and 60,600 vpd on weekends. These traffic volumes reflect increases of about 27% over baseline conditions on weekdays and a 30% increase on weekends. Projected gateway traffic volumes for continued military use (the No NPS scenario) would amount to 13% of the growth that would occur without any of the proposed changes. This indicates that proposed land use changes related to park uses would be responsible for the remaining 14% of projected growth on weekdays and 17% of projected growth on weekends.

In the year 2010 the Presidio's gateway ADTs are projected to be 74,100 vpd on weekdays and 69,800 on weekends. The traffic volumes reflect an increase of 47% over existing weekday and 49% over existing weekend conditions. Projected gateway traffic volumes for continued military use would amount to 24% of the growth that would occur without any of the proposed changes. Thus, proposed land use changes related to park uses would be responsible for 23% of projected growth on weekdays and 25% of projected growth on weekends.

Closure of the Battery Caufield road would eliminate Presidio access through the 15th Avenue entrance, which would eliminate modeled traffic on the route and reduce model volumes on adjacent sections of Washington Boulevard. The relatively light use in this area (about 1,000 trips per day) would have little or no effect on local traffic outside the Presidio.

The generally lower traffic volumes under this alternative would tend to delay the need for capacity improvements, but there would still be capacity problems by the year 2010 in the locations described in alternative A.

Impacts of Parking Changes — Alternative C calls for extensive parking system improvements and the removal of a large amount of parking. Under this alternative the parking supply would be reduced from about 13,000 spaces to 7,820 spaces. This would be a reduction to 60% of the existing parking supply. Existing parking areas would be reconfigured, and spaces added and removed, for a net reduction of 5,210 spaces. The proposed parking supply would exceed average demand by an estimated 60 spaces.

Changes to the Presidio's parking system would reduce the number of available spaces while simplifying and better defining parking areas. Parking around the Presidio's perimeter would accommodate average daily parking demand, with a surplus under normal conditions and only minor shortages during peak periods. Most of the parking reductions would be in interior locations; as a result, parking spaces would be harder to find in some of these areas during peak periods, especially where transit service was concentrated. Long-term parking would generally be around the outer edges of developed areas, making it less convenient to drive and easier to use alternative modes of travel. Adequate short-term, service, and disabled-access parking would continue to be provided in convenient locations.

Incentives for alternative-mode travel, combined with limited available parking within the Presidio, would continue to shift the mode split toward alternative transportation. With mutual actions by the city to increase transit opportunities for visitors to San Francisco, parking demand should decrease over time. However, adequate parking would be provided inside the boundaries around the Presidio's perimeter to ensure that adjacent neighborhoods were not adversely affected by Presidio parking demands. Issuing city permits for neighborhood parking would also dissuade visitor parking outside the Presidio boundary.

Special event parking would be accommodated in part by temporary parking areas on Crissy Field. However, larger special events would need to be planned to take advantage of permanent parking spaces during off-peak periods because the parking system would not be designed to accommodate the peak demands of general and event visits simultaneously. Event coordination between staff of the Presidio, the city of San Francisco, Fort Mason Foundation, and the Exploratorium would reduce concurrent demand for available parking spaces.

Restrictions on parking along some streets and outside of parking lots would generally reduce the number of accidents related to parked or parking vehicles.

Impacts of Doyle Drive Reconstruction — The impacts of Doyle Drive reconstruction would be the same as under alternative A. Short-term impacts on the Presidio would include potentially serious traffic congestion at and near construction sites, increased noise and air pollution, increased traffic volumes on Presidio roadways from shortcutting, and the use of Presidio land for staging equipment. Long-term effects would include the irretrievable commitment of land for the right-of-way, the probable removal of some historic buildings, and continuing air and noise pollution.

Local and Regional Transportation Network. The local and regional transportation network would be affected by future Presidio-generated traffic and by changes to Doyle Drive.

Increased travel demand under alternative C would result in traffic levels similar to but generally lower than in alternative A. As a result, it would affect intersections within the Presidio and around its perimeter in much the same way as alternative A. Recommended improvements to address projected impacts would generally be the same as in alternative A, so impacts would be similar.

New traffic generated by the Presidio as well as regional traffic growth under alternative C would also affect roadway corridors within the Presidio, around the Presidio's boundaries, and on regional travel corridors serving the Presidio. Anticipated traffic level increases would be slightly smaller than under alternative A, with similar gateway distributions. As a result, local and regional impacts would be similar to those for alternative A.

Traffic on roadways within the Presidio and on roadways through its gateways extending several blocks outside the Presidio would be busier than under existing conditions. Recommended improvements would avoid the increased congestion that would otherwise occur at many locations and at key intersections. Increased Presidio traffic because of this alternative would also cause minor traffic volume increases on regional routes such as U.S. Highway 101 and 19th Avenue.

The impacts of Doyle Drive reconstruction on the local and regional transportation network would be the same as under alternative A. A Presidio interchange would be benefit the local traffic network by decreasing traffic at several other park gateways.

Conclusion

Proposed land use changes at the Presidio under this alternative would result in increased travel to, from, and within the Presidio. Planned improvements would reduce the share of trips into and out of the site by auto and increase the share of trips made on transit; the percentage share of bicycle/pedestrian trips would stay about the same, but volumes would increase. About 8,000-9,000 person trips daily would be added on MUNI, Golden Gate Transit, and other transit lines by 2010. This would eliminate some potential auto trips and increase fare box revenues for underused bus lines; however, heavily patronized lines might be more crowded during peak travel periods. Bicycle and pedestrian trips between

the Presidio and surrounding neighborhoods would increase by about 5,500-14,500 each day. These increases would have few if any negative impacts and would also eliminate an estimated 2,400 auto trips each weekday and 3,500 each weekend day. By 2010 total transit use would increase by 106% on weekdays and 208% on weekend days; pedestrian and bicycle use would increase by 68% on weekdays and 90% on weekend days.

Average daily traffic is projected to increase by about 23%-25% by the year 2010 as a result of Presidio land uses changes. The potential for congestion and other impacts related to traffic increases would be highest within the Presidio and near its boundaries. However, most impacts would be avoided by implementing roadway and intersection improvements and correcting dangerous traffic conditions at several locations. Some of the increased auto traffic would be on regional routes, resulting in slight increases in auto-related impacts on these routes; however, there would not be enough volume to create operational difficulties on the roadways.

The Presidio would generate increased demands for parking; however, planned parking improvements and the development or expansion of alternative transportation modes for access would reduce those demands. No significant negative impacts are anticipated.

The impacts of Doyle Drive reconstruction would be the same as under alternative A.

Cumulative Impacts

Traffic increases generated by the Presidio would have a negative cumulative effect on regional traffic growth and related congestion. By the year 2010 regional automobile traffic is expected to grow by 47% over existing weekday levels and 49% over existing weekend levels in the vicinity of the Presidio; 23%-25% of projected growth would be attributable to Presidio land uses. Presidio traffic increases on Doyle Drive, Highway 1, and the Golden Gate Bridge would also have a minor cumulative effect on congestion. If use of the Public Health Service hospital and LAMC/LAIR facilities increased outside NPS jurisdiction, there could be additional cumulative effects. The cumulative effects of Doyle Drive reconstruction would be addressed by Caltrans and other affected agencies in future environmental analyses; the cumulative effects of projects other than Doyle Drive reconstruction are not known at this time.

Impacts on Land Use, the Presidio Community, and Surrounding Neighborhoods

Analysis

Land Use. Developed areas would be concentrated in the north of the site, as most nonhistoric buildings in the south would be removed. As a result, the total building square footage inside the park boundary would be reduced by 51% to about 3.3 million; this would include 868 housing units in 204 residential structures totaling 1.8 million square feet. The Letterman complex and Public Health Service hospital would not be within the boundary of the park; therefore city zoning would be applied and institutional use, such as an acute care hospital facility, could be expected. The bridge district maintenance function would be moved to Armistead Road. An overnight environmental education program might be provided at the cavalry stables area. Other land uses and special use permits would be similar to those of alternative A.

The percentage breakdown of the total building square footage by use, shown in table 11, would be office (30%), residential (23%), warehouse (14%), dormitory (10%), industrial (9%), retail, military defense structures, institutional, and infrastructure (each 5% or less), and medical/research (0%). The overall land use breakdown, as shown in table 28 and the Land Use – Alternative C map, would be as follows: recreation/open space (1,007 acres; 70.9%), residential use (133 acres; 9.4%), institutional use (132 acres; 9.3%), special use (65 acres; 4.5%), industrial use (54 acres; 3.8%), and commercial/office use (29 acres; 2.1%). There would be a 29% increase in open/space/recreational areas above existing conditions.

Land uses in the neighborhoods surrounding the Presidio are primarily residential. These areas are densely developed, and proposed Presidio uses are not expected to have any significant effects on residential development or population growth. The Presidio's conversion would contribute little to the demand for additional housing in the city, especially because housing would be available within the park area (see the "Impacts on Housing" section).

Generally, Presidio land uses along or near the boundary would not change dramatically from existing conditions and would include open space, residential, and institutional uses; therefore, no significant impacts on park neighbors are anticipated. The exception is the Public Health Service hospital site, which has

been vacant for about a decade. Future use of this site under alternative C is not known because it would not be part of the park. It is expected that city planning and zoning controls would regulate future use at the site.

Population. Alternative C would have a large resident population in 2000 — about 3,700 people. But this population would drop sharply between 2000 and 2010, declining to just under 1,000 residents. The guest population would remain the same, at about 600 persons per night in both 2000 and 2010.

Community Support Services. The Presidio community would be similar to that of alternative A. As a result, a similar variety of commercial support services and recreational and meeting facilities would be provided. These services would benefit the community and visitors and have no significant impacts on commercial services in surrounding areas.

Within a few blocks of the Presidio are several small-scale commercial districts in the Marina area to the east and the Richmond and Pacific Heights areas to the south. Farther east is the moderate-scale Lombard Street district, and farther south the moderate-scale Geary Boulevard district (CCSF 1988). Much of the property in these districts is already developed, and any addition or intensification of commercial use would be subject to San Francisco planning and zoning regulations. Because commercial services within the Presidio would be tailored to meet basic visitor and community needs only, no significant negative impacts on businesses in these districts are anticipated. Presidio employees, residents, and visitors would purchase goods and services from local businesses, including specialty services, but not in sufficient quantity to encourage the growth of competing enterprises. See the "Impacts on the Regional Economy and Employment" section for additional information.

Conclusion

Under alternative C there would be a 29% increase in open space. Total building square footage would be reduced to about 3.3 million, or almost half of the existing square footage. There would be no medical/research use because the LAMC and LAIR facilities would be excluded from the boundary and the Public Health Service hospital would not be included. The total land area would decrease by an estimated 60 acres to 1,420 acres.

The size of the Presidio residential population would decline over time, but the present level of support services would be maintained to support both visitors and the community.

The potential for additional residential or commercial development in areas near the park is limited under existing land use controls, except on undeveloped or underdeveloped lots. The addition or intensification of land uses in these areas would be subject to San Francisco planning and zoning regulations, and no significant land use impacts are anticipated under existing controls. Employee, residents, and visitor spending would benefit local businesses but would not be great enough to induce the growth of competing businesses.

Cumulative Impacts

The restoration of about 230 acres of open space would have a minor but positive cumulative effect on efforts to preserve open space in the city and region. Land use changes at the Presidio under this alternative would have an insignificant cumulative effect on surrounding neighborhoods.

Impacts on the National Historic Landmark District

Analysis

Presidio Historic Buildings. Under alternative C the National Park Service would manage 845 Presidio buildings, 494 of which are listed as contributing to the national historic landmark district. No boundary changes would be sought to include the Public Health Service hospital complex within the park boundary, so the Park Service would have no management control over the 16 historic buildings in this area. The historic portion of the Letterman complex would remain inside the park boundary. Appendix B lists all of the historic buildings and their proposed treatment under each of the management alternatives. Table 51 summarizes the treatment of Presidio buildings under alternative C. Treatment categories are stabilization/preservation, rehabilitation, restoration, and removal.

TABLE 51: SUMMARY OF BUILDING TREATMENTS - ALTERNATIVE C

Treatment	Historic	Nonhistoric	Total
Stabilize and Preserve	113	17	130
Rehabilitate	337	15	352
Restore	7	0	7
Remove	37	319	356
Excluded from Park	16	9	25
Total	**510**	**360**	**870**

Under alternative C the overall impact on historic buildings would be beneficial. A total of 457 historic buildings would be retained. Of these, 337 would be rehabilitated to accommodate new uses; 113 would be stabilized and preserved; and seven would be restored.

Management of historic buildings would be similar to that described in alternative A. *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1992f) would provide guidelines for all proposed actions affecting historic buildings and structures. For buildings to be rehabilitated, uses would be selected that would require minimal alteration of the buildings' defining characteristics. Some historic buildings would have to be altered to accommodate new uses, which could have an effect on historic building fabric or materials. Building-specific assessments of existing conditions, an inventory of the character-defining elements of each historic building, and the Presidiowide rehabilitation guidelines would aid in minimizing adverse impacts.

Impacts related to rehabilitation of historic buildings would be addressed when tenants were selected and proposals submitted. Historic building rehabilitation would be certified by National Park Service preservation staff through the 1992 Golden Gate Operations and Maintenance Programmatic Agreement.

Buildings supporting public uses would be made fully accessible to physically disabled visitors, as required by federal law. In addition, during rehabilitation, buildings would be made to meet the nationally accepted model building codes to the maximum extent feasible.

As in alternative A, 37 historic buildings would be adversely affected because of their demolition and removal. Mitigating measures for these buildings, including recording to HABS standards and preserving significant buildings materials, would be developed in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation.

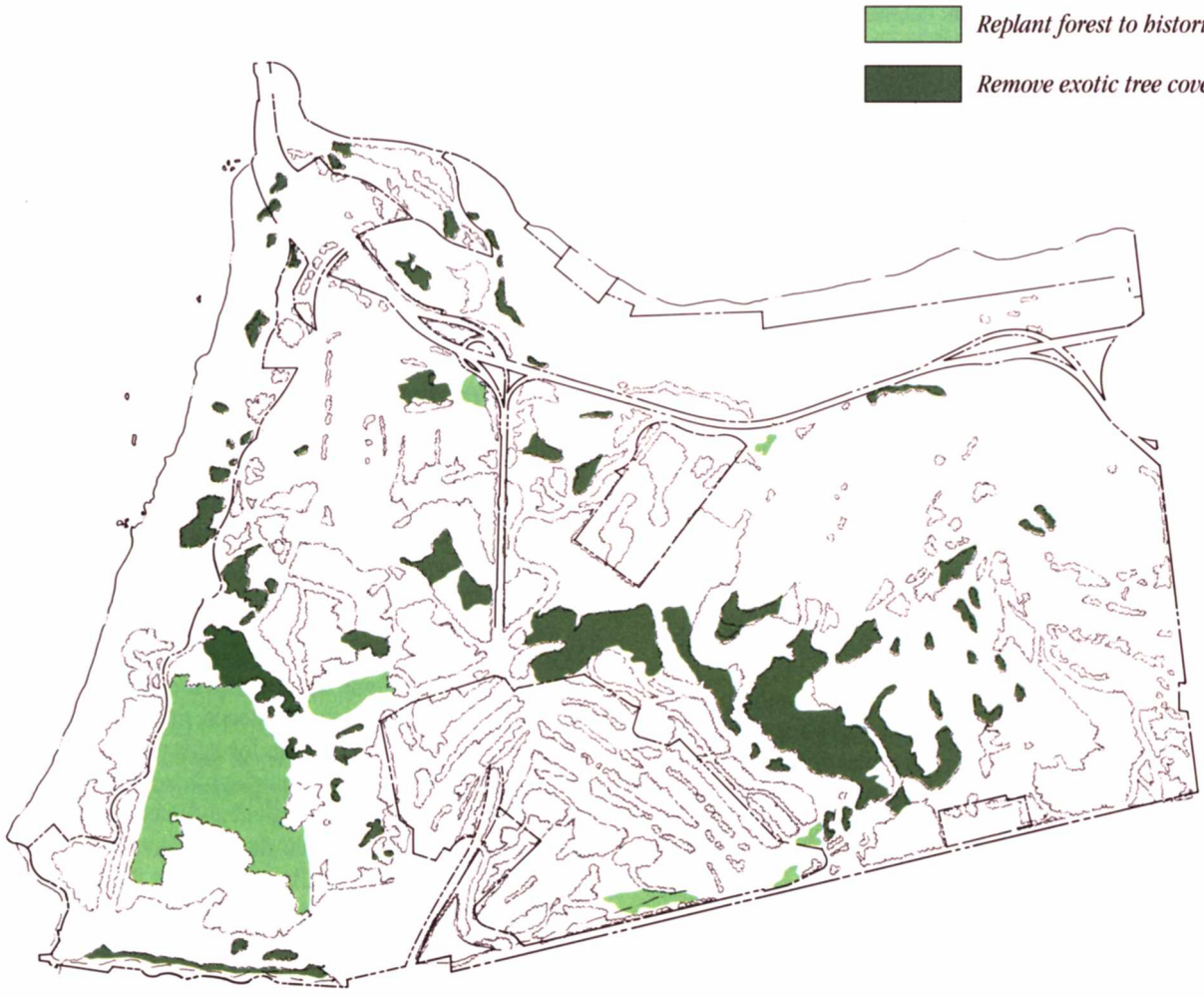
During and after the transition from military post to park, some of the historic buildings would remain vacant. Although they would be mothballed and monitored to prevent deterioration, there could be adverse impacts on the historic fabric of those buildings.

Presidio Cultural Landscape. The beneficial impacts on the cultural landscape would be similar to those of alternative A. There would be some additional benefits because 319 nonhistoric buildings would be removed, which would permit restoration and rehabilitation of more historic settings. About 72 acres of historic forest would also be restored.

New construction could have negative impacts on the cultural landscape. Such construction would only be permitted if existing buildings and improvements did not meet essential management needs. Every reasonable consideration would be given to using existing buildings for park purposes. Alterations and additions might need to be made to historic buildings to accommodate new uses. Any new construction would be compatibly designed and sited in keeping with the character-defining elements of their settings following *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. The Park Service would develop Presidio design guidelines to encourage the design of new buildings to be compatible in scale, color, material, and character with the historic landmark district.

Conclusion

Under alternative C the Presidio's historic buildings and cultural landscape would be greatly enhanced. Continued use of historic buildings would provide for their preservation, and the removal of 319 nonhistoric buildings would improve the historic setting by minimizing modern intrusions. The removal of 37 historic buildings would adversely affect the national historic landmark district.



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Historic Forest Removal/Restoration – Alternative C

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The exclusion of the LAMC and LAIR facilities from the park boundary could have an impact on the cultural landscape there, but no historic buildings would be affected. The Park Service would have no management control over actions affecting the historic buildings and landscape at the Public Health Service hospital.

Cumulative Impacts

There has been a continuing loss of historic buildings regionally, including those related to military history. Because the buildings and cultural landscape within the Presidio national historic landmark district would be rehabilitated and preserved under this alternative, it would have a positive cumulative effect on regional efforts to preserve such resources and their settings.

Impacts on Archeology

Analysis

Based on archeological discoveries within San Francisco, it is possible that potentially significant subsurface prehistoric archeological sites are present within the Presidio. The 200 years of use suggests that historic archeological remains would also be found. Any work undertaken might disturb potential archeological resources. There is one state-recorded archeological site on the Presidio.

Any ground-disturbing work undertaken in the park would have the potential to affect undiscovered archeological sites and resources. Until exact locations were selected and preliminary designs were available for specific projects, it would not be possible to accurately project effects. Direct effects would be avoided to the extent possible through consultation between designers and the park's archeology office. Should avoiding sites be impossible, mitigating measures, including excavation and recording of sites, would be carried out in consultation with the state historic preservation officer. Should previously unknown resources be uncovered during construction, work would be stopped in the discovery area, and the National Park Service would consult according to section 800.11, title 36, of the *Code of Federal Regulations*.

Direct impacts would vary and be closely related to specific kinds of proposed actions. The proposed upgrading and ongoing maintenance of buildings, roads, and all utilities at the Presidio would require ground disturbance of various types, as would the remediation of hazardous substances, pollutants, and contaminants. Improvements to bring the water treatment plant into compliance with drinking water standards could have a negative effect on archeological resources in the Lobos Creek drainage. New construction, well drilling, and diversions could all affect the drainage, which is a probable site for both prehistoric and historic resources.

New construction on any part of the Presidio might also have an adverse effect on archeological resources. For example, construction surrounding the improvements to Doyle Drive might have an impact on known prehistoric archeological sites in the Crissy Field area as well as historical archeological resources.

Because the Public Health Service hospital site would not be added to the park through congressional legislation, protection of archeological resources, such as the cemetery, within the 36-acre site would not be the responsibility of the National Park Service. Future impacts cannot be determined. Similarly, the impacts of any future actions taken in the portion of the Letterman complex excluded from the park boundary cannot be determined at present.

No sacred sites have been identified in consultation with Native American groups (NPS 1993b).

Conclusion

Direct impacts on archeological sites cannot be analyzed at the present time because sites have not been identified. Many of the actions required to make utilities and other infrastructure safe and/or in compliance with current standards might affect unknown archeological resources. New construction as well as repair and maintenance of existing buildings, roads, and other features would increase the likelihood of inadvertent damage to sites. Measures implemented by the Park Service would avoid or mitigate any adverse impacts to sites.

Cumulative Impacts

Cumulative impacts on known archeological sites and resources at known sites are not anticipated to be adverse; cumulative impacts on unknown sites would not be significant because mitigating measures would be implemented by the Park Service, as described in the "Alternative C" section.

Impacts on Wetlands and Stream Drainages

Analysis

As described in alternative A, 20-80 acres of wetlands at Crissy Field would be reestablished, Lobos Creek and three other stream drainages (a total of 33 acres) would be restored, and other small pockets of wetland habitat would be protected and enhanced. Before wetland and creek restoration actions were implemented, detailed environmental analysis would be conducted to determine any additional impacts.

Conclusion

Restoration and protection of wetlands at Crissy Field (20-80 acres) and in other areas within the Presidio would have a beneficial impact on water resources and would provide critical wildlife habitat and increase the overall biodiversity of the area. The restoration of the El Polin Spring and Lobos Creek watersheds would enhance natural drainage patterns and add 33 acres of riparian habitat.

Cumulative Impacts

There are an estimated 170,660 acres of estuary wetlands in the Bay Area. The restoration of a portion of the Presidio wetlands would have a minor but positive cumulative effect on projects to restore and maintain regional wetlands.

Impacts on Native Plant Communities

Analysis

Approximately 145 acres at the Presidio are currently dominated by native plant species, including 15 acres of rare and endangered plants. Under alternative C these areas would be managed to protect and enhance native plant communities and to minimize the intrusion of exotic species. No adverse impacts are anticipated in these areas.

A total of 356 historic and nonhistoric buildings would be removed, including structures at the northern end of Fort Scott and along Washington Boulevard and Nauman Road. This would allow 155 acres to be restored with native plants under this alternative. After restoration, 295 acres would support native plant communities. Short-term impacts on native vegetation associated with construction/structural demolition activities would be slightly greater than described under alternative A.

Part of the native plant restoration would take place in areas where individual trees and groves of trees have escaped from the historic boundaries of the Presidio forest. These trees and groves would be removed, and native plants would be reestablished in their place. The removal of trees and restoration of native species on approximately 72 acres would have a positive impact on the number and diversity of native plant communities.

Conclusion

The restoration of native species and the removal of exotic species from native habitat would have a beneficial impact on native plant preservation and biodiversity. Restoration of about 155 acres of native habitat within wetlands and riparian areas would stabilize sensitive soils, restore natural drainage patterns and influences, and enhance water quality in streams and drainages. The total land area restored to native plant habitat would be 295 acres. The threats to native plant communities posed by competition from nonnative tree species would gradually decrease under the proposed proactive forest management.

Cumulative Impacts

Native plant habitat is rapidly being lost in the Bay Area because of increasing development. The actions under this alternative would aid in perpetuating individual species and native plant communities and, together with other similar projects in the national recreation area, would have a minor but positive cumulative effect on a regional scale.

Impacts on Wildlife

Analysis

Under alternative C, terrestrial and marine animal species would be inventoried, monitored, and protected and their habitats enhanced as part of the park's resource management program. The removal of 356 buildings and restoration of 155 acres to natural conditions would increase available habitat for native wildlife. Open space, which also benefits wildlife by providing habitat, would increase by 230 acres to a total of 1,010 acres.

Marine Species. The impacts on marine species would be the same as under alternative A. If implemented, water taxi service to and from Crissy Field could directly affect marine animals. Impacts on marine animals would also result from



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Native Plant Restoration – Alternative C

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increased visitor use at Crissy Field, Fort Point, and the coastal bluffs. The improvement in water quality as a result of wetland restoration at Crissy Field would benefit Dungeness crabs, among other species. Restoration of the dune system there would promote the natural functions of the beach ecosystem and increase the attractiveness of the area to native species.

Migratory Species. The impacts on migratory species would be the same as under alternative A. Establishing a bird sanctuary at Crissy Field would also have a beneficial effect on migrating wildlife by providing an area for undisturbed feeding and resting.

Native Terrestrial and Aquatic Species. The impacts on terrestrial and aquatic species would be the same as under alternative A. Increased visitor use throughout the Presidio would probably cause impacts on resident wildlife species. Designation of appropriate recreational uses and use areas would limit those impacts. Trail construction might temporarily disturb nesting birds. The removal of some trees in the historic forest would decrease the number of trees available for nesting birds.

Conclusion

An additional 155 acres of native plant communities and 230 acres of open space would be restored, providing additional habitat for wildlife. Designation of appropriate recreational uses and use areas and establishment of a bird sanctuary would limit visitor impacts on wildlife populations.

If implemented, water taxi service could potentially cause adverse impacts on marine species, including harbor seals and California sea lions. Additional analysis would be conducted before the service was initiated.

Cumulative Impacts

Actions under this alternative would restore and expand wildlife habitat and, together with other similar projects in the national recreation area, would have a minor but positive cumulative effect on a regional scale.

Impacts on Threatened, Endangered, Rare, and Sensitive Species

Analysis

The impacts on threatened, endangered, rare, and sensitive species would be the same as under alternative A. The Raven's manzanita and all other special-status plant species would be protected and enhanced. The Park Service would consult further with the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the California Native Plant Society concerning the protection of plant species considered sensitive.

A Presidiowide inventory and monitoring program for rare and endangered plant species would also be established under this alternative. Specific actions and techniques for protection, enhancement, and restoration of each species would be developed.

Actions under alternative C are not anticipated to have any adverse effects on special status animal species. No listed or candidate threatened or endangered animal species are known to have critical habitat within the Presidio. The possibility of reintroducing listed or candidate species would be investigated; if such species were reintroduced, it would increase the biodiversity of the Presidio as well as the long-term viability of the species that were reintroduced.

Conclusion

Under this alternative threatened, endangered, rare, and sensitive plant species would benefit from inventorying and monitoring and from the restoration and protection of critical habitat. Threatened, endangered, rare, and sensitive animal species would also benefit because of the monitoring of transient species, the restoration of native plant communities that provide critical habitat for species like the state-listed willow flycatcher, and the possible reintroduction of special-status species. No adverse effects on any species are anticipated.

Cumulative Impacts

This alternative would aid in perpetuating individual rare, endangered, and sensitive plant species and the integrity of their communities. It would also benefit threatened, endangered, rare, and sensitive wildlife species through restoration of habitat. Actions would have a positive cumulative effect on a regional scale.

Impacts on Topography and Soils

Analysis

Under alternative C, 365 acres of soils would be disturbed during building removal, native plant restoration, asphalt removal, new parking and road development, trail rehabilitation and development, and site and historic landscape restoration. The impacts would be minor and temporary, and the restoration of open space and native vegetation would have long-term positive effects on soil stabilization and reduced erosion. Trail construction would involve recontouring of soil surfaces in some areas. Runoff and soil erosion would be likely to increase on stretches of trail that were heavily used.

The majority of soils affected under this alternative have been previously disturbed by human use. Site-specific plans, including additional environmental compliance documentation for major soil-disturbing activities, would be developed before the initiation of work and would include in-depth assessment and quantification of the anticipated disturbances.

The restoration of natural drainages would require site disturbance, primarily from the use of heavy equipment to recreate natural contours, remove unwanted drainage culverts, and reestablish native habitat. Regardless of the care and environmental oversight taken during these operations, soil erosion and temporary deterioration of surface water quality could be expected before revegetation. Drainage restoration plans would be prepared that would contain prescriptions for monitoring of conditions before and after the completion of work and for immediate post-restoration site stabilization.

At Fort Scott, short-term site disturbance and possible localized soil erosion would occur in association with the removal of nonhistoric buildings (133 more housing units than under alternative A), the grading of the parade ground, and the rehabilitation of the historic landscape. In addition, pavement would be removed, and new parking established at Ralston Street. Relandscaping of parking at the north of the complex and relocation of the Golden Gate Bridge maintenance facility to the north side of Doyle Drive would also disturb soils.

In the east housing area, soils would be disturbed during the El Polin Spring site restoration. The removal of pavement around housing and the telephone exchange, the removal of asphalt on Lover's Lane, and the restoration of Quarry Road would also temporarily disturb soils.

At Lobos Creek, the establishment of a Golden Gate natural resource center at the reserve center site would disturb soils, but would affect less surface area than proposals under alternative A. Soils would be disturbed during the removal of the dirt road south of the reserve center and the removal of asphalt around the center.

In the Presidio forest, a small amount of soils would be disturbed during pavement removal at Inspiration Point, construction of new parking east of Arguello, and site development at Rob Hill to construct an amphitheater and provide landscape improvements. Soils would also be disturbed to build a new parking area near the Washington Boulevard housing area and restore the site after housing removal.

Conclusion

Alternative C would provide maximum protection of sensitive soils within the Presidio and reclaim the most acreage (365 acres) through the restoration of normal soil profiles, surface contours, and natural drainage/watersheds. Although this alternative would involve the most initial site disturbance and post-restoration soil movement, long-term objectives would be to naturally restore topography and soils to the fullest extent and greatest benefit possible using best available practices to effectively eliminate any unacceptable or long-term resource damage.

Cumulative Impacts

A total of 365 acres of soils would be disturbed over the short term. In the long term soils and topography would be restored to a more natural condition; therefore, cumulative impacts would be insignificant.

Impacts on Air Quality

Analysis

Predicted CO levels by intersection under 2010 conditions with NPS activities and with current uses continuing were described in alternative A. Computer modeling results indicated that future reductions in vehicle emissions would yield CO levels that would not exceed the state 1-hour standard or the federal and state 8-hour standard. Alternative A was used for analysis because it represents the "worst case" for air quality impacts related to traffic — an equal or greater number of future trips as compared to the other alternatives.

The results of the computer modeling presented in table 52 show the impacts of alternative B on the production of major vehicle emissions — total organics

(relative hydrocarbons), carbon monoxide, nitrogen oxides, and particulates. The predicted emission levels for alternative C exceed the threshold levels of 0.075 tons per day for hydrocarbons, nitrogen oxides, sulfur oxides, and particulates. These emission levels would have a significant negative impact on air quality.

It is notable that all of the mobile-source pollutant threshold levels are exceeded for current land uses and trip-generating characteristics. However, the bulk of the pollutants are generated by traffic on Highways 1 and 101 that is not related to activities at the Presidio.

Conclusion

The impacts would be similar to those of alternative A. The levels of all mobile-source contaminants except carbon monoxide (hydrocarbons, nitrogen oxides, sulfur oxides, and particulates) would be significant because these levels are already exceeded; however, the bulk of the pollutants would be generated by traffic on Highways 1 and 101 that is not related to activities on the Presidio.

Cumulative Impacts

Regional airsheds encompassing the Presidio currently do not meet air quality standards. The implementation of alternative C would have a minor (less than a 1%) but adverse cumulative effect on this condition.

Impacts on Noise

Analysis

The impacts would be the same as under alternative A except that additional construction noise would occur during the removal of 55 additional nonhistoric buildings. Traffic noise would be also similar to that under alternative A except it would be slightly reduced because of less projected traffic.

Conclusion

Future noise levels in the Presidio would be minimally higher than at present but would not violate the San Francisco noise ordinance. During implementation, construction would be a source of increased noise and related impacts, although the noise would be reduced to an acceptable level through mitigating actions. Noise would also increase as traffic to and from the Presidio increased. Park land uses and related internal traffic increases would not have significant impacts on noise.

TABLE 52: PROJECTED EMISSIONS FROM MOBILE SOURCES UNDER NPS MANAGEMENT ALTERNATIVE C (TONS/DAY)

Year/ Management Alternative	Daily Emissions				
	Total Organics (HC)	Carbon Monoxide (CO)	Nitrogen Oxides (NO_x)	Sulfur Oxides (SO_x)	Particulates (PM_{10})
Presidio Baseline Condition (1992)	0.91	9.08	1.21	0.13	1.07
2010 – Continuation of Current Uses	0.59	6.98	0.94	0.10	0.74
2010 – Alternative C	0.88	9.96	1.51	0.17	0.57

NOTE: Vehicle emissions were calculated by use of the California Air Resources Board's URBEMIS 3 model recommended by BAAQMD.

Cumulative Impacts

There would be short-term cumulative impacts on noise levels as a result of Presidio construction projects and Caltrans reconstruction of Doyle Drive. Long-term cumulative impacts would primarily result from traffic on Doyle Drive (Highway 101) and Park Presidio Boulevard (Highway 1).

Impacts on Interpretation and Education

Analysis

As in alternative A, visitors would benefit from expanded opportunities at the visitor center and other educational/cultural program facilities at the main post and elsewhere in the Presidio. In addition, a conference/research/training program and a National Park Service employee development center would be established at Fort Scott. There would be no park programs at the former Public Health Service hospital or the LAMC/LAIR facilities because they would not be included within the

park boundary; therefore, the potential variety and number of educational opportunities within the park would be somewhat reduced.

A residential environmental education center would be established at the former cavalry barracks. This facility would provide a variety of educational programs for schoolchildren and adults. Because of its proximity to the cavalry stables, groups could easily participate educational activities there. This action would benefit Bay Area schoolchildren.

Conclusion

Alternative C would increase educational opportunities for visitors throughout the Presidio. Conferences, seminars, training, demonstrations, interpretation, and environmental education at the main post, Fort Scott, the cavalry stables, Crissy Field, and other open spaces areas would encourage learning, attract national and international visitors, and contribute to National Park Service stewardship through environmental education.

Cumulative Impacts

Programming at the Presidio and Golden Gate National Recreation Area would contribute to regional and national efforts to expand interpretive and educational opportunities for the public. Additional educational resources would be available for Bay Area residents and visitors.

Impacts on Recreation

Analysis

Alternative C would expand opportunities for public recreation throughout the Presidio. In general, existing recreational facilities such as the golf course, tennis courts, pools, and gyms would be maintained and opened to the public. A few facilities would be removed to expand natural habitat and enhance the cultural landscape. Improvements such as new trails, including the Bay Area Ridge Trail and Juan Bautista de Anza National Historic Trail, would be designed and constructed to improve bicycle and pedestrian circulation and connect the Presidio trail system to the existing regional network. A total of 9.5 miles of hiking trails would be established, an increase of 4 miles; 11 miles of bicycle routes would be designated on existing roads.

Specific impacts would be similar to those of alternative A, except that 356 historic and nonhistoric structures would be removed, providing additional open space for hiking and passive recreation. The additional buildings to be removed, above those proposed in alternative A, would be predominately in the Fort Scott, east housing and Presidio Hill planning areas.

Because the Public Health Service hospital would not be included in the park boundary, the tennis courts and a new 0.6-mile trail link north of Lobos Creek would not be available to the public.

Conclusion

Under alternative C most existing recreational programs and facilities would be opened to the public, and additional hiking trails (4 miles), biking routes (11 miles), picnic areas, and other recreational amenities would be provided. The overall increase in recreational opportunities would benefit both out-of-town and local visitors. The removal of one ballfield and restricted use of another would have a short-term adverse effect on current users; however, other facilities would be available for these types of activities.

Cumulative Impacts

The provision of open space and facilities for the public at the Presidio and Golden Gate National Recreation Area would have a minor but positive cumulative effect on recreational opportunities in the city and Bay Area.

Impacts on Scenic Viewing

Analysis

The removal of 356 buildings and restoration of sites, including opening historic and scenic vistas, would greatly increase opportunities for scenic viewing. Many historic viewsheds would be restored. Other impacts would be similar to those of alternative A except for the following.

East Housing Area. The removal of 10 additional nonhistoric buildings (a total of 47) and restoration and revegetation of the sites would improve the scenic quality of the east housing area and maximize open space. There would be short-term impacts on scenic viewing for several years while the areas were being revegetated.

Fort Scott. The removal of 20 additional nonhistoric buildings at Fort Scott (a total of 34) would enhance scenic viewing for park visitors. The additional buildings, above those to be removed under alternative A, would primarily be housing behind the historic pilot houses near Lincoln Boulevard and the Golden Gate Bridge plaza. Because part of the Fort Scott area would be used as a maintenance facility, the overall visual improvements might be somewhat offset.

Presidio Hill. The removal of 20 additional nonhistoric buildings in the Wherry housing area and along Washington Avenue (a total of 166) would have a positive impact on scenic viewing. This area is within view of Lincoln Boulevard and Baker Beach, which are heavily used by visitors and residents. Removal of these structures would have short-term visual impacts until restoration was complete and vegetation was established.

New Construction. New construction at Fort Scott and the golf course could have impacts on the historic scene. Careful design and siting would integrate new construction to ensure compatibility with the historic setting and scenic views.

Conclusion

The visual qualities and scenic viewing opportunities within the Presidio would be greatly enhanced. Removal of 356 buildings would open vistas and enhance the integrity of the cultural landscape. Restoration of Crissy Field, Lobos Creek, and the drainage near El Polin Spring would provide additional viewing opportunities.

Cumulative Impacts

Actions under alternative C and other resource management actions at Golden Gate National Recreation Area would have a positive cumulative effect on scenic vistas and viewing in the region.

Impacts on Human Health, Safety, and the Environment

Analysis

The impacts of alternative C would be similar to those of alternative A except for the following.

There would be a higher risk of lead and asbestos exposure to workers engaged in building and pavement rehabilitation and removal. These risks would be minimized by implementing appropriate mitigating measures.

Although there would be fewer people visiting the Presidio than under alternative A, their potential risk of exposure to hazardous substances would be greater because more contaminated soils would disturbed during building and pavement removal.

Conclusion

The impacts of this alternative would be the same as those of alternative A except that short-term risks to human health and the environment would increase because more extensive building demolition and rehabilitation, pavement removal, and restoration.

Cumulative Impacts

The specific cumulative impacts caused by hazardous substances remediation (including underground storage tanks) at the Presidio are unknown at this time because the Army has not fully characterized the extent of the contamination and because cleanup plans have not been finalized. However, if the Army fully remediated the identified contamination, there would be a beneficial cumulative impact on human health, safety, and the environment. Over the long term, the removal of asbestos and lead-based paint in buildings would have a beneficial cumulative impact.

Impacts on Energy Consumption

Analysis

In accordance with the energy conservation requirements of Executive Orders 11912 and 12003, a comprehensive energy conservation program would be established.

The energy requirements of alternative C would be similar to those of a small community, with 3,700 residents and 4,500 employees in 2000, decreasing to 1,000 and 4,000 employees in 2010. However, with NPS control during rehabilitation of structures, numerous energy design stipulations could be implemented. The removal of 356 structures under this alternative would also significantly reduce energy needs.

The use of water conservation devices and techniques for all structures would reduce the amount of water needed, thus reducing the amount of power needed to pump both water and sewage. Such conservation devices include restricted-flow shower heads and faucets and low volume flush toilets.

One of the major uses of energy at the Presidio would be fuel consumption, primarily by shuttle buses. Visitor shuttles would travel 40,000 miles per year around the Presidio, using about 4,000 gallons of fuel. The shuttles would be alternative-fuel vehicles. Public transit use would reduce some gas consumption by eliminating some private automobile trips. Additionally, the Park Service vehicle fleet would consist of alternative fuel vehicles, to the extent possible.

Conservation Measures

The Park Service would expand the energy conservation public education activities previously carried out by the Army, develop a comprehensive energy conservation plan, and develop specific measures to minimize building energy use for each building to be renovated.

Conclusion

Because of the removal of 356 buildings, use of reclaimed water, and increased efficiency, energy consumption would decrease at the Presidio in the future.

Cumulative Impacts

Energy-reducing measures at the Presidio and Golden Gate National Recreation Area would have a minor but positive effect on energy conservation in the region.

Impacts on NPS Management and Operations

Analysis

Site Development. Site development, including building rehabilitation, and associated planning activities for full implementation of alternative C are expected to cost about $628 million. Approximately $322 million would be borne by future tenants, $193 million by the National Park Service, and $113 million by D.O.D.

Infrastructure Rehabilitation. The impacts would be the same as under alternative A except for the following.

Water Supply and Distribution — Under alternative C, projected demands for potable water are estimated at 488,000 gallons per day in the year 2000 and 296,000 gallons per day in the year 2010 (Jones & Jones 1993a). An additional 1.0 millions gallons a day for irrigation would be needed primarily for the golf course, cemetery, and parade grounds. Water consumption would be reduced because the former Public Health Service hospital would not be added to Golden Gate National Recreation Area and the facilities at LAMC and LAIR would be excluded from the park.

Storm Drainage System — No storm drain work would be conducted at the Public Health Service hospital and Letterman facilities because they would not be included within the park.

Sanitary Sewer System — The load on the city's facilities would increase from 250,000 gallon per day (1992) to about 415,000 gallons per day in 2000 and then decrease to 251,000 gallons per day in 2010 (Jones & Jones 1993a). Sewage discharge would be less than under alternative A or under either of the other alternatives because more buildings would be removed.

Electric Power Distribution — No electrical service upgrades would be carried out at the Public Health Service hospital and the LAMC/LAIR facilities.

Transportation Services. Preliminary internal shuttle bus service and ferry operation analyses recommended that the services be funded by concession fees, parking fees, and/or tenant fees collected in the Presidio. Shuttle bus operation for the Presidio route recommendations was estimated to cost $3,727,000 in capital costs and $1,338,000 in annual operation costs. Numerous ferry service options were suggested for further analysis, as described in alternative A; pier rehabilitation cost estimates would be needed in addition to capital and operating costs. Transportation services may require subsidy for the first few years of operation; phased implementation strategy is recommended to increase service as demand increases.

Operations and Staffing. The impacts on law enforcement, fire protection, and emergency medical services would be the same as under alternative A. It is estimated that 388 staff and an annual operating budget of $32 million ($17 million would be recovered from tenant revenues) would be required. Staffing would include 147 maintenance personnel, 70 law enforcement and public safety personnel; 35 fire and emergency/rescue staff; 45 visitor services personnel; 44 resource management personnel; and 31 administration personnel.

Concession Revenues. Under alternative C the Presidio would generate about $23 million in 2000 and more than $28 million in 2010 in visitor service and overnight lodging revenues (Jones & Jones 1993a). A portion of the concession revenues would be returned to the park through stipulations in the concession contracts.

Additional concession revenues could be expected from recreational facilities like the golf course. Such revenues were not projected for the DEIS, but they could be substantial. Future concessions analysis would address potential revenues and NPS profit-sharing.

The possibility of adding visitor services at Crissy Field would be analyzed as tenant programs were developed and water taxi service was implemented. This might result in additional revenues for the Presidio from retail and food and beverage concessions (Jones & Jones 1993a).

Conclusion

Substantial increases in funding and personnel would be required for full implementation of this alternative. An estimated $515 million would be required for site development activities, including demolition of nonhistoric structures and restoration of native plant habitat and natural watershed conditions. Fees collected from concessions, parking, and/or tenants would be used to implement shuttle bus and ferry service operations once legislation authorizing this was enacted; however, these concessions might require initial subsidies. About $32 million ($17 million would be recovered from tenants) and 388 full-time employees would be required for annual Presidio operations. No negative impacts on law enforcement, fire, or emergency medical operations and services are anticipated with projected staffing levels.

Under this alternative the Presidio would generate about $23 million in 2000 and $28 million in 2010 in visitor service and overnight lodging revenues. Of these revenues, a portion would be returned to the park, as determined through the concession contracting agreement process. Additional concession revenues could also be anticipated from recreational facilities like the golf course.

Cumulative Impacts

The actions and fiscal responsibilities proposed under this alternative would have a significant cumulative impact on NPS management and operations nationwide, both beneficial and adverse. The project would generate revenues for the federal treasury, but would also result in increased operational costs to the National Park Service. Future concession fees at the Presidio and Golden Gate National Recreation Area would have a positive cumulative effect on revenues to the federal government.

Unavoidable Adverse Effects

Alternative C would change land uses within the Presidio. In particular, almost 75% of the housing would eventually be replaced with open space, and some parking and recreation space would be replaced with restored wetlands. Establishment of these land uses would preclude other uses that might be desirable. In particular, the removal of housing and restoration of open space would most likely preclude the provision of housing in these areas in the future.

Thirty-seven historic buildings would be removed under this alternative. Most of these structures are at Crissy Field in the Directorate of Engineering and Housing complex at the east end and the World War II barracks area at the west end. All of the historic structures to be removed are identified in appendix B.

Additional recreational use and employment under this alternative would result in increased use of all forms of transportation — bicycle, pedestrian, transit, and automobile. Mitigating measures would reduce some otherwise significant transportation effects; however, some minor cumulative effects on regional traffic would be unavoidable by the year 2010.

Increased travel to and from the Presidio would contribute cumulatively to vehicle emissions within the air basin and to the frequency of air quality standard violations for pollutants. At the Presidio, projected emissions for air pollutants, hydrocarbons, nitrogen oxides, sulfur oxides, and particulates would continue to exceed threshold levels of 0.075 tons/day for mobile sources on a daily basis.

Growth-Inducing Impacts

The Presidio under National Park Service management could have the following growth-inducing impacts on the region as the local economy and community respond to Presidio activities.

- **New Jobs** — About 4,100 jobs would be generated at the Presidio in the year 2010, compared to about 5,500 jobs (2,000 Army and 3,550 civilian) under Army use.

  Impacts:

  New jobs at the Presidio would increase the demand for housing for employees in surrounding areas. Some of this demand would replace the demand of civilian employees under Army use. Onsite housing would only meet about 33% of the housing demand by Presidio employees. The new net regional housing demand created by Presidio employees would be about 359 housing units in the year 2010. Of this, about 40%, or 144 housing units, would be in San Francisco.

  New employee households would create increased demands for goods and services in areas surrounding their homes and throughout the Bay Area. This could result in indirect population and housing growth because of an increase in service jobs.

  New employment could lead to an increase in expenditures for business-related and personal goods and services (ranging from office supplies and major equipment to daily lunches) in areas near the Presidio. This could result in the growth of businesses in areas along the western end of Lombard and Chestnut streets and in commercial districts near the Presidio's southern entrances as well as throughout the Bay Area in general. This growth could indirectly result in increases in building sizes, infill on vacant lots, and traffic and pedestrian activity in areas near the Presidio.

- **New Tourism** — The Presidio could draw up to an estimated 7.3 million visitors per year, compared to the 3.5 million visitors at present (Peccia & Associates 1993) — an increase of 108%.

  Impacts:

  Increased tourism at the Presidio would increase the demand for lodging, restaurant, and other tourist-oriented services in surrounding areas, especially to the east, south, and southeast in the Marina and Richmond districts and perhaps Cow Hollow and Pacific Heights. The Lombard Street area, which already includes hotel and motel uses and is zoned C-2 (community business) would likely be the focus of increased tourism because it is on one of the main access routes to the Presidio. Other areas that might experience growth are the commercial portion of Chestnut Street west of Van Ness Avenue and possibly the commercial districts near the Presidio's southern entrances. In these areas building up to the limits of zoning codes and pressures for changes in allowable uses would be likely. It is also possible that some of the residential areas south of the Presidio and in the western end of the Marina district would experience pressures from people interested in developing bed-and-breakfast-type uses, where these uses are or could be permitted under the San Francisco planning code. Such changes would be subject to existing city and county of San Francisco planning and zoning regulations. Tourist-related business growth could result in indirect growth in population and housing demand in the city and the region.

- **Utility Upgrades** — Infrastructure improvements would not encourage additional growth outside of the Presidio because these improvements are only for onsite services.

- **Roadway Improvements** — To the extent that the planned traffic circulation and safety improvements could increase the capacity of affected transportation networks beyond that needed to accommodate Presidio traffic and transit services, they could promote additional growth in other areas served by the same traffic network. This could result in indirect population and housing growth.

Relationship of Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

Restoration and protection of 20-80 acres of wetlands and 30 acres of dunes at Crissy Field, 295 acres of native plant habitat, and the riparian corridors at El Polin Spring and along Tennessee Hollow and Lobos Creek would enhance the long-term productivity of the Presidio environment. These actions would preclude other uses such as recreation and parking, unless the flooded areas were refilled, dunes removed, and the habitats returned to previous conditions.

Alternative C would involve the removal and remediation of hazardous substances, pollutants, and contaminants at the Presidio. These cleanup activities would be carried out by the Army in compliance with federal and state laws and regulations. When these cleanup activities were completed, it is possible that certain areas of the Presidio could be restored to more natural conditions, thereby potentially increasing long-term productivity.

Recreational uses would not have significant effects on long-term productivity.

Irreversible and Irretrievable Commitments of Resources

Under alternative C all archeological sites would be avoided where possible. Where this was not possible, disturbance would be mitigated through recovery of cultural information and significant artifacts. However, some losses of archeological objects and cultural information would likely occur because of vandalism, collecting, or construction activities. These losses would be irreversible.

The 37 historic buildings removed under the proposed action would be an irreversible loss. Mitigating measures would be conducted before removal to fully document the structures according to NPS policy and standards.

Although most developed areas could be restored to previous conditions over time, the use of land, construction materials, energy, and financial resources to implement the proposed action would, in the practical sense, be an irretrievable commitment of resources.

Alternative D

Impacts on the Regional Economy and Employment

Analysis

Employment and Payroll Related to Park Use. Table 12 shows direct employment and payroll estimates under alternative D. Direct employment in the year 2000 is estimated at 7,200, dropping to about 6,800 in 2010 because of the removal of additional buildings. Jobs would be distributed in about the same way as under alternative A. The largest employment category would be office, with nearly 3,400 employees in the year 2010. Medical/research would follow, with about 2,050 jobs. The industrial, institution, and retail categories would provide about 430, 410, and 325 jobs, respectively.

Direct payroll under alternative D would total about $176 million in 2000 and $168 million in 2010. The 2010 payroll would be an increase of about $100 million over the baseline condition.

Secondary employment in the seven industry sectors represented at the Presidio is expected to generate about 3,340 jobs in the city of San Francisco in 2000 and 3,150 jobs in 2010, as shown in table 13; these jobs are estimated to raise annual payroll by about $155 million and $148 million, respectively. Secondary employment is projected to add about 6,700 jobs in the Bay Area in 2000 and 6,300 jobs in 2010, which would raise the annual regional payroll by more than $310 million in 2000 and $296 million in 2010 (table 14).

Total Presidio employment, in all sectors except construction, is estimated to add about 10,500 jobs in San Francisco in 2000 and 10,000 jobs in 2010 (table 15); this would raise the annual payroll by $331 million and $316 million, respectively. In the same years total Presidio employment is expected to generate about 14,000 jobs and 13,000 jobs in the Bay Area, increasing the annual regional payroll by $486 million and $464 million (table 16).

The effects on employment and earnings from closing the military base versus converting it for park use are compared in table 17. The closure of the military base is estimated to cause a decline of 3,150 jobs and $66 million in income in the Bay Area (USACE 1991). In contrast, reuse of the Presidio under alternative D is estimated to increase San Francisco employment by more than 10,250 jobs and earnings by more than $323 million. Additionally, park conversion is estimated to increase Bay Area employment by about 13,500 jobs and Bay Area earnings by about $475 million.

None of the changes in employment and earnings are expected to cause a large disruption in the regional labor market. The increase in Presidio-related jobs represents only a 0.4% (4/10 of 1%) gain in regional employment; the increase in Presidio-related earnings represents only a 0.37% gain in regional income. Nevertheless, these changes should provide a boost to San Francisco's economy. Much of the employment and income gain is expected to occur within the city and county of San Francisco. Conversion of the Presidio is estimated to increase city employment by 1.12% and city payroll by about 0.88%.

Construction-Related Employment and Payroll. The construction period at the Presidio is expected to continue from year 1994 to year 2010 and be most intense between 1994 and 2000. Direct employment related to construction activities is estimated to be about 2,240 jobs in 2000 and 635 jobs in 2010 (see table 18). The annual construction payroll is expected to be about $62 million annually between 1994 and 2000 and about $17.5 million annually between 2001 and 2010.

Secondary construction activities are expected to generate about 1,450 jobs annually in the city and county in 2000 and 410 jobs in 2010. Secondary construction activities are estimated to raise the annual payroll in San Francisco by $55 million annually between 1994 and 2000 and by $15 million annually between 2001 and 2010. About 2,900 jobs are expected to be generated annually in the region between 1994 and 2000, and about 825 jobs annually between 2001 and 2010. Annual payroll in the region is estimated to increase by $109 million in 2000 and $31 million in 2010.

Total (direct and secondary) construction activities related to the Presidio conversion are expected to generate about 3,700 jobs in 2000 and 1,050 jobs in 2010 in San Francisco; annual payroll would be raised by $116 million annually between 1994 and 2000 and by $33 million annually between 2001 and 2010. In the region, total construction activities are expected to generate about 5,130 jobs in 2000 and about 1,460 jobs in 2010 and to raise annual payroll by $171 million annually between 1994 and 2000 and $48.5 million between 2001 and 2010.

State Sales and Use Tax. Based on estimated commercial activities at the Presidio under alternative D, an additional $2.4 million in state sales and use tax revenues would be generated in 2000 and $2.2 million in 2010. BART would collect about $220,000 in sales tax revenues in 2000 and $203,000 in 2010. All tax revenues would be new because military uses are exempt from state taxes.

Resident, Employee, and Visitor Expenditures. Under alternative D residents, employees, and visitors would generate about $33.5 million in the year 2000 and more than $40 million in the year 2010 in revenues for services and overnight lodging. Sales volumes per square foot would be in the acceptable range for both retail and food and beverage operations in both 2000 and 2010. Sales projections are summarized in table 53.

A few visitor services might be advantageous at Crissy Field to increase future revenues for Presidio retail and food and beverage concessions. Such services would be analyzed as tenant programs were developed and ferry service was implemented.

Conclusion

Under alternative D there would be some positive effects on employment opportunities and on the local and regional economy, including indirect effects on local businesses and tax revenues. About 7,000 jobs related to park use would be created at the Presidio by the year 2010 (4,900 of these would be new jobs), and the annual payroll would increase by about $100 million to about $170 million (about $120 million attributable to new jobs). Total employment in construction and other employment sectors in the city and the Bay Area would increase to about 11,000 jobs and 14,500 jobs, respectively; of this, about 7,700 would be new jobs to the city, and 10,150 new jobs to the region. Total earnings in the city and the region would increase by $349 million ($244 million attributable to new jobs) and $512 million ($358 million attributable to new jobs), respectively. Park conversion would generate enough jobs and earnings in the region to more than offset jobs and income lost because of the substantial reduction in the Sixth Army presence at the Presidio. Nevertheless, anticipated jobs and earnings would only be a small percentage of existing jobs and earnings in the city and Bay Area.

By 2010, state sales and use tax revenues from the Presidio would increase by about $2.4 million annually. About $33.5 million in 2000 and more than $40 million in 2010 would be generated in service and overnight lodging revenues.

TABLE 53: SUMMARY OF FOOD, BEVERAGE, AND RETAIL SALES - ALTERNATIVE D

	2000	2010
Presidio Sales Summary		
Total Food and Beverage Sales	$ 8,761,000	$ 9,903,000
Total Retail Sales	14,680,000	17,656,000
Total Guest Room Revenues	10,103,000	13,102,000
Total Revenues	**$33,544,000**	**$40,661,000**
Presidio Sales by Square Footage		
Food and Beverage	$111.67	$126.24
Retail	$147.88	$177.85

Cumulative Impacts

Conversion of the Presidio into a national park system area would have a minor but positive cumulative effect on local and regional employment and income and on state tax revenues. Resident, employee, and visitor expenditures at the Presidio would contribute a small percentage to the regional economy.

Impacts on City Services

Cost Analysis

The provision of services would be the same as in alternative A. The city of San Francisco would not be significantly affected because primary responsibility for these services would rest with the National Park Service.

The provision of water, wastewater, and storm drainage services would be the same as under alternative A except that the Department of Defense would be responsible to the National Park Service for maintenance of the water, wastewater, and storm drainage systems at the Wherry housing area and Letterman complex. Demand for water from the city of San Francisco is estimated at about 50,000 gallons per day in both 2000 and 2010; the cost would be about $22,000 per year. Sewage disposal charges would be about $1,033,000 in 2000 and $1,056,000 in 2010 to dispose of about 451,000 and 461,000 gallons of sewage discharge per day, respectively.

Under alternative D the MUNI trolley would be extended by the city for a capital cost of $1,687,000 and annual operating costs of $68,600. Extension of MUNI lines 29 and 43 would increase annual operating costs by $5,000 and $36,000, respectively. Intersection improvements would be implemented at nine locations, as needed, to eliminate problems and safety hazards related to regional and Presidio traffic increases. Total cost would be $2,540,000; initial safety and traffic flow improvements would cost $2,270,000, and second-phase improvements at two intersections would cost $270,000. The National Park Service would assist in seeking funding for these improvements (Peccia & Associates 1993).

Revenue Analysis

City revenues for alternative D could total $4,361,000 from all sources for the year 2000 and $4,086,000 by the year 2010 if all taxes were applicable. These would be new city tax revenues because military base uses are exempt.

Table 54 presents individual sources of tax revenue for alternative D. If applicable, property tax would account for the largest share of revenue in years 2000 and 2010. Because many of the revenue sources would depend on the square footage used for different business activities, there would be a decrease between the two periods as available square footage was reduced.

TABLE 54: CITY REVENUES - ALTERNATIVE D

Revenue Source*	2000	2010
Property Tax**	$1,415,000	$1,306,000
Sales Tax	771,000	710,000
Business Tax	594,000	543,000
Hotel Tax	549,000	549,000
Other	1,022,000	978,000
Total	$4,351,000	$4,086,000

*All revenues are expressed in constant dollars.
**This tax may not be applicable

Public School Enrollment Analysis

About 340 schoolchildren living at the Presidio would be enrolled in San Francisco public schools in the year 2000. By 2010 about 320 children would be enrolled. This would be 0.51% (1/2 of 1 percent) of the total San Francisco school enrollment in 2000 and 0.15% in 2010. The demand would be about one-third of the Presidio Army demand in 1990. The reduction in the number of Presidio schoolchildren enrolled in public schools would slightly reduce the demand on existing school facilities. There would be about 1,240 school-aged dependents in 2000 and 1,169 dependents in 2010 attending schools in the region, or about 40% of the dependents enrolled in schools under Army use.

Conclusion

Under alternative D the city would benefit from an increase in tax revenues of about $4 million in 2010, if all taxes were applicable. Demand for the provision of water and sewer services would be minimal; user fees would cover the costs of providing these services. There would be few demands on city public safety

services because most services would be provided by the Park Service. Transportation-related improvements would have one-time capital costs of $4,227,000 and annual operating costs of $109,600. Tax levies and fare revenues would help support these improvements.

Presidio schoolchildren would constitute a very small percentage of the total San Francisco school enrollment.

Cumulative Impacts

The Presidio would contribute in a minor way to the tax revenues currently being generated in the city and therefore have a minor cumulative impact on city revenues. The demand for city services at the Presidio would be minor; therefore, the cumulative impact on those services would be insignificant.

Impacts on Housing

Analysis

Housing Stock Use. Under alternative D, housing would be used by persons employed on the Presidio — NPS staff, nonprofit partners, and Sixth Army staff — by other military personnel, and as guest lodging. A total of 255 units would be available for park and partner employees until the year 2000; that number would be reduced to 215 units by 2010. About 150 housing units would be reserved for Sixth Army personnel, and an additional 642 units in the Wherry and Washington Avenue housing areas would be used by other military staff. Eighty-five units would reserved for guests. In addition, 255 staff and 636 guests would use dormitory space. Although few housing units would be removed, military use would substantially reduce the housing supply available to park and park partner employees.

Under this alternative 52 units would be removed by 2000, and an additional 40 units would be phased out from 2000 to 2010; a total of 1,092 housing units would remain by 2010. A total of 524 dormitory units would be removed or converted to other uses. The 92 housing units removed by 2010 would reduce the Bay Area housing stock by 0.004% (4/1000 of 1 percent) over the 1990 level and the San Francisco housing stock by 0.03% (3/100 of 1 percent) over the 1990 level.

Under this alternative, it is assumed that the military would pay the direct annual operating and maintenance costs of housing for military personnel plus a pro rata share of common expenses, such as police protection, resulting in a net loss to the Park Service of potential annual revenues.

Housing Demand Estimates. The percent of employee households (including Sixth Army households) desiring Presidio housing that could be accommodated on site would be 29% in both 2000 and 2010. A new net regional housing demand of 728 housing units in 2000 and 688 in 2010 would be expected. Year 2010 estimates include 275 units in San Francisco (equal to about 2% of new housing construction in the city between 1980-1990), 250 units in the North Bay, and about 165 units on the peninsula and in the East Bay.

Conclusion

Because of the high proportion of housing used by the military, only about 29% of employee housing demand could be accommodated on site; a new net regional housing demand of about 725 units would be created. A total of 92 housing units would be removed by 2010, and about 524 dormitory beds would be removed or converted to other uses. When compared to the housing stock of the Bay Area and city of San Francisco, the employee housing demand and the reduction of housing would not be significant effects.

Cumulative Impacts

The Presidio housing demand would be a small portion of the employment-related housing demand increase in San Francisco and the Bay Area. Similarly, the reduced Presidio housing stock would be a small portion of the total housing stock in the city and region. However, given the short supply of affordable housing in the city, there would be an adverse cumulative impact from removing comparatively affordable housing stock at the Presidio.

Impacts on Health Care and Medical Research

Analysis

Letterman Army Medical Center and Letterman Army Institute of Research. Under the military reuse alternative, opportunities for park uses would be foreclosed. Three scenarios are possible at LAMC and LAIR: reuse by the Navy, reuse by the Veterans Administration, and a joint reuse by the Navy and the VA.

The U.S. Navy proposes to close its hospital in Oakland. The facility is within 1,950 feet of the Hayward Fault and 1,450 feet from the Chabot Fault. The facility could sustain significant damage or failure in the event of a serious earthquake.

The alternative of building a new Navy hospital in Oakland is considered more expensive than the alternative of transferring to LAMC. The Navy proposes to reuse LAMC, LAIR, and the other buildings in the Letterman complex.

The San Francisco Veterans Administration hospital at Fort Miley is a 272-bed facility that provides primary, secondary, tertiary, and extended care in all major diagnostic and treatment specialties. In addition, the hospital has an extensive research and development program. The Veterans Administration wishes to transfer all of its operations from Fort Miley to the Letterman complex, maintaining only its psychiatric unit and warehousing at Fort Miley.

The third scenario for the reuse of the Letterman complex is for the Navy and the VA to jointly reuse the facilities.

The Navy projects that it could realize cost savings in moving from Oakland to the Letterman complex, even with the costs of rehabilitating the facilities. The estimated cost of a new Navy Hospital in Oakland is $190 million to $250 million. If the Navy entered into a joint venture with Alameda County and used 263 beds of a proposed 613-bed hospital, the capital cost is estimated at $215 million. The cost of renovating LAMC is estimated at more than $100 million, and the rehabilitation of LAIR is estimated at $36 million. Active duty personnel and their dependents, as well as retired military and dependents formerly served by the Oakland naval hospital would have to travel further distances to receive care at the Letterman complex. This alternative would probably result in the closure of the Oakland naval hospital.

The Veterans Administration also expects that it could realize cost savings if the San Francisco Veterans Administration hospital were moved from Fort Miley to the Presidio. Renovating the existing facility at Fort Miley is estimated to cost between $135 and $150 million. The Veterans Administration would be able to renovate the LAMC before moving. This would avoid the disturbance to its patients and clients while renovating the Fort Miley buildings.

The hospital could provide patient care for dependents of active-duty personnel for all services, retired military, and their dependents and survivors in the San Francisco service area formerly served by LAMC. This would resolve a significant impact of closure of the Presidio Army base: increased medical costs for retired military and their dependents and survivors.

Public Health Service Hospital. Under alternative D the hospital complex would be included in the park boundary and developed by a private or nonprofit partner as a residential/educational and conference center. Its development as a conference center would not affect the existing supply of acute-care hospital beds in the Bay Area for two reasons: It is currently vacant, and there is an oversupply of acute-care beds in San Francisco and the Bay Area. Development as a conference center would preclude the hospital's use as a long-term health care facility, and a need for such facilities has been identified in San Francisco (Baxter 1991).

The city of San Francisco holds a lease option authorized by Congress for use of the Public Health Service hospital until 1998. To date, it has not allocated funds to exercise this option to establish a long-term chronic care facility (City and County of San Francisco [CCSF] 1993). If the city did not release this option, federal legislation might be required to revoke the option and release the property before the expiration date.

Conclusion

Alternative D would benefit active-duty personnel and retired military and their dependents by allowing the Letterman complex to provide patient care. Opportunities for park activities would be foreclosed. The Public Health Service hospital would be used for residential education and conference activities and would not add more acute-care beds in an area where there are already too many; it would not serve as a chronic care facility, for which there in unmet demand.

Cumulative Impacts

This alternative would have both positive and negative cumulative impacts. The opportunity for continued medical care and research for the military would be provided, but some opportunities for park activities would be foreclosed.

Impacts on Medical Aid Incidents

Analysis

The total number of medical incidents requiring hospital care is estimated to increase to 227 in 2000 and 277 in 2010. This would be an increase of 69 incidents in 2000 over the baseline year (1992) of 158 incidents and an increase of 158 incidents in 2010 over the baseline year. Letterman would continue to

operate as a hospital and could provide the needed emergency services. Also, the existing hospital emergency medical care system throughout the city could adequately provide the needed services.

Conclusion

The increase in the number of medical aid incidents would amount to about one medical incident requiring hospital care every sixth day by 2000 and one every fourth day by 2010. This increase would not be significant, and cases would be distributed among area hospitals and LAMC.

Cumulative Impacts

The increase in medical aid incidents requiring hospitalization would have an insignificant cumulative impact on hospital services in the region.

Impacts on Traffic and Transportation Systems

Analysis

Impacts on Presidio Traffic and Roadways. Alternative transportation use, traffic volumes, parking changes and improvements, and Doyle Drive reconstruction would cause the following impacts on traffic levels and patterns within the Presidio. Presidio traffic volumes do not include Highway 1 and 101 traffic. The baseline (existing conditions) year used for comparison was 1988.

Impacts of Alternative Transportation Use — Alternative D calls for facility and service improvements and implementation of TSM incentives to encourage nonauto travel. The physical improvements include extending MUNI lines 41 and 45 to the main post, developing transit hubs on the Presidio, establishing a park shuttle system and a shuttle system for military personnel, improving sidewalks and bike paths, and providing other improvements to encourage walking, bicycling, and transit use. About 5 miles of hiking trails would be added (for a total of 10.5 miles), and 11 miles of biking routes would be designated on existing roadways. These measures are assumed to become effective after the year 2000, so they do not affect the year 2000 estimated mode splits.

Transportation mode use estimates for alternative D are presented in table 26 at the beginning of the "Environmental Consequences" section. Year 2000 projected weekday travel into and out of the Presidio is estimated at 100,200 person trips per day. Of these, 78,500 person trips would be by auto, 10,100 on transit, and 11,600 by bicycle and on foot. Modal shares would be 78% auto, 10% transit, and 12% bicycles and pedestrians.

Year 2000 weekend travel into and out of the Presidio is estimated at 102,300 person trips per day, with 73,700 person trips by auto, 6,000 on transit, and 22,600 by bicyclists and pedestrians. The mode split would be 72% auto, 6% transit, and 22% bicycles and pedestrians.

Year 2010 projected weekday travel into and out of the Presidio is estimated at 126,700 person trips per day. About 93,900 person trips would be by auto, 17,200 on transit, and 15,600 by bicyclists and pedestrians. The mode split would be 74% auto, 14% transit, and 12% bicycles and pedestrians.

Year 2010 weekend travel into and out of the Presidio is estimated at 131,800 person trips per day, with an expected 87,400 person trips by auto, 14,100 on transit, and 30,300 by bicyclists and pedestrians. The mode split would be 66% auto, 10% transit, and 24% bicycles and pedestrians.

The projected auto, transit, and bicycle and pedestrian daily trip estimates indicate that the number of trips by each travel mode would increase by the year 2010. However, transit's share of the total trips would increase, while the auto share would decrease and the bicycle/pedestrian share would remain about the same as under existing conditions. An additional 10,000 transit trips daily and 7,500-14,500 bicycle/pedestrian trips daily could be expected. Overall transit use would increase 148% on weekdays and 231% on weekend days; total pedestrian and bicycle use would increase by 93% on weekdays and 92% on weekend days. The additional growth in transit ridership would replace about 3,000 potential auto trips each weekday, and about 3,800 auto trips each weekend day.

Because of the shift in the mode split, auto-related congestion and noise and air pollution would not increase as quickly or as much as it would otherwise. The reduced growth in auto traffic would also tend to delay the need for roadway, intersection, and parking system improvements. Increased transit ridership would result in corresponding increases in fare box revenues. Because of the additional demand for transit, peak period ridership would be closer to capacity, resulting in increasingly crowded conditions on some buses. In cases where the increased demand could not be accommodated by existing transit service, additional service might be needed.

Impacts of Traffic Volumes — Alternative D would generate the most traffic of the four alternatives. The most significant increase would be at the 15th Avenue entrance, where volumes would increase by more than 20% over alternative A because of greater use of the Public Health Service hospital facilities. Despite slightly higher traffic volumes throughout the Presidio, the same capacity problem areas would exist. Improvements might become necessary slightly earlier than under the other alternatives.

Table 27 shows the projected entrance volumes by vehicle trips under alternative D. In the year 2000 the average daily traffic (ADT) through Presidio gateways is projected to be 67,000 vehicles per day (vpd) on weekdays and 63,600 vpd on weekends. These traffic volumes reflect increases of about 33% over baseline conditions on weekdays and a 36% increase on weekends. Projected gateway traffic volumes for continued military use (the No NPS scenario) would amount to 13% of the growth that would occur without any of the proposed changes. This indicates that proposed land use changes related to park uses would be responsible for the remaining 20% of projected growth on weekdays and 23% of projected growth on weekends.

In the year 2010 the Presidio's gateway ADTs are projected to be 78,700 vpd on weekdays and 74,200 on weekends. The traffic volumes reflect an increase of 56% over existing weekday and 59% over existing weekend conditions. Projected gateway traffic volumes for continued military use would amount to 24% of the growth that would occur without any of the proposed changes. Thus, proposed land use changes related to park uses would be responsible for 32% of projected growth on weekdays and 35% of projected growth on weekends.

Impacts of Parking Changes — Alternative D calls for extensive parking system improvements and the removal of a large amount of parking. Under this alternative the parking supply would be reduced from about 13,000 spaces to 8,710 spaces. This would be a reduction to 70% of the existing parking supply. Existing parking areas would be reconfigured, and spaces added and removed, for a net reduction of about 4,290 spaces. The proposed parking supply would exceed average demand by an estimated 280 spaces.

Changes to the Presidio's parking system would reduce the number of available spaces while simplifying and better defining parking areas. Parking around the Presidio's perimeter would accommodate average daily parking demand, with a surplus under normal conditions and only minor shortages during peak periods. Most of the parking reductions would be in interior locations; as a result, parking spaces would be harder to find in some of these areas during peak periods, especially where transit service was concentrated. Long-term parking would generally be around the outer edges of developed areas, making it less convenient to drive and easier to use alternative modes of travel. Adequate short-term, service, and disabled-access parking would continue to be provided in convenient locations.

Incentives for alternative-mode travel, combined with limited available parking within the Presidio, would continue to shift the mode split toward alternative transportation. With mutual actions by the city to increase transit opportunities for visitors to San Francisco, parking demand should decrease over time. However, adequate parking would be provided inside the boundaries around the Presidio's perimeter to ensure that adjacent neighborhoods were not adversely affected by Presidio parking demands. Issuing city permits for neighborhood parking would also dissuade visitor parking outside the Presidio boundary.

Special event parking would be accommodated in part by temporary parking areas on Crissy Field. However, larger special events would need to be planned to take advantage of permanent parking spaces during off-peak periods because the parking system would not be designed to accommodate the peak demands of general and event visits simultaneously. Event coordination between staff of the Presidio, the city of San Francisco, Fort Mason Foundation, and the Exploratorium would reduce concurrent demand for available parking spaces.

Restrictions on parking along some streets and outside of parking lots would generally reduce the number of accidents related to parked or parking vehicles.

Impacts of Doyle Drive Reconstruction — The impacts of Doyle Drive reconstruction would be the same as under alternative A. Short-term impacts on the Presidio would include potentially serious traffic congestion at and near construction sites, increased noise and air pollution, increased traffic volumes on Presidio roadways from shortcutting, and the use of Presidio land for staging equipment. Long-term effects would include the irretrievable commitment of land for the right-of-way, the probable removal of some historic buildings, and continuing air and noise pollution.

Impacts on Local and Regional Transportation Network. The local and regional transportation network would be affected by future Presidio-generated traffic and by changes to Doyle Drive.

Increased travel demand under alternative D would result in traffic levels similar to but generally higher than in alternative A. As a result, it would affect intersections within the Presidio and around its perimeter in much the same way as alternative A. Recommended improvements to address projected impacts would generally be the same as in alternative A, so impacts would be similar.

New traffic generated by the Presidio as well as regional traffic growth under alternative D would also affect roadway corridors within the Presidio, around the Presidio's boundaries, and on regional travel corridors serving the Presidio. Anticipated traffic level increases would be slightly greater than under alternative A, with similar gateway distributions. As a result, local and regional impacts would be similar to those for alternative A.

Traffic on roadways within the Presidio and on roadways through its gateways extending several blocks outside the Presidio would be busier than under existing conditions. Recommended improvements would avoid the increased congestion that would otherwise occur at many locations and at key intersections. Increased Presidio traffic because of this alternative would also cause minor traffic volume increases on regional routes such as U.S. Highway 101 and 19th Avenue.

The impacts of Doyle Drive reconstruction on the local and regional transportation network would be the same as under alternative A. A Presidio interchange would be benefit the local traffic network by decreasing traffic at several other park gateways.

Conclusion

Proposed land use changes at the Presidio under this alternative would result in increased travel to, from, and within the Presidio. Planned improvements would reduce the share of trips into and out of the site by auto and increase the share of trips made on transit; the percentage share of bicycle/pedestrian trips would stay about the same, but volumes would increase. About 10,000 person trips daily would be added on MUNI, Golden Gate Transit, and other transit lines by 2010. This would eliminate some potential auto trips and increase fare box revenues for underused bus lines; however, heavily patronized lines might be more crowded during peak travel periods. Bicycle and pedestrian trips between the Presidio and surrounding neighborhoods would increase by about 7,500-14,500 each day. These increases would have few if any negative impacts and would also eliminate an estimated 3,000 auto trips each weekday and 3,800 each weekend day. By 2010 total transit use would increase by 148% on weekdays and 231% on weekend days; pedestrian and bicycle use would increase by 93% on weekdays and 92% on weekend days.

Average daily traffic is projected to increase by about 32%-35% by the year 2010 as a result of Presidio land uses changes. The potential for congestion and other impacts related to traffic increases would be highest within the Presidio and near its boundaries. However, most impacts would be avoided by implementing roadway and intersection improvements and correcting dangerous traffic conditions at several locations. Some of the increased auto traffic would be on regional routes, resulting in slight increases in auto-related impacts on these routes; however, there would not be enough volume to create operational difficulties on the roadways.

The Presidio would generate increased demands for parking; however, planned parking improvements and the development or expansion of alternative transportation modes for access would reduce those demands. No significant negative impacts are anticipated.

The impacts of Doyle Drive reconstruction would be the same as under alternative A.

Cumulative Impacts

Traffic increases generated by the Presidio would have a negative cumulative effect on regional traffic growth and related congestion. By the year 2010 regional automobile traffic is expected to grow by 56% over existing weekday levels and 59% over existing weekend levels in the vicinity of the Presidio; 32%-35% of projected growth would be attributable to Presidio land uses. Presidio traffic increases on Doyle Drive, Highway 1, and the Golden Gate Bridge would also have a minor cumulative effect on congestion. The cumulative effects of Doyle Drive reconstruction would be addressed by Caltrans and other affected agencies in future environmental analyses; the cumulative effects of projects other than Doyle Drive reconstruction are not known at this time.

Impacts on Land Use, the Presidio Community, and Surrounding Neighborhoods

Analysis

Land Use. There would be no substantial increases in open space under this alternative. The Wherry housing area would remain in the long term and be used on a semi-permanent basis by the military. The military would also be expected to use the Letterman complex. About 150 buildings, or 0.7 million square feet, would be removed, including about 23 residential structures containing 92 housing units; this would decrease built space by 11%. Special use permits would be issued, and the Public Health Service hospital would be included in the boundary for use as a residential educational facility. Total building square footage within the Presidio would be about 5.67 million square feet.

The percentage breakdown of the total building square footage by use, shown in table 11, would be residential (32%), office (18%), medical/research (14%), institution (8%), warehouse (9%), dormitory and industrial (each about 6.5%), and retail, military defense structures and infrastructure (each 3% or less). The overall land use breakdown, as shown in table 28 and the Land Use – Alternative D map, would be similar to existing conditions: recreation/open space (894 acres; 60%), residential use (248 acres; 17%), institutional use (200 acres; 13.5%), special use (64.5 acres; 4.5%), industrial use (45 acres; 3%), and commercial/office use (29 acres; 2%). There would be a 14% increase in recreation/open space areas above existing conditions.

Land uses in the neighborhoods surrounding the Presidio are primarily residential. These areas are densely developed, and proposed Presidio uses are not expected to have any significant effects on residential development or population growth. The Presidio's conversion would contribute little to the demand for additional housing in the city, especially because housing would be available within the park area (see the "Impacts on Housing" section).

Generally, Presidio land uses along or near the boundary would not change from existing conditions and would include open space, residential, and institutional uses; therefore, no significant impacts on park neighbors are anticipated. The exception is the Public Health Service hospital site, which has been vacant for about a decade. Future use of this site under alternative D is not known because it would not be part of the park. It is expected that city planning and zoning controls would regulate future use at the site.

Population. Alternative D would have a large resident population in 2000 — about 2,900 people. But this population would drop between 2000 and 2010, declining to 2,800 residents. The guest population would remain the same, at about 850 persons per night in both 2000 and 2010.

Community Support Services. The Presidio community would have use of commercial services and meeting facilities. Military personnel would manage medical care at the Letterman hospital, the day care center, and exclusive military commercial and community support services at the Wherry housing area. Presidio services would benefit the community and visitors and have no significant impacts on commercial services in surrounding areas.

Within a few blocks of the Presidio are several small-scale commercial districts in the Marina area to the east and the Richmond and Pacific Heights areas to the south. Farther east is the moderate-scale Lombard Street district, and farther south the moderate-scale Geary Boulevard district (CCSF 1988). Much of the property in these districts is already developed, and any addition or intensification of commercial use would be subject to San Francisco planning and zoning regulations. Because commercial services within the Presidio would be tailored to meet basic visitor and community needs only, no significant negative impacts on businesses in these districts are anticipated. Presidio employees, residents, and visitors would purchase goods and services from local businesses, including specialty services, but not in sufficient quantity to encourage the growth of competing enterprises. See the "Impacts on the Regional Economy and Employment" section for additional information.

Conclusion

Under alternative D there would little change in building and land uses. Open space would only increase by 14%, and total building square footage would only be reduced by about 0.7 million, or 11% of existing square footage. The military would manage a major portion of the built space.

The size of the Presidio residential population would remain relatively stable. The present level of support services would be maintained to support both visitors and the community. The military would have a long-term needs for support services.

The potential for additional residential or commercial development in areas near the park is limited under existing land use controls, except on undeveloped or underdeveloped lots. The addition or intensification of land uses in these areas

would be subject to San Francisco planning and zoning regulations, and no significant land use impacts are anticipated under existing controls. Employee, resident, and visitor spending would benefit local businesses but would not be great enough to induce the growth of competing businesses.

Cumulative Impacts

The restoration of about 110 acres of open space would have a minor but positive cumulative effect on efforts to preserve open space in the city and region. Land use changes at the Presidio would have an insignificant cumulative effect on surrounding neighborhoods.

Impacts on the National Historic Landmark District

Analysis

Presidio Historic Buildings. Under alternative D the National Park Service would manage 870 Presidio buildings, 510 of which are listed as contributing to the national historic landmark district. Appendix B lists all of the historic buildings and their proposed treatment under each of the management alternatives. Table 55 summarizes the treatment of Presidio buildings under alternative D. Treatment categories are stabilization/preservation, rehabilitation, restoration, and removal.

Under alternative D the overall impact on historic buildings would be beneficial. A total of 473 historic buildings would be retained. Of these, 356 would be rehabilitated to accommodate new uses, 114 would be stabilized and preserved, and three would be restored.

Management of historic buildings would be similar to that described in alternative A. *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (NPS 1992f) would provide guidelines for all proposed actions affecting historic buildings and structures. For buildings to be rehabilitated, uses would be selected that would require minimal alteration of the buildings' defining characteristics. Some historic buildings would have to be altered to accommodate new uses, which could have an effect on historic building fabric or materials. Building-specific assessments of existing conditions, an inventory of the character-defining elements of each historic building, and the Presidiowide rehabilitation guidelines would aid in minimizing adverse impacts.

TABLE 55: SUMMARY OF BUILDING TREATMENTS – ALTERNATIVE D

Treatment	Historic	Nonhistoric	Total
Stabilize and Preserve	114	26	140
Rehabilitate	356	219	575
Restore	3	0	3
Remove	37	115	152
Excluded from Park	0	0	0
Total	**510**	**360**	**870**

Impacts related to rehabilitation of historic buildings would be addressed when tenants were selected and proposals submitted. Historic building rehabilitation would be certified by National Park Service preservation staff through the 1992 Golden Gate Operations and Maintenance Programmatic Agreement.

Buildings supporting public uses would be made fully accessible to physically disabled visitors, as required by federal law. In addition, during rehabilitation, buildings would be made to meet the nationally accepted model building codes to the maximum extent feasible.

As in alternative A, 37 historic buildings would be adversely affected because of their demolition and removal. Mitigating measures for these buildings, including recording to HABS standards and preserving significant building materials, would be developed in consultation with the state historic preservation officer and the Advisory Council on Historic Preservation.

During and after the transition from military post to park, some of the historic buildings would remain vacant. Although they would be mothballed and monitored to prevent deterioration, there could be adverse impacts on the historic fabric of those buildings.

Presidio Cultural Landscape. The beneficial impacts on the cultural landscape would be similar to those of alternative A, except that only about 4 acres of historic forest would also be restored.

New construction could have negative impacts on the cultural landscape. Such construction would only be permitted if existing buildings and improvements did not meet essential management needs. Every reasonable consideration would be given to using existing buildings for park purposes. Alterations and additions might need to be made to historic buildings to accommodate new uses. Any new construction would be compatibly designed and sited in keeping with the character-defining elements of their settings following *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. The Park Service would develop Presidio design guidelines to encourage the design of new buildings to be compatible in scale, color, material, and character with the historic landmark district.

Conclusion

Under alternative D the Presidio's historic buildings and cultural landscape would be enhanced. Continued use of historic buildings would provide for their preservation, and the removal of 115 nonhistoric buildings would improve the historic setting by minimizing modern intrusions. The removal of 37 historic buildings would adversely affect the national historic landmark district.

Cumulative Impacts

There has been a continuing loss of historic buildings regionally and nationwide, including those related to military history. Because the buildings and cultural landscape within the Presidio national historic landmark district would be rehabilitated and preserved under this alternative, it would have a positive cumulative effect on regional efforts to preserve such resources and their settings.

Impacts on Archeology

Analysis

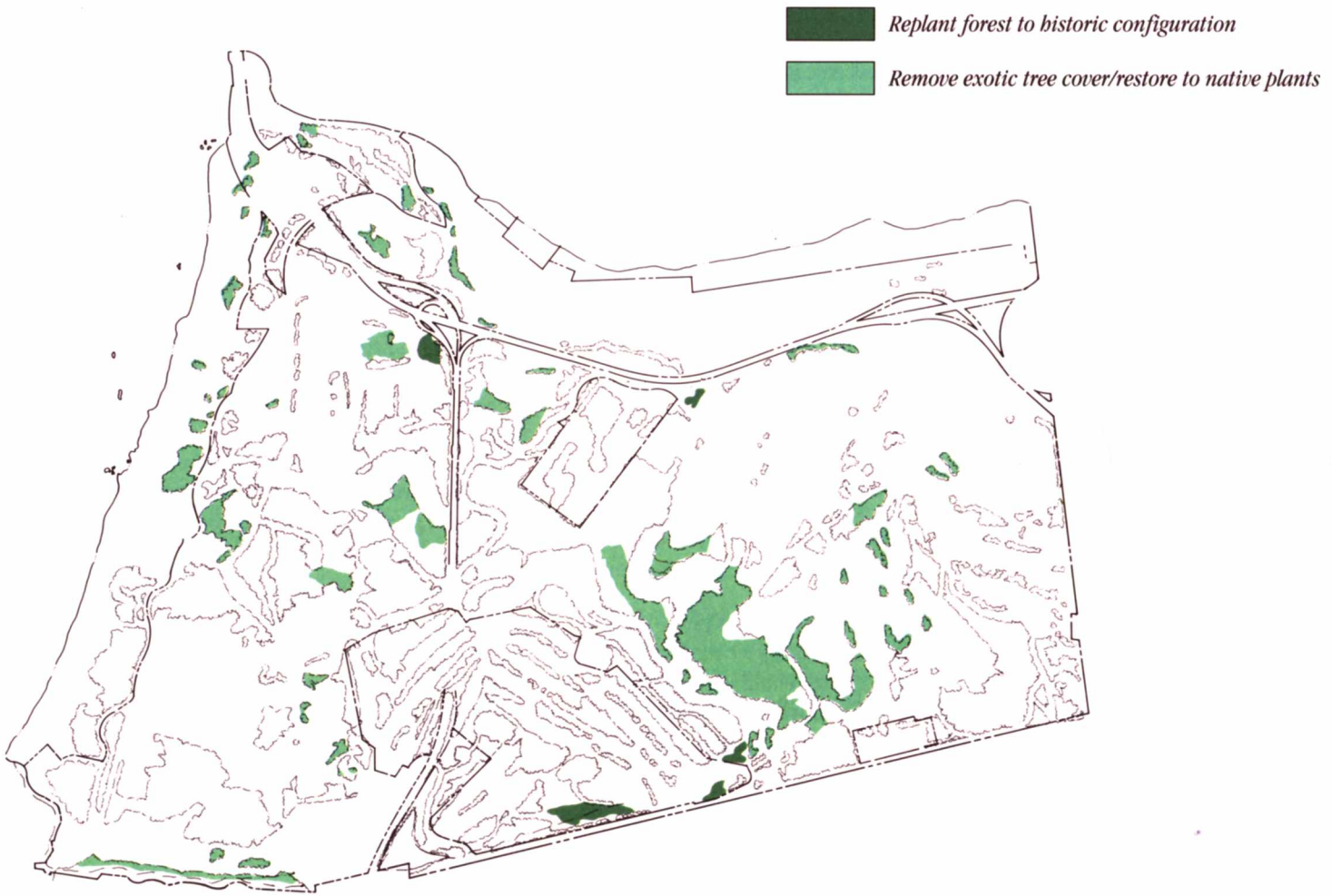
Based on archeological discoveries within San Francisco, it is possible that potentially significant subsurface prehistoric archeological sites are present within the Presidio. The 200 years of use suggests that historic archeological remains would also be found. Any work undertaken might disturb potential archeological resources. There is one state-recorded archeological site on the Presidio.

Any ground-disturbing work undertaken in the park would have the potential to affect undiscovered archeological sites and resources. Until exact locations were selected and preliminary designs were available for specific projects, it would not be possible to accurately project effects. Direct effects would be avoided to the extent possible through consultation between designers and the park's archeology office. Should avoiding sites be impossible, mitigating measures, including excavation and recording of sites, would be carried out in consultation with the state historic preservation officer. Should previously unknown resources be uncovered during construction, work would be stopped in the discovery area, and the National Park Service would consult according to section 800.11, title 36, of the *Code of Federal Regulations*.

Direct impacts would vary and be closely related to specific kinds of proposed actions. The proposed upgrading and ongoing maintenance of buildings, roads, and all utilities at the Presidio would require ground disturbance of various types, as would the remediation of hazardous substances, pollutants, and contaminants.

Improvements to bring the water treatment plant into compliance with drinking water standards could have a negative effect on archeological resources in the Lobos Creek drainage. New construction, well drilling, and diversions could all affect the drainage, which is a probable site for both prehistoric and historic resources.

New construction on any part of the Presidio might also have an adverse effect on archeological resources. For example, construction surrounding the improvements to Doyle Drive might have an impact on known prehistoric archeological sites in the Crissy Field area as well as historic archeological resources.



Historic Forest Removal/Restoration – Alternative D

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

641 | 20178 | DSC | July 1993

No known sacred sites have been identified in consultation with Native American groups (NPS 1993b).

Conclusion

Direct impacts on archeological sites cannot be analyzed at the present time because sites have not been identified. Many of the actions required to make utilities and other infrastructure safe and/or in compliance with current standards might affect unknown archeological resources. New construction as well as repair and maintenance of existing buildings, roads, and other features would increase the likelihood of inadvertent damage to sites. Measures implemented by the Park Service would avoid or mitigate any adverse impacts to sites.

Cumulative Impacts

Cumulative impacts on known archeological sites and resources at known sites are not anticipated to be adverse; cumulative impacts on unknown sites would not be significant because mitigating measures would be implemented by the Park Service, as described in the "Alternative D" section.

Impacts on Wetlands and Stream Drainages

Analysis

As described in alternative A, 20-80 acres of wetlands at Crissy Field would be reestablished, Lobos Creek and three other stream drainages (a total of 33 acres) would be restored, and other small pockets of wetland habitat would be protected and enhanced. Before wetland and creek restoration actions were implemented, detailed environmental analysis would be conducted to determine any additional impacts.

Conclusion

Restoration and protection of wetlands at Crissy Field (20-80 acres) and in other areas within the Presidio would have a beneficial impact on water resources and would provide critical wildlife habitat and increase the overall biodiversity of the area. The restoration of the El Polin Spring and Lobos Creek watersheds would enhance natural drainage patterns and add 33 acres of riparian habitat.

Cumulative Impacts

There are an estimated 170,660 acres of estuary wetlands in the Bay Area. The restoration of a portion of the Presidio wetlands would have a minor but positive cumulative effect on projects to restore and maintain regional wetlands.

Impacts on Native Plant Communities

Analysis

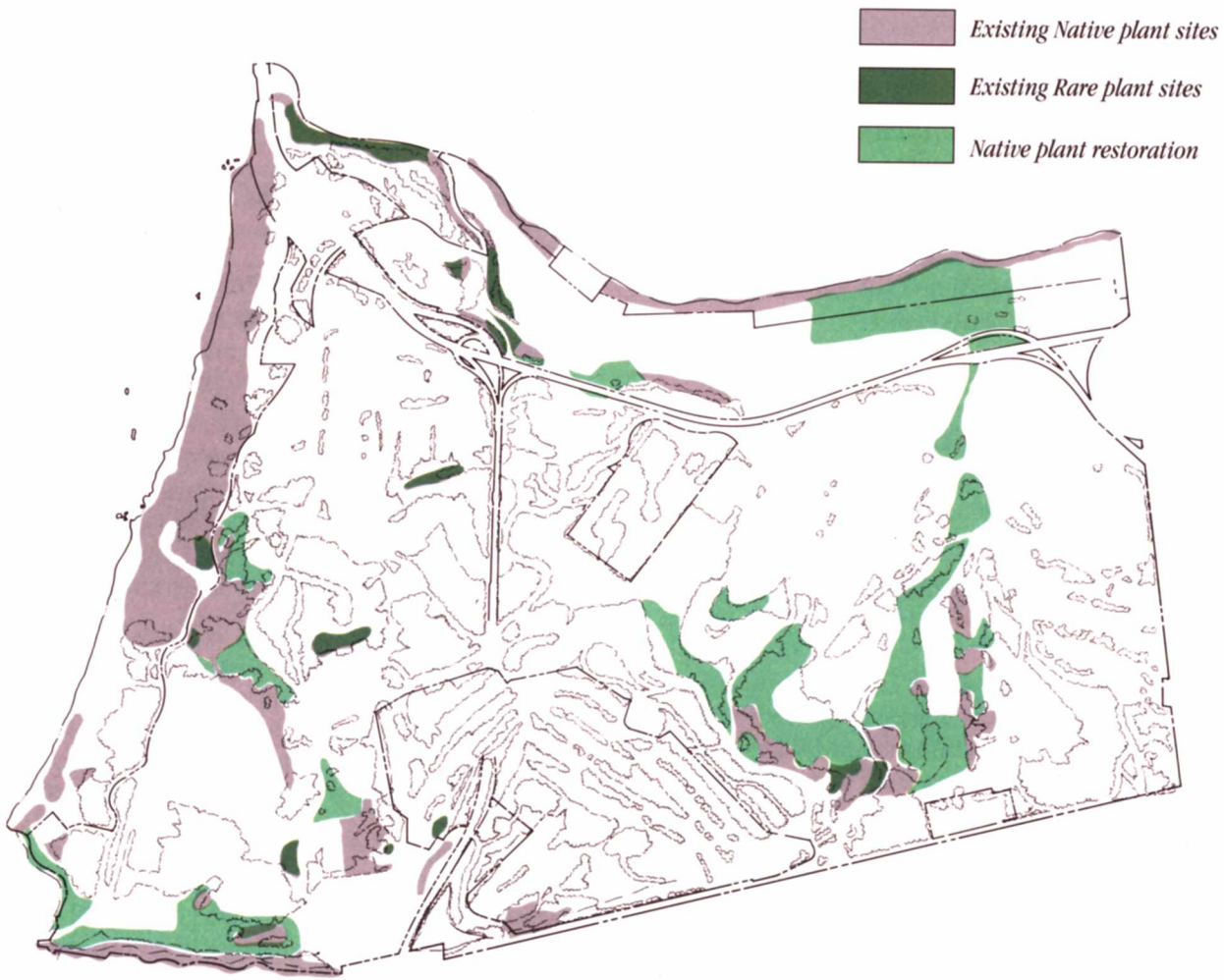
Approximately 145 acres at the Presidio are currently dominated by native plant species, including 15 acres of rare and endangered plants. Under alternative D these areas would be managed to protect and enhance native plant communities and to minimize the intrusion of exotic species. No adverse impacts are anticipated in these areas.

A total of 152 historic and nonhistoric buildings would be removed. This would allow 125 acres to be restored with native plants under this alternative. After restoration, 270 acres would support native plant communities. Short-term impacts on native vegetation associated with construction/structural demolition activities would be less than under alternative A.

Part of the native plant restoration would take place in areas where individual trees and groves of trees have escaped from the historic boundaries of the Presidio forest. These trees and groves would be removed, and native plants would be reestablished in their place. The removal of trees and restoration of native species on approximately 4 acres would have a small but positive impact on the number and diversity of native plant communities.

Conclusion

The restoration of native species and the removal of exotic species from native habitat would have a beneficial impact on native plant preservation and biodiversity. Restoration of about 125 acres of native habitat within wetlands and riparian areas would stabilize sensitive soils, restore natural drainage patterns and influences, and enhance water quality in streams and drainages. The total land area restored to native plant habitat would be 270 acres. The threats to native plant communities posed by competition from nonnative tree species would gradually decrease under the proposed proactive forest management.



Native Plant Restoration – Alternative D

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

641 | 20174 | DSC | July 1993

Cumulative Impacts

Native plant habitat is rapidly being lost in the Bay Area because of increasing development. The actions under this alternative would aid in perpetuating individual species and native plant communities and, together with other similar projects in the national recreation area, would have a minor but positive cumulative effect on a regional scale.

Impacts on Wildlife

Analysis

Under alternative D, terrestrial and marine animal species would be inventoried, monitored, and protected and their habitats enhanced as part of the park's resource management program. The removal of 152 buildings and restoration of 125 acres to natural conditions would increase available habitat for native wildlife. Open space, which also benefits wildlife by providing habitat, would increase by 110 acres to a total of 890 acres.

Marine Species. The impacts on marine species would be the same as under alternative A. If implemented, water taxi service to and from Crissy Field could directly affect marine animals. Impacts on marine animals would also result from increased visitor use at Crissy Field, Fort Point, and the coastal bluffs. The improvement in water quality as a result of wetland restoration at Crissy Field would benefit Dungeness crabs, among other species. Restoration of the dune system there would promote the natural functions of the beach ecosystem and increase the attractiveness of the area to native species.

Migratory Species. The impacts on migratory species would be the same as under alternative A. Establishing a bird sanctuary at Crissy Field would also have a beneficial effect on migrating wildlife by providing an area for undisturbed feeding and resting.

Native Terrestrial and Aquatic Species. The impacts on terrestrial and aquatic species would be the same as under alternative A. Increased visitor use throughout the Presidio would probably cause impacts on resident wildlife species. Designation of appropriate recreational uses and use areas would limit those impacts. Trail construction might temporarily disturb nesting birds. The removal of some trees in the historic forest would decrease the number of trees available for nesting birds.

Conclusion

An additional 125 acres of native plant communities and 110 acres of open space would be restored, providing additional habitat for wildlife. Designation of appropriate recreational uses and use areas and establishment of a bird sanctuary would limit visitor impacts on wildlife populations.

If implemented, water taxi service could potentially cause adverse impacts on marine species, including harbor seals and California sea lions. Additional analysis would be conducted before the service was initiated.

Cumulative Impacts

Actions under this alternative would restore and expand wildlife habitat and, together with other similar projects in the national recreation area, would have a minor but positive cumulative effect on a regional scale.

Impacts on Threatened, Endangered, Rare, and Sensitive Species

Analysis

The impacts on threatened, endangered, rare, and sensitive species would be the same as under alternative A. The Raven's manzanita and all other special-status plant species would be protected and enhanced. The Park Service would consult further with the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the California Native Plant Society concerning the protection of plant species considered sensitive.

A Presidiowide inventory and monitoring program for rare and endangered plant species would also be established under this alternative. Specific actions and techniques for protection, enhancement, and restoration of each species would be developed.

Actions under alternative D are not anticipated to have any adverse effects on special status animal species. No listed or candidate threatened or endangered animal species are known to have critical habitat within the Presidio. The possibility of reintroducing listed or candidate species would be investigated; if such species were reintroduced, it would increase the biodiversity of the Presidio as well as the long-term viability of the species that were reintroduced.

Conclusion
Under this alternative threatened, endangered, rare, and sensitive plant species would benefit from inventorying and monitoring and from the restoration and protection of critical habitat. Threatened, endangered, rare, and sensitive animal species would also benefit because of the monitoring of transient species, the restoration of native plant communities that provide critical habitat for species like the state-listed willow flycatcher, and the possible reintroduction of special-status species. No adverse effects on any species are anticipated.

Cumulative Impacts
This alternative would aid in perpetuating individual rare, endangered, and sensitive plant species and the integrity of their communities. It would also benefit threatened, endangered, rare, and sensitive wildlife species through restoration of habitat. Actions would have a positive cumulative effect on a regional scale.

Impacts on Topography and Soils

Analysis
Under alternative D, 298 acres of soils would be disturbed during building removal, native plant restoration, asphalt removal, new parking and road development, trail rehabilitation and development, and site and historic landscape restoration. The impacts would be minor and temporary, and the restoration of open space and native vegetation would have long-term positive effects on soil stabilization and reduced erosion. Trail construction would involve recontouring of soil surfaces in some areas. Runoff and soil erosion would be likely to increase on stretches of trail that were heavily used.

The majority of soils affected under this alternative have been previously disturbed by human use. Site-specific plans, including additional environmental compliance documentation for major soil-disturbing activities, would be developed before the initiation of work and would include in-depth assessment and quantification of the anticipated disturbances.

The restoration of natural drainages would require site disturbance, primarily from the use of heavy equipment to recreate natural contours, remove unwanted drainage culverts, and reestablish native habitat. Regardless of the care and environmental oversight taken during these operations, soil erosion and temporary deterioration of surface water quality could be expected before revegetation. Drainage restoration plans would be prepared that would contain prescriptions for monitoring of conditions before and after the completion of work and for immediate post-restoration site stabilization.

Specific actions under this alternative would be similar to those in alternative A except that there would be much less building removal and habitat restoration. In the Presidio Hill planning area, pavement would be removed and the new clubhouse constructed at the golf course, but no housing would be removed and only minimal site restoration would take place in the Wherry housing area.

Conclusion
Alternative D would disturb a total of 298 acres of soil. Short-term and immediate post-restoration soil movement and compaction and degradation of water quality would be minimal under this alternative; however, the positive long-term effects of drainage restoration and natural soil-forming processes would be less extensive than those of alternatives A and C. This alternative would generally provide long-term protection of sensitive Presidio soils.

Cumulative Impacts
A total of 298 acres of soils would be disturbed in the short term. In the long term soils and topography would be restored to a more natural condition; therefore, cumulative impacts would be insignificant.

Impacts on Air Quality

Analysis
Predicted CO levels by intersection under 2010 conditions with NPS activities and with current uses continuing were described in alternative A. Computer modeling results indicated that future reductions in vehicle emissions would yield CO levels that would not exceed the state 1-hour standard or the federal and state 8-hour standard. Alternative A was used for analysis because it represents the "worst case" for air quality impacts related to traffic — an equal or greater number of future trips as compared to the other alternatives.

The results of the computer modeling presented in table 56 show the impacts of alternative B on the production of major vehicle emissions — total organics (relative hydrocarbons), carbon monoxide, nitrogen oxides, and particulates.

The predicted emission levels for alternative D exceed the threshold levels of 0.075 tons per day for hydrocarbons, nitrogen oxides, sulfur oxides, and particulates. These emission levels would have a significant negative impact on air quality.

It is notable that all of the mobile-source pollutant threshold levels are exceeded for current land use and trip-generating characteristics. However, the bulk of the pollutants are generated by traffic on Highways 1 and 101 that is not related to activities at the Presidio.

Conclusion

The impacts would be similar to those of alternative A. The levels of all mobile-source contaminants except carbon monoxide (hydrocarbons, nitrogen oxides, sulfur oxides, and particulates) would be significant because these levels are already exceeded; however, the bulk of the pollutants would be generated by traffic on Highways 1 and 101 that is not related to activities on the Presidio.

Cumulative Impacts

Regional airsheds encompassing the Presidio currently do not meet air quality standards. The implementation of alternative D would have a minor (less than a 1%) but adverse cumulative effect on this condition.

Impacts on Noise

Analysis

The impacts would be the same as under alternative A except that there would be fewer impacts related to building removal because only 152 buildings would be removed. Noise related to infrastructure improvements, resource enhancement, and building rehabilitation would be similar to that under alternative A. Traffic noise would be the same as under alternative A.

Conclusion

Future noise levels in the Presidio would be minimally higher than at present but would not violate the San Francisco noise ordinance. During implementation, construction would be a source of increased noise and related impacts, although the noise would be reduced to an acceptable level through mitigating actions. Noise would also increase as traffic to and from the Presidio increased. Park land uses and related internal traffic increases would not have significant impacts on noise.

TABLE 56: PROJECTED EMISSIONS FROM MOBILE SOURCES UNDER NPS MANAGEMENT ALTERNATIVE D (TONS/DAY)

Year/ Management Alternative	Daily Emissions				
	Total Organics (HC)	Carbon Monoxide (CO)	Nitrogen Oxides (NO_x)	Sulfur Oxides (SO_x)	Particulates (PM_{10})
Presidio Baseline Condition (1992)	0.91	9.08	1.21	0.13	1.07
2010 – Continuation of Current Uses	0.59	6.98	0.94	0.10	0.74
2010 – Alternative D	1.08	12.38	1.80	0.20	0.82

NOTE: Vehicle emissions were calculated by use of the California Air Resources Board's URBEMIS 3 model recommended by BAAQMD.

Cumulative Impacts

There would be short-term cumulative impacts on noise levels as a result of Presidio construction projects and Caltrans reconstruction of Doyle Drive. Long-term cumulative impacts would primarily result from traffic on Doyle Drive (Highway 101) and Park-Presidio Boulevard (Highway 1).

Impacts on Interpretation and Education

Analysis

As in alternative A, visitors would benefit from expanded opportunities at the visitor center and other educational/cultural program facilities at the main post and elsewhere in the Presidio. In addition, a conference/research/training program and a National Park Service employee development center would be established at Fort Scott. No interpretive opportunities would be provided in the Letterman complex or Wherry housing area.

Conclusion

Alternative D would increase educational opportunities for visitors throughout the Presidio. Conferences, seminars, training, demonstrations, interpretation, and environmental education at the main post, Fort Scott, the cavalry stables, Crissy Field, and other open space areas would encourage learning, attract national and international visitors, and contribute to National Park Service stewardship through environmental education. No programs would be available in the Letterman complex or Wherry housing area.

Cumulative Impacts

Programming at the Presidio and Golden Gate National Recreation Area would contribute to regional and national efforts to expand interpretive and educational opportunities for the public. Additional educational resources would be available for Bay Area residents and visitors.

Impacts on Recreation

Analysis

Alternative D would expand opportunities for public recreation throughout the Presidio except in the Letterman complex and Wherry housing area. Although there would be less space dedicated to visitor activities and programs, most of the developed areas would remain available for public recreation.

As in alternative A, orientation and information about recreational opportunities would be greatly improved. Outdoor recreational values would be enhanced, and indoor recreational facilities would be shared by the Park Service, park partners, visitors, and military residents. The golf course would also become available to the public. The Presidio's open space would provide settings for a variety of recreational activities. The removal of one ballfield and restricted use of another would have a short-term adverse effect on current users; however, other facilities would be available for these types of activities.

The pool, gym, and tennis courts at the Letterman complex would be limited to military use only and would not be available to park visitors. In addition, the 51 acres at the Wherry housing area would not be available for public use. However, this area has limited recreational facilities and opportunities.

Access and circulation improvements such as trails and bicycle routes would be similar to those of alternative A. A total of 10.5 miles of hiking trails would be established, an increase of 5 miles; 11 miles of bicycle routes would be designated on existing roads. The trail linking the Presidio Hill and Lobos Creek valley areas would not be an NPS priority, as no public programs would occur in these areas.

Conclusion

This alternative would offer fewer recreational opportunities than alternative A because less space would be dedicated to visitor activities and programs. In addition, the pool, gym, and tennis courts at the Letterman complex would not be open to the general public. One ballfield would be removed, and the use of another would be restricted. However, despite the reduction in recreational facilities, many new opportunities would be available.

Cumulative Impacts

The provision of open space and facilities for the public at the Presidio and Golden Gate National Recreation Area would have a minor but positive cumulative effect on recreational opportunities in the city and Bay Area.

Impacts on Scenic Viewing

Analysis

Alternative D would provide some visual improvements, but fewer than under alternative A. Because only 152 buildings would be removed, and the Letterman hospital and Wherry housing area would remain, there would be less enhancement of the cultural landscape and its scenic qualities. However, no significant negative impacts would result from this alternative.

Letterman Complex. The 10-story Letterman hospital building would not be removed. Therefore, there would be no enhancement of the visual integrity of this site, and views would not improve from surrounding vantage points.

Public Health Service Hospital. The 1950s hospital addition to the main building would not be removed. Thus, the building would not be returned to a smaller scale, and views from vantage points in adjacent neighborhoods would remain the same as at present.

Presidio Hill. None of the Wherry housing units would be removed to increase open space and enhance the setting. Thus, views from Lincoln Boulevard and other regional viewpoints would not improve.

New Construction. New construction at Fort Scott and the golf course could have impacts on the historic scene. Careful design and siting would integrate new construction to ensure compatibility with the historic setting and scenic views.

Conclusion
The visual qualities and scenic viewing opportunities within the Presidio would be greatly enhanced. Removal of 152 buildings would open vistas and enhance the integrity of the cultural landscape. Restoration of Crissy Field, Lobos Creek, and the drainage near El Polin Spring would provide additional viewing opportunities.

Cumulative Impacts
Actions under alternative D and other resource management actions at Golden Gate National Recreation Area would have a positive cumulative effect on scenic vistas and viewing in the region.

Impacts on Human Health, Safety, and the Environment

Analysis
The impacts of alternative D would be similar to those of alternative A except for the following.

The risk of lead and asbestos exposure during building demolition and rehabilitation would be moderate (only 152 buildings would be removed, compared to 301 under alternative A).

There is always a potential risk of exposure to hazardous substances whenever restoration, landscaping and soil grading is performed.

Conclusion
Because this alternative calls for less restoration work than alternative A, there would be a correspondingly reduced risk to human health and the environment. As compared to alternative A, there would be a reduced risk of exposure to lead and asbestos during building demolition because fewer buildings would be removed. The risks of exposure to lead and asbestos in buildings occupied by the Park Service would be mitigated. However, the risks of exposure in buildings occupied by other agencies would have to be mitigated by those agencies.

Cumulative Impacts
The specific cumulative impacts caused by hazardous substances remediation (including underground storage tanks) at the Presidio are unknown at this time because the Army has not fully characterized the extent of the contamination and because cleanup plans have not been finalized. However, if the Army fully remediated the identified contamination, there would be a beneficial cumulative impact on human health, safety, and the environment. Over the long term, the removal of asbestos and lead-based paint in buildings would have a beneficial cumulative impact.

Impacts on Energy Consumption

Analysis
In accordance with the energy conservation requirements of Executive Orders 11912 and 12003, a comprehensive energy conservation program would be established.

The energy requirements of alternative D would be similar to those of a small community, with 2,900 residents and 7,200 employees in 2000, decreasing to 2,800 and 6,800 employees in 2010. However, with NPS control during rehabilitation of structures, numerous energy design stipulations could be implemented. The removal of 152 structures under this alternative would also significantly reduce energy needs.

The use of water conservation devices and techniques for all structures would reduce the amount of water needed, thus reducing the amount of power needed to pump both water and sewage. Such conservation devices include restricted-flow shower heads and faucets and low volume flush toilets.

One of the major uses of energy at the Presidio would be fuel consumption, primarily by shuttle buses. Visitor shuttles would travel 40,000 miles per year around the Presidio, using about 4,000 gallons of fuel. The shuttles would be

alternative-fuel vehicles. Public transit use would reduce some gas consumption by eliminating some private automobile trips. Additionally, the Park Service vehicle fleet would consist of alternative fuel vehicles, to the extent possible.

Conservation Measures

The Park Service would expand the energy conservation public education activities previously carried out by the Army, develop a comprehensive energy conservation plan, and develop specific measures to minimize building energy use for each building to be renovated.

Conclusion

Because of the removal of 152 buildings, use of reclaimed water, and increased efficiency, energy consumption would decrease at the Presidio in the future.

Cumulative Impacts

Energy-reducing measures at the Presidio and Golden Gate National Recreation Area would have a minor but positive effect on energy conservation in the region.

Impacts on NPS Management and Operations

Analysis

Site Development. Site development, including building rehabilitation, and associated planning activities for full implementation of alternative D are expected to cost about $1,021 million. Approximately $402 million would be borne by future tenants, $165 million by the National Park Service, and $454 million by the military.

Infrastructure Rehabilitation. The impacts would be the same as under alternative A except for the following.

Water Supply and Distribution — Under alternative D, projected demands for potable water are estimated at 530,000 gallons per day in the year 2000 and 542,000 gallons per day in the year 2010 (Jones & Jones 1993a). An additional 1.0 millions gallons a day for irrigation would be needed primarily for the golf course, cemetery, and parade grounds.

Because the Wherry housing area would be retained and there would be a large military community along with many new park uses, water consumption would be greater than under alternative A or C but less than under alternative B.

Storm Drainage System — The impacts would be the same as under alternative A.

Sanitary Sewer System — The load on the city's facilities would increase from 250,000 gallon per day (1992) to about 450,000 gallons per day in 2000 and 460,000 gallons per day in 2010 (Jones & Jones 1993a). Sewage discharge would be greater than under any of the other alternatives because fewer buildings would be removed and LAMC, LAIR, and the Public Health Service hospital would all be within the park boundary.

Electric Power Distribution — The impacts would be the same as for alternative A.

Transportation Services. Preliminary internal shuttle bus service and ferry operation analyses recommended that the services be funded by concession fees, parking fees, and/or tenant fees collected in the Presidio. Shuttle bus operation for the Presidio route recommendations was estimated to cost $3,727,000 in capital costs and $1,338,000 in annual operation costs. Numerous ferry service options were suggested for further analysis, as described in alternative A; pier rehabilitation cost estimates would be needed in addition to capital and operating costs. Transportation services may require subsidy for the first few years of operation; phased implementation strategy is recommended to increase service as demand increases.

Operations and Staffing. The impacts on law enforcement, fire protection, and emergency medical services would be the same as under alternative A. It is estimated that 347 staff and an annual operating budget of $44 million ($28 million would be recovered from tenants) would be required. Staffing would include 147 maintenance personnel, 70 law enforcement and public safety personnel; 35 fire and emergency/rescue staff; 45 visitor services personnel; 44 resource management personnel; and 31 administration personnel.

Concession Revenues. Under alternative D the Presidio would generate about $33.5 million in 2000 and more than $40 million in 2010 in visitor service and overnight lodging revenues (Jones & Jones 1993a). A portion of the concession revenues would be returned to the park through stipulations in the concession contracts.

Additional concession revenues could be expected from recreational facilities like the golf course. Such revenues were not projected for the DEIS, but they

could be substantial. Future concessions analysis would address potential revenues and NPS profit-sharing.

The possibility of adding visitor services at Crissy Field would be analyzed as tenant programs were developed and water taxi service was implemented. This might result in additional revenues for the Presidio from retail and food and beverage concessions (Jones & Jones 1993a).

Conclusion

Substantial increases in funding and personnel would be required for full implementation of this alternative. An estimated $567 million would be required for site development activities, including demolition of nonhistoric structures and restoration of native plant habitat and natural watershed conditions. Fees collected from concessions, parking, and/or tenants would be used to implement shuttle bus and ferry service operations once legislation authorizing this was enacted; however, these concessions might require initial subsidies. About $44 million ($24 million would be recovered from tenant revenues) and an additional 347 full-time employees would be required for annual Presidio operations. No negative impacts on law enforcement, fire, or emergency medical operations and services are anticipated with projected staffing levels.

Under this alternative the Presidio would generate about $33.5 million in 2000 and $40 million in 2010 in visitor service and overnight lodging revenues. Of these revenues, a portion would be returned to the park, as determined through the concession contracting agreement process. Additional concession revenues could also be anticipated from recreational facilities like the golf course.

Cumulative Impacts

The actions and fiscal responsibilities proposed under this alternative would have a significant cumulative impact on NPS management and operations nationwide, both beneficial and adverse. The project would generate revenues for the federal treasury, but would also result in increased operational costs to the National Park Service. Future concession fees at the Presidio and Golden Gate National Recreation Area would have a positive cumulative effect on revenues to the federal government.

Unavoidable Adverse Effects

Alternative D would change land uses within the Presidio. In particular, some parking and recreation space would be replaced with restored wetlands. Establishment of these land uses would preclude other uses that might be desirable. In particular, the removal of housing and restoration of open space would most likely preclude the provision of housing in these areas in the future.

Thirty-seven historic buildings would be removed under this alternative. Most of these structures are at Crissy Field in the Directorate of Engineering and Housing complex at the east end and the World War II barracks area at the west end. All of the historic structures to be removed are identified in appendix B.

Additional recreational use and employment under this alternative would result in increased use of all forms of transportation — bicycle, pedestrian, transit, and automobile. Mitigating measures would reduce some otherwise significant transportation effects; however, some minor cumulative effects on regional traffic would be unavoidable by the year 2010.

Increased travel to and from the Presidio would contribute cumulatively to vehicle emissions within the air basin and to the frequency of air quality standard violations for pollutants. At the Presidio, projected emissions for air pollutants, hydrocarbons, nitrogen oxides, sulfur oxides, and particulates would continue to exceed threshold levels of 0.075 tons/day for mobile sources on a daily basis.

Growth-Inducing Impacts

The Presidio under National Park Service management could have the following growth-inducing impacts on the region as the local economy and community respond to Presidio activities.

- **New Jobs** — About 6,800 jobs would be generated at the Presidio in the year 2010, compared to about 5,500 jobs (2,000 Army and 3,550 civilian) under Army use.

  Impacts:

  New jobs at the Presidio would increase the demand for housing for employees in surrounding areas. Some of this demand would replace the demand of civilian employees under Army use. Onsite housing would only meet about 29% of the housing demand by Presidio employees. The new net regional housing demand created by Presidio employees would be about 688 housing units in the year 2010. Of this, about 40%, or 275 housing units, would be in San Francisco.

New employee households would create increased demands for goods and services in areas surrounding their homes and throughout the Bay Area. This could result in indirect population and housing growth because of an increase in service jobs.

New employment could lead to an increase in expenditures for business-related and personal goods and services (ranging from office supplies and major equipment to daily lunches) in areas near the Presidio. This could result in the growth of businesses in areas along the western end of Lombard and Chestnut streets and in commercial districts near the Presidio's southern entrances as well as throughout the Bay Area in general. This growth could indirectly result in increases in building sizes, infill on vacant lots, and traffic and pedestrian activity in areas near the Presidio.

- **New Tourism** — The Presidio could draw up to an estimated 8 million visitors per year, compared to the 3.5 million visitors at present (Peccia & Associates 1993) — an increase of 129%.

  Impacts:

  Increased tourism at the Presidio would increase the demand for lodging, restaurant, and other tourist-oriented services in surrounding areas, especially to the east, south, and southeast in the Marina and Richmond districts and perhaps Cow Hollow and Pacific Heights. The Lombard Street area, which already includes hotel and motel uses and is zoned C-2 (community business) would likely be the focus of increased tourism because it is on one of the main access routes to the Presidio. Other areas that might experience growth are the commercial portion of Chestnut Street west of Van Ness Avenue and possibly the commercial districts near the Presidio's southern entrances. In these areas building up to the limits of zoning codes and pressures for changes in allowable uses would be likely. It is also possible that some of the residential areas south of the Presidio and in the western end of the Marina district would experience pressures from people interested in developing bed-and-breakfast-type uses, where these uses are or could be permitted under the San Francisco planning code. Such changes would be subject to existing city and county of San Francisco planning and zoning regulations. Tourist-related business growth could result in indirect growth in population and housing demand in the city and the region.

- **Utility Upgrades** — Infrastructure improvements would not encourage additional growth outside of the Presidio because these improvements are only for onsite services.

- **Roadway Improvements** — To the extent that the planned traffic circulation and safety improvements could increase the capacity of affected transportation networks beyond that needed to accommodate Presidio traffic and transit services, they could promote additional growth in other areas served by the same traffic network. This could result in indirect population and housing growth.

Relationship of Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

Restoration and protection of 20-80 acres of wetlands and 30 acres of dunes at Crissy Field, 270 acres of native plant habitat, and the riparian corridors at El Polin Spring and along Tennessee Hollow and Lobos Creek would enhance the long-term productivity of the Presidio environment. These actions would preclude other uses such as recreation and parking, unless the flooded areas were refilled, dunes removed, and the habitats returned to previous conditions.

Alternative D would involve the removal and remediation of hazardous substances, pollutants, and contaminants at the Presidio. These cleanup activities would be carried out by the Army in compliance with federal and state laws and regulations. When these cleanup activities were completed, it is possible that certain areas of the Presidio could be restored to more natural conditions, thereby potentially increasing long-term productivity.

Recreational uses would not have significant effects on long-term productivity.

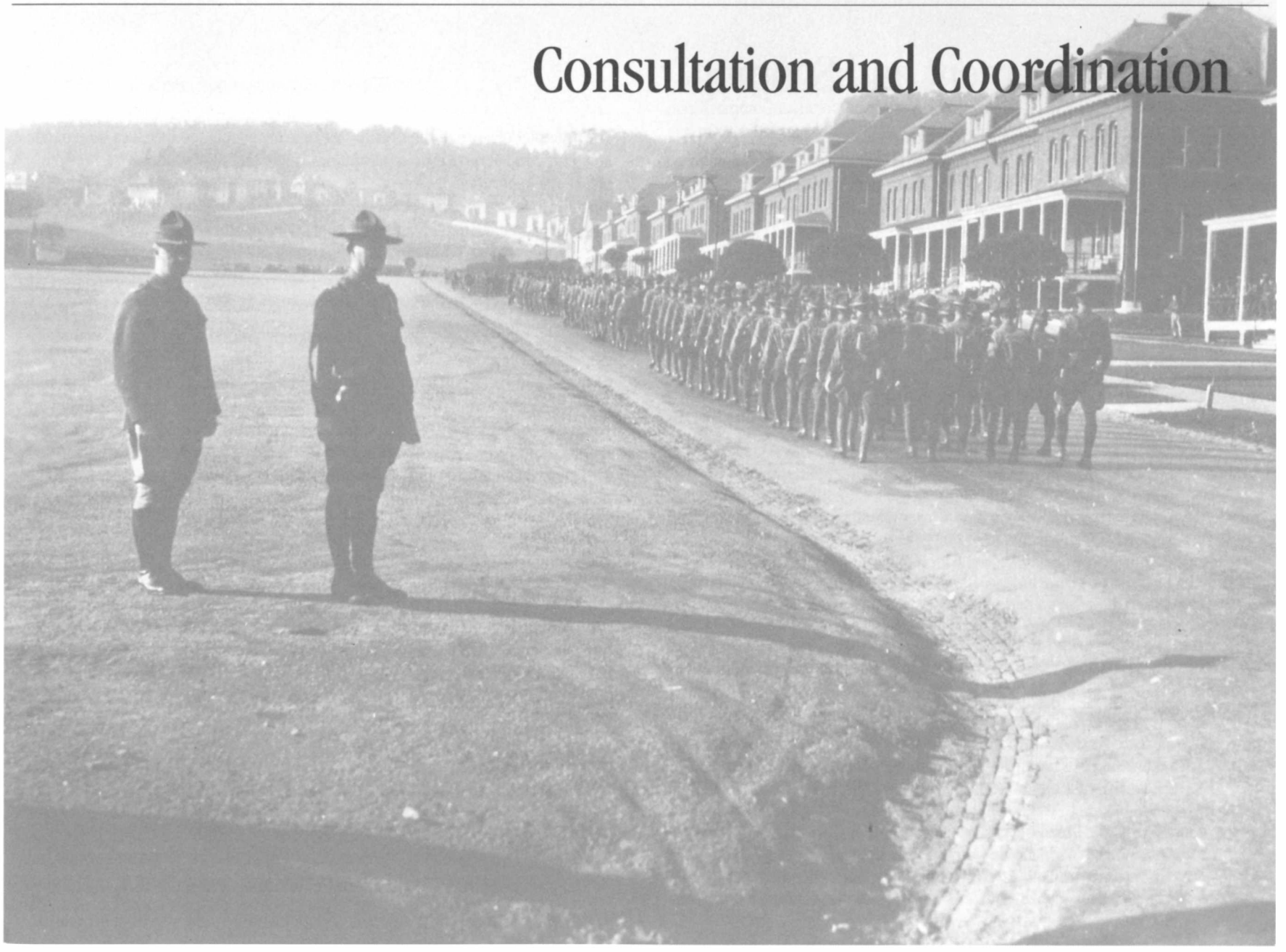
Irreversible and Irretrievable Commitments of Resources

Under alternative D, all archeological sites would be avoided where possible. Where this was not possible, disturbance would be mitigated through recovery of cultural information and significant artifacts. However, some losses of archeological objects and cultural information would likely occur because of vandalism, collecting, or construction activities. These losses would be irreversible.

The 37 historic buildings removed under the proposed action would be an irreversible loss. Mitigating measures would be conducted before removal to fully document the structures according to NPS policy and standards.

Although most developed areas could be restored to previous conditions over time, the use of land, construction materials, energy, and financial resources to implement the proposed action would, in the practical sense, be an irretrievable commitment of resources.

Consultation and Coordination



Public Involvement and Scoping

The future of the Presidio is being shaped with extensive input from the public. Public involvement has been at the local and national level and will continue to be an important part of the general management plan amendment process. Each phase of the planning process has featured a variety of public events and meetings. Response forms have been provided to facilitate written comments. Two Presidio newsletters — *Reveille* and *Presidio Update* — have been distributed widely.

The public involvement program has involved the cooperative efforts of the Presidio planning team, Golden Gate National Recreation Area communications staff, and the following entities.

- **GGNRA Citizens Advisory Commission (CAC)** — The commission has conducted all of the formal public hearings and provided advice on planning issues throughout the process. Commission members are Bay Area residents appointed by the secretary of the interior.
- **City and County of San Francisco** — Through a memorandum of understanding with the city and county of San Francisco, the National Park Service has provided funding support for a planning team member within the San Francisco Department of City Planning. She has coordinated input from all city departments involved with the Presidio conversion process and has helped address key issues that would affect San Francisco government or residents. In addition to this coordination, the planning commission has sponsored public hearings.
- **Presidio District Interpretive Staff** — Interpretive rangers have provided many programs to increase public understanding of the significance of Presidio resources and the Presidio planning process.
- **Golden Gate National Park Association** — The Golden Gate National Park Association is a nonprofit cooperating association for the national recreation area. At the request of the recreation area superintendent, the association has established the Presidio Council to bring specialized expertise and a national perspective to the planning process. The Presidio Council has increased national outreach and consulted with the local community to ensure that planning process participants represent diverse backgrounds. The association has also produced the planning newsletters and publications.

The potential closure of the Presidio as an army post made Bay Area newspaper headlines, and several civic organizations held conferences about the Presidio before the general management plan amendment process started. Planning officially began with a 1990 *Federal Register* notice of intent to prepare an EIS for the general management plan amendment. Five public scoping meetings were held between May 15 and June 2, 1990; times and locations of scoping sessions were announced in the *Federal Register*. Statements of issues and concerns were accepted through July 18, 1990.

During the scoping meetings the public commented on draft Presidio planning guidelines. The Golden Gate National Recreation Area Advisory Commission reviewed and revised the guidelines prior to their adoption. The adopted planning guidelines set a framework that included preserving historic elements and open space, protecting natural features, finding uses that will support the Presidio's operating costs and are in keeping with national park purposes, and ensuring that the Presidio remains open to the public.

More than 500 people participated in eight workshops held throughout the Bay Area in January and February of 1991 (four in San Francisco, one each in Marin, Alameda, Contra Costa, and San Mateo counties). With the aid of professional facilitators and innovative large-scale graphics, participants worked in small groups to map out ideas for various areas of the Presidio, while noting the qualities and resources of the Presidio that they hoped would remain unchanged. In the style of a town meeting, each workshop concluded with groups sharing their visions with each other and combining their ideas to create one large, inclusive planning map.

A "vision kit" was distributed as an insert in the winter 1991 issue of *Reveille*. It provided a worksheet for written response to the following questions:

> What do you value about the Presidio?
>
> What new purpose or purposes should the Presidio serve as an urban national park site?
>
> What programs and activities would be compatible with that purpose?
>
> What qualities most describe certain Presidio areas and what programs/uses do you envision for each area?

What kind of community should the Presidio be?

What groups should be served?

What services should be provided?

What issues or problems need to be solved before your vision of the Presidio can be fulfilled?

The National Park Service received 175 completed vision kits. To organize the hundreds of ideas received from the public, park staff and invited subject experts participated in technical work sessions in May 1991. They produced summaries of ideas about resource significance, interpretive themes, visions, visitor use, and community context. The summaries from the technical work sessions were translated into large graphic displays and shared with the public at the two-day Presidio forum in June 1991. The graphic summaries were photographed and made available in a booklet entitled *The Presidio Forum Displays*.

In December 1991 the Park Service released the *Presidio Concepts Workbook* to summarize the ideas received from the public and to help the public visualize and contrast various options for the Presidio. The workbook organized potential uses and themes under four concepts entitled preservation and exploration, cultural crossroads, environmental living and learning, and recreation and renewal. During December and January two informational workshops were attended by 300 people, and a public hearing on the workbook was held at which over 60 people gave testimony. The workbook included a response form for written comments. Two hundred and seventy-seven written responses were received.

In April 1992 park staff set up a Presidio planning information center as an aid to interested organizations and citizens. Along with staff knowledgeable about the Presidio and the planning process, the center provided documents developed during assessment of existing conditions at the Presidio, information about the ideas developed during the planning process, and relevant historical preservation and legal requirements affecting the Presidio transition. In addition to using the reserve library, the public could also order copies of many technical analyses, maps, meeting summaries, and other documents related to the Presidio conversion. Informal presentations provided opportunities for dialogue between the public and Park Service planners on key topics such as cultural resource management, transportation planning, native plant/forest issues, and public safety.

In the spring of 1992 the Park Service issued a *Call for Interest* to seek nonprofit organizations, academic institutions, government agencies, and for-profit enterprises wishing to occupy and maintain facilities at the Presidio. It was sent to over 5,000 organizations worldwide, and elicited over 350 responses covering the themes of international understanding, education, youth, environment, art and culture, community services, recreation, conference and visitor services, and medical and biotech research. The National Park Service analyzed the responses to test the feasibility of various program concepts envisioned for the Presidio and to begin to assess which organizations are seriously interested in becoming tenants at the post when the Park Service assumes management.

Although the public involvement activities in the early phases of the planning process were widely advertised, the participants did not reflect the diverse population of the San Francisco Bay Area. To reach out to groups of people who had been underrepresented in the process, the Park Service and the Presidio Council launched a program in June 1992 known as the community consultation initiative (CCI). More than 20 Bay Area leaders of urban neighborhood associations and community organizations attended the initial meeting. Meetings will continue throughout the Presidio conversion process to establish a forum for community concerns, facilitate responses to the *Call for Interest*, and begin planning for community-based program development at the Presidio.

The Park Service consulted with representatives from San Francisco Bay Area Native American organizations and communities to discuss their interests and concerns about the future of the Presidio of San Francisco. Representatives were invited from the Muwekma-Ohlone tribe, California Native American Heritage Commission, Navajo Nation, Aboriginal Public Policy Institute, Coastal Miwok, Ione-Band Miwok, National Indian Justice Center, American Indian Legal Training Program, Ya-Ka-Ma Indian Education and Development Foundation, American Indian Historical Society, and the International Indian Treaty Council. The initial meeting, held August 4, 1992, included representatives from the Muwekma-Ohlone Tribe, Kashaya Pomo Rancheria, Cache Creek Rancheria, and the Potrero Hill Community Council. The group agreed to continue to meet throughout the Presidio conversion process. A memorandum of agreement is currently being prepared between Golden Gate National Recreation Area and several Native American communities historically associated with the Presidio site to provide for consultation on several topics of concern.

Compliance Status

Documentation of National Park Service compliance with federal and state laws and regulations is incorporated into the text of this *Draft Environmental Impact Statement*. Compliance with nine major federal laws, executive orders, and regulations and associated state regulations is summarized here.

National Environmental Policy Act of 1969

This *Draft Environmental Impact Statement* provides public disclosure of the planning and decision-making process and the potential environmental consequences of the proposed action and alternatives, as required by the National Environmental Policy Act. The draft document will be available for public review and comment for 60 days. Agency and public comments will then be considered, the draft plan and environmental analysis will be reviewed and revised in light of those comments, and a final general management plan amendment and environmental impact statement will be published, which will respond individually or through summaries to all substantive comments received. A record of decision will be published 30 days following publication of the final plan and environmental impact statement. It will document the final decision and the alternatives considered, identify the environmentally preferable alternative, and describe means of avoiding environmental harm. At that time the final plan will be implemented.

Endangered Species Act of 1973

Section 7 of the Endangered Species Act directs all federal agencies to further the purposes of the act. Federal agencies are required to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat.

Informal consultation under section 7 of the Endangered Species Act was initiated in May 1991 when the National Park Service contacted the U.S. Fish and Wildlife Service to obtain a list of the endangered and threatened species that may be present on the Presidio. Correspondence has been maintained with the U.S. Fish and Wildlife Service on a regular basis since this effort was initiated. Three species known or suspected to inhabit the Presidio are listed on the federal endangered species list; 26 species are candidates for listing. The National Park Service has concluded that the proposed action would not adversely affect any federally listed or candidate species or critical habitat. In addition, the National Park Service will implement the USFWS recovery plan for the federally listed Raven's manzanita.

Executive Orders 11988 ("Floodplain Management") and 11990 ("Protection of Wetlands")

Executive Orders 11988 and 11990 direct federal agencies to enhance floodplain and wetland values, to avoid development in floodplains and wetlands whenever there is a practical alternative, and to avoid to the extent possible adverse impacts associated with the occupancy or modification of floodplains and wetlands. All of the alternatives are compatible with these executive orders. In addition, the proposed action would result in restoration of wetlands at Crissy Field.

Section 106 of the National Historic Preservation Act of 1966, as Amended

As required by section 106 of the National Historic Preservation Act, the *Draft General Management Plan Amendment* and *Draft Environmental Impact Statement* are being reviewed by the state historic preservation officer and the Advisory Council on Historic Preservation in accordance with the council's regulations (36 CFR 800). Section 106 activities for planning are directed by the August, 15, 1990, programmatic agreement between the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers.

The National Park Service initiated consultation on May 17, 1990, providing the Advisory Council on Historic Preservation and the state historic preservation officer with copies of the task directive and concepts workbook. The National

Park Service has since provided information to the state historic preservation officer concerning the identification of historic properties and the progress of planning. The full council has participated in a tour of the Presidio. Consultation will continue throughout the planning process. The outcome of consultations will result in a memorandum of agreement between the state historic preservation officer, Advisory Council on Historic Preservation, and the National Park Service on actions proposed in the final general management plan amendment.

Section 110 of the National Historic Preservation Act and Executive Order 11593

The Presidio has been systematically surveyed for historic resources as part of a 1992 revision of the nomination form for national historic landmark status. As a result, many 1930s and 1940s buildings have been added to the list of contributing structures. Buildings and structures that have been determined to contribute to the national historic landmark will be preserved, rehabilitated, and used in accordance with NPS policy and *The Secretary of the Interior's Standards for the Treatment of Historic Properties*.

Archeological Resources Protection Act of 1979

The National Park Service will meet its obligations under the Archeological Resources Protection Act in all activities at the Presidio. No archeological resources will be excavated without proper permits. Unauthorized excavation, removal, damage, alteration, or defacement of archeological resources will be prosecuted. All archeological site data will remain confidential.

American Indian Religious Freedom Act of 1979

In accordance with the American Indian Religious Freedom Act (PL 95-341) and the Native American Relationships Management Policy of the National Park Service (52 CFR 35674), the National Park Service has invited the relevant Native American groups who might use or have direct or indirect interest in the Presidio to participate in the planning process. Consultations have taken place with the Muwekma-Ohlone Tribe, Kashaya Pomo Rancheria, Cache Creek Rancheria, and the Potrero Hill Community Council. The National Park Service, as a matter of policy, will be as nonrestrictive as possible in permitting Native American access to and use of any identified traditional sacred resources for traditional ceremonies.

Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 104 Stat. 3049) requires consultation with certain Native American communities if circumstances regarding human remains, associated artifacts, or objects of cultural patrimony arise. As noted above, relevant Native American groups have been invited to participate in the planning process. A memorandum of agreement is being prepared for consultation between Golden Gate National Recreation Area and several historically associated Native American communities.

Participating Government Agencies

A number of city, state, and federal agencies and authorities administer programs and activities affecting the Presidio. The National Park Service will continue to consult with these agencies and authorities during the DEIS and plan implementation process.

City and County of San Francisco

A 1990 memorandum of understanding between the superintendent of Golden Gate National Recreation Area and the mayor of San Francisco provides for cooperation between the National Park Service and the mayor's office, planning commission, and other departments through a San Francisco planning department coordinator.

Bay Area Air Quality Management District

The Bay Area Air Quality Management District regulates stationary pollution sources and establishes plans to meet ambient air quality standards consistent with the California Clean Air Act of 1988 and the federal Clean Air Act of 1970 as amended. The Bay Area Air Quality Management District's air quality modeling and projections have been used in analyzing effects of the plan. Air emission permits will be the responsibility of park partner tenants.

San Francisco Bay Conservation and Development Commission

The Bay Conservation and Development Commission is a permitting authority established by the state in 1965 to review development proposals within its jurisdiction, which is eastward from the Golden Gate and 100 feet inland from the highest tide. This agency is concerned with actions that affect public access, potential wetland reclamation, dredging, or other actions associated with marsh and water taxi development at Crissy Field.

Golden Gate Bridge, Highway, and Transportation District

The Golden Gate Bridge, Highway, and Transportation District administers permitted lands surrounding the south terminus of the Golden Gate Bridge and regional bus and ferry service from Marin County. Their need for an improved maintenance area and coordination concerns for regional transit are considered in the draft plan amendment.

Metropolitan Transportation Commission

The Metropolitan Transportation Commission was created in 1970 and is the Bay Area agency responsible for approving transportation projects receiving federal funding, allocating and setting priorities for funding resources, and evaluating and setting guidelines for transportation services, including transit service and bridge tolls. Transportation sections of the Presidio draft plan amendment were assembled with the objectives of the regional transportation plan in mind.

San Francisco Bay Regional Water Quality Control Board

This regional board is a permitting authority concerned with surface and ground water quality and stormwater discharges. It also administers the federal Clean Water Act. Water supply and treatment, sewers, and stormwater systems are among the responsibilities of this agency. Infrastructure improvement studies are being undertaken with the assistance of the board.

California Coastal Zone Conservation Commission

The California Coastal Commission's jurisdiction is outside of the Golden Gate. This agency would probably take an interest in any proposed developments that would affect water quality and quantity, sewage treatment, or stormwater discharge as they relate to the Presidio's west coast section.

California Department of Fish and Game

The California Department of Fish and Game (DFG) ensures that fish and wildlife are preserved to be used and enjoyed by the people in the state. They maintain all species of fish and wildlife for their natural and ecological values as well as for their economic benefit to people. The agency provides for recreational, scientific, and educational uses of fish and wildlife. The National Park Service consulted the DFG's natural diversity database during preparation of the Presidio DEIS.

California Department of Toxic Substances

This agency will be involved with the Army's remediation of toxic waste sites throughout the Presidio.

California Department of Transportation (Caltrans)

The Presidio lies in California Department of Transportation District 4. Because two major highways, U.S. 101 and State Route 1, cross the site, the effects on traffic are being assessed in Presidio planning, and communication has begun on potential highway improvements.

California Environmental Protection Agency

This agency represents the state in oversight of hazardous cleanup activities. The Army will have the primarily responsibility for remediation and cooperation with regulatory agencies. The Army's environmental remediation process has begun with California Environmental Protection Agency involvement and is expected to continue.

California Historic Preservation Officer

The California state historic preservation officer coordinates state participation in the implementation of the National Historic Preservation Act. The officer consults with and assists other agencies in identifying historic properties, assessing effects on them, and considering alternatives to avoid or reduce those effects. The state historic preservation officer may assume primary responsibility for reviewing federal undertakings in the state by agreement with the Advisory Council of Historic Preservation.

U.S. Department of the Army

In May 1991 the United States Army released the *Final Environmental Impact Statement: Base Closure of the Presidio of San Francisco*, which analyzed the environmental impacts associated with the closure of the Presidio as an Army base. The Army's ongoing commitment and cooperation will be necessary.

U.S. Army Corps of Engineers

As the federal permitting authority for projects affecting navigable waterways, the U.S. Army Corps of Engineers approves the disposal of dredging materials in San Francisco Bay. The agency would review any wetland reclamation or water ferry actions that were implemented. The agency is also a partner in reshaping the Presidio's infrastructure system. Current and potential projects using innovative technology are being coordinated with the Corps of Engineers.

U.S. Coast Guard

The Coast Guard is part of the emergency response network in the bay and coastal areas and would be involved in any projects affecting navigation (in coordination with the Army Corps of Engineers). The Coast Guard facility has been abandoned at the Presidio, but a helipad remains.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is the federal agency responsible for the conservation, use, understanding, and management of fish and wildlife. Consultation with the agency is required when any federal action could affect a listed endangered or threatened species to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. The National Park Service has consulted with the U.S. Fish and Wildlife Service to obtain a list of the endangered and threatened species that may be present on the Presidio.

Advisory Council on Historic Preservation

The National Historic Preservation Act requires a federal agency to consider the effects of the agency's undertaking on properties included on or eligible for the National Register of Historic Places, to take steps to minimize harm to national historic landmarks that may be adversely affected, and before approval of an undertaking to give the Advisory Council on Historic Preservation a reasonable opportunity to comment on it.

List of Agencies and Organizations to Whom Copies of the Draft Environmental Impact Statement Are Being Sent

Federal Agencies

Department of Agriculture, Regional Office
Department of the Army
- Corps of Engineers, San Francisco District
- Corps of Engineers, South Pacific Division
- Presidio of San Francisco
- Sixth Army Headquarters

Department of Commerce
- National Marine Fisheries Service
- National Oceanic and Atmospheric Administration

Department of Energy, Regional Office
Department of Health and Human Services, Regional Office
Department of Housing and Urban Development, Regional Office
Department of the Interior
- Bureau of Indian Affairs
- Bureau of Land Management, State Office, Sacramento
- Office of Environmental Project Review
- Regional Environmental Officer (Patricia Port)
- U.S. Fish and Wildlife Service, Regional Office

Department of Labor, Regional Office
Department of Transportation
- Coast Guard, 12th Coast Guard District
- Federal Highway Administration, Region Nine
- Federal Transit Administration, Region Nine

Environmental Protection Agency, Region IX
Federal Emergency Management Agency, Regional Office

Federal Advisory Groups

Advisory Council on Historic Preservation
Golden Gate National Recreation Area Citizens Advisory Commission
National Parks Advisory Board

Elected Officials

U.S. Senator Barbara Boxer
U.S. Senator Dale Bumpers
U.S. Senator Robert Byrd
U.S. Senator Dianne Feinstein
U.S. Senator Daniel Inouye
U.S. Senator Bennett Johnson
U.S. Senator Frank H. Murkowski
U.S. Senator Don Nickles
U.S. Senator Ted Stevens
U.S. Senator Malcolm Wallop
U.S. Representative Ron Dellums
U.S. Representative James Hansen
U.S. Representative Tom Lantos
U.S. Representative George Miller
U.S. Representative John Murtha
U.S. Representative Joseph McDade
U.S. Representative Nancy Pelosi
U.S. Representative Ralph Regula
U.S. Representative Bruce Vento
U.S. Representative Lynn Woolsey
U.S. Representative Sidney Yates
U.S. Representative Don Young
State Senator Quentin Kopp
State Senator Milton Marks
State Senator Nicholas C. Petris
State Assemblyperson Tom Bates
State Assemblyperson Vivien Bronshvag
State Assemblyperson Willie Brown
State Assemblyperson John Burton
State Assemblyperson Barbara Lee
State Assemblyperson Jackie Speier
Governor Pete Wilson
Mayor Frank Jordan
San Francisco Board of Supervisors

State Agencies

Coastal Zone Conservation Commission North Central Coast Region
Department of Fish and Game
Department of Health Services
Department of Parks and Recreation Office of the Director
San Francisco Area Manager
Department of Navigation and Ocean Development
Department of Toxic Substances
Department of Transportation
Environmental Protection Agency
San Francisco Bay Regional Water Quality Control Board
San Francisco Bay Conservation and Development Commission
State Historic Preservation Officer
State Clearinghouse
State Coastal Conservancy

Regional, County, and Municipal Agencies

Association of Bay Area Governments
Bay Area Air Quality Management District
Metropolitan Transportation Commission
East Bay Regional Park District
Golden Gate Bridge, Highway, and Transportation District
City and County of San Francisco
- Assessor
- Bicycle Advisory Committee
- Chief Administrative Officer
  - Solid Waste
  - Convention Facilities
- City Attorney's Office
- Fire Department
- Mayor's Office
  - Citizen Representative
  - Office of Community Development
  - Office of Economic Planning and Development
  - Office of Emergency Services
  - Office of Housing
- Parking and Traffic Department
- Planning Commission
- Planning Department
  - Environmental Review Officer
- Police Department
- Public Health Department
  - Director
  - AIDS Office
  - Emergency Medical Services Agency
  - Environmental Health Division
  - Paramedic Division
  - Toxics Division
- Public Utilities Commission
  - Energy Conservation
  - Municipal Railway
  - Water Department
- Public Works Department
  - Bureau of Building Inspection
  - Bureau of Engineering
    - Clean Water Program
    - Landscape Architecture
  - Bureau of Street and Sewer Repair
- Recreation and Parks Department
- Real Estate Department

Organizations

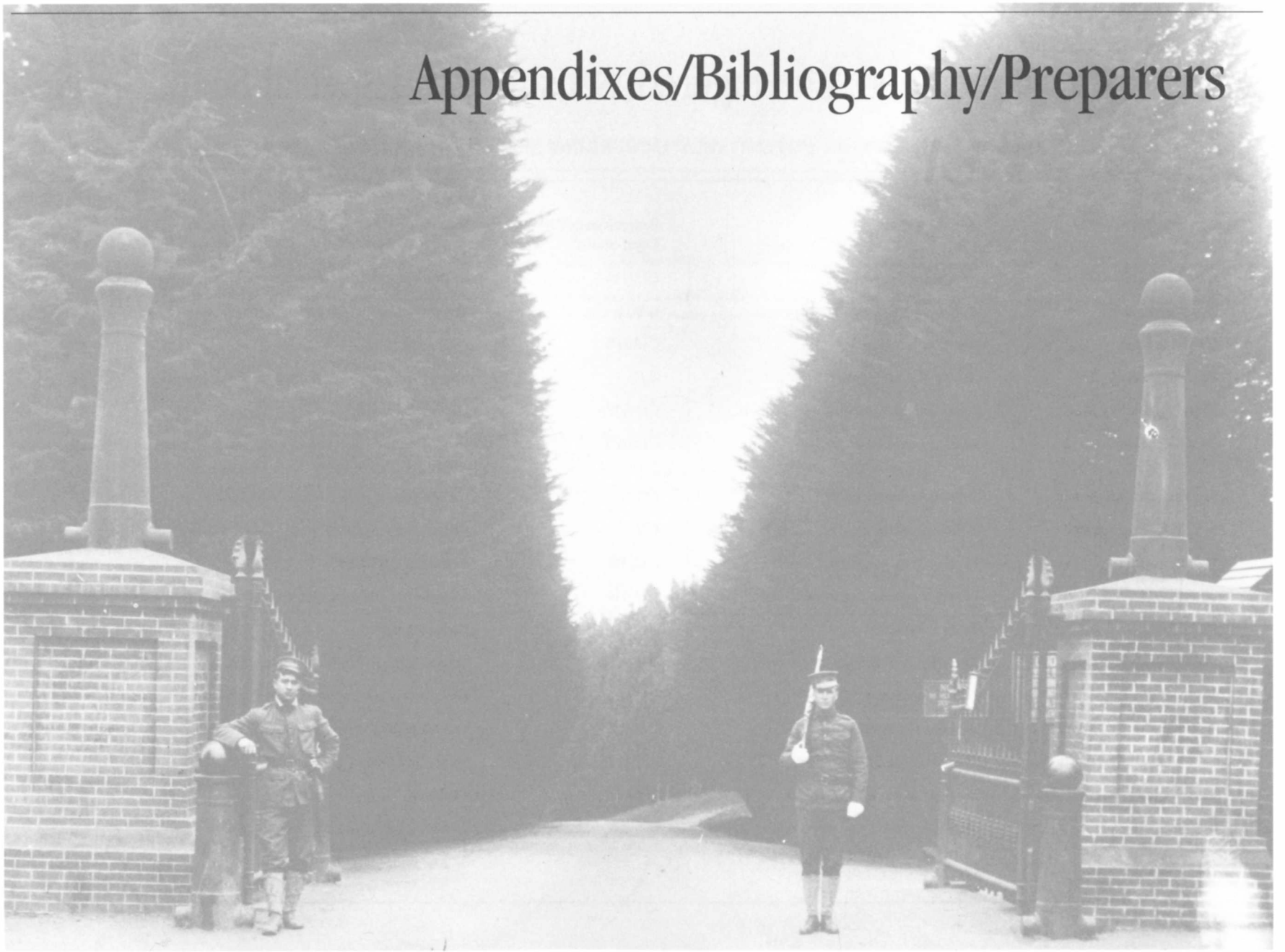
American Institute of Architects, San Francisco Chapter
American Planning Association, Northern California Chapter
American Society of Landscape Architects, San Francisco Chapter
Arms Control Research Center
Audubon Society, Golden Gate Chapter
Audubon Society, Marin Chapter
Bay Area Council
Bay Area Ridge Trail Council
Baykeeper
Cache Creek Rancheria
California Boardsailers Association
California Native Plant Society, Bay Chapter
Citizens for a Better Environment
Coalition of San Francisco Neighborhoods
Cow Hollow Association
Earth Island Institute
Friends of Mountain Lake Park
Friends of the Earth
Golden Gate National Park Association
Greenpeace
Kashaya Pomo Rancheria
Lake Street Residents Association
League of Women Voters
Lincoln Park Neighborhood Association
Marina Civic Improvement and Property Owners Association
Marina Neighborhood Association
Miwok Valley Association
Muwekma-Ohlone Tribe
National Japanese American Historical Society
National Maritime Museum
National Parks and Conservation Association
National Toxics Campaign
Neighborhood Associations for Presidio Planning
Pacific Heights Neighborhood Council
People for a Golden Gate National Recreation Area
Planning Association for the Richmond
Presidio Heights Association of Neighbors
Presidio Terrace Association
Potrero Hill Community Council
San Francisco Chamber of Commerce
San Francisco Planning and Urban Research Association
San Francisco Tomorrow
Sea Cliff Association
Sierra Club
- Bay Chapter, Presidio Task Force
- Legal Defense Fund, Bay Chapter
- National Office

Urban Ecology
Wilderness Society

Libraries

Alameda County Library
Contra Costa County Library
Marin County Library
San Francisco City and County Library
Stanford University Library
University of California at Berkeley Library
University of California at Los Angeles Library
State Library in Sacramento

A summary of the plan and notice of the public comment period will be sent to the GGNRA media mailing list and to the entire Presidio newsletter mailing list.



Appendixes/Bibliography/Preparers

Appendix A: Threatened, Endangered, Sensitive, and Special-Status Species

TABLE A-1: KNOWN OR POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Federal/State/CNPS Legal Status[a]	Habitat
Laurel Hill manzanita	*Arctostaphylos hookeri*	C1**/-/1A	Coastal serpentine scrub
Raven's manzanita[b]	*Arctostaphylos hookeri* var. *ravenii*	E/E/1B	Serpentine chaparral; coastal prairie endemic to the Presidio
Marsh sandwort	*Arendria paludicola*	C1/E/1B	Freshwater marsh
Coast rock cress[b]	*Arabis blepharophylla*	-/-/2	Coastal prairie and scrub; broadleafed upland forest
Point Reyes bird's-beak	*Cordylanthus maritimus ssp. palustris*	C1/-/1B	Coastal salt marsh[d]
Presidio clarkia[b]	*Clarkia franciscana*	C1/E/1B	Coastal scrub; valley and foothill grassland, often on serpentine endemic to the Presidio
San Francisco wallflower	*Erysimum franciscanum*	C2/-/4	Coastal dunes; coastal scrub, often serpentine
San Francisco gumplant[b]	*Grindelia maritima*	C2/-/3	Coastal scrub and bluff scrub; valley and foothill grassland
Marin dwarf flax[b]	*Hesperolinon congestum*	C1/-/1B	Serpentine grassland
Wedge-leaved horkelia	*Horkelia cuncata ssp. sericea*	C2/-/1B	Closed-cone conifer forest; coastal scrub
Beach layla	*Layla carnos*	C1/E/1B	Coastal dunes[d]
San Francisco lessingia[b]	*Lessingia germanorum* var. *germanorum*	C1/E/1B	Coastal scrub endemic to the Presidio
Coast lily	*Lilium maritimum*	C1/-/1B	Closed-cone pine forest; coastal prairie and scrub
San Francisco owl clover[b]	*Orthocarpus floribundus*	C2/-/1B	Coastal prairie; valley and foothill grassland
San Francisco popcorn flower[c]	*Plagiobothrys diffusus*	C2*/E/1A	Valley and foothill grassland
Marina checkerbloom	*Sidalcea hickmanii ssp. viridis*	C2/-/1B	Chaparral
San Francisco campion	*Silene verecunda ssp. verecunda*	C2/-/1B	Coastal scrub; valley and foothill grassland

SOURCE: Jones & Stokes Associates, Inc. 1990a.

TABLE A-1: KNOWN OR POTENTIALLY OCCURRING SPECIAL-STATUS SPECIES, *CONTINUED*

a. Status definitions:

Federal	=	U.S. Fish and Wildlife Service (50 CFR 17.12; 55 FR 6184, February 21, 1990)
E	=	Listed endangered under the federal Endangered Species Act
C1	=	A candidate species under review for federal listing. Category 1 includes species for which the USFWS has substantial information on biological vulnerability and threats to support the appropriateness of proposing to list them as threatened or endangered
C2	=	A candidate species under review for federal listing. Category 2 includes species for which the USFWS presently has some information indicating that proposing to list them as threatened or endangered is warranted but for which further biological research and field study are needed to determine biological vulnerability and threats.
*	=	Possibly extinct
**	=	Believed to be extinct in the wild but extant in cultivation
State	=	California Department of Fish and Game (1987)
E	=	Listed as endangered under the state Endangered Species Act
CNPS	=	California Native Plant Society (Smith and Berg 1988)
1A	=	Presumed extinct in California
1B	=	Considered rare and endangered in California and probably meets state definition for listing as rare, threatened, or endangered
2	=	Considered rare and endangered in California but more common elsewhere
3	=	Suggested for listing, but necessary information is lacking that would allow assignment to one of the other lists or to reject assignment
4	=	Considered rare but not endangered (species that do not presently meet state criteria for listing under the Endangered Species Act)

b. Known occurrence at the Presidio.
c. Last known occurrence at the Presidio (1933).
d. Habitat type not present on portion of Presidio managed by Army.

TABLE A-2: POSSIBLE THREATENED, ENDANGERED, AND SENSITIVE ANIMAL SPECIES

Common Name	Scientific Name	Status	Habitat
Winter-run chinook salmon	*Oncorhynchus tshawytscha*	FT, SE	Lobos Creek surveyed; no fish found
California red-legged frog	*Rana aurora draytoni*	FC1, petitioned for listing as FE or FT, CSC	*Recorded from Mountain Lake; following restoration, Lobos Creek may be suitable, but prefers ponds and lakes
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	FE, SE	Never occurred in San Francisco; requires ponds or marshes with emergent vegetation and red-legged frogs
Southwestern pond turtle	*Clemmys marmorata pallida*	FC1, petitioned for listing as FE or FT, CSC	*Mountain Lake but now extirpated
Brown pelican	*Pelecanus occidentalis*	FE, SE	Occurs along coastal areas of Presidio
Bald eagle	*Haliaeetus leucocephalus*	FE, SE	Migrates through San Francisco and Presidio
Peregrine falcon	*Falco peregrinus*	FE, SE	Migrates through San Francisco and Presidio
Willow flycatcher	*Empidonax trailii*	SE	*Recorded from Lobos Creek
Pacific western big-eared bat	*Plecotus townsendii townsendii*	FC2, CSC	No individuals or colonies recorded; may use buildings temporarily during migration
Greater western mastiff bat	*Eumops perotis californicus*	FC2, CSC	No records; could live on buildings or cliffs temporarily during migration
Mission blue butterfly	*Icaricia icariodes missionensis*	FE	Coastal scrub with populations of *Lupinus albifrons, L. varicolor* (both known from the Presidio), and *L. formosus*
San Francisco fork-tailed damselfy	*Ischnura gemina*	FC2	Not found on Lobos Creek survey
Globose dune beetle	*Coelus globosus*	FC2	Dunes and sandy areas such as Crissy Field, Baker Beach
Ricksecker's water scavenger beetle	*Hydrochara rickseckeri*	FC2	Riparian areas such as Lobos Creek
Bumblebee scarab beetle	*Lichnanthe ursina*	FC2	Dunes and sandy areas such as Crissy Field, Baker Beach

TABLE A-2: POSSIBLE THREATENED, ENDANGERED, AND SENSITIVE ANIMAL SPECIES, *CONTINUED*

*Species marked with an asterisk have been recorded from the Presidio. For the other species, the habitat entry describes areas or habitats that should be searched for these species.

Status Definitions:

Federal

FE: Listed as endangered under the federal Endangered Species Act.

FT: Listed as threatened under the federal Endangered Species Act.

FC1: A candidate species under review for listing as endangered or threatened. Category 1 species are those for which the USFWS has enough substantial information on biological vulnerability and threat(s) to support a proposal to list a species. Development and publication of the proposed rule is anticipated.

FC2: A candidate species for which there is some evidence of vulnerability but for which there are not enough data to support a listing proposal at this time. USFWS has some information indicating that a listing proposal is warranted but for which further biological research and field study are needed to determine biological vulnerability and threats.

Petitioned for listing: The USFWS has received a petition for listing a species as threatened or endangered. The petition has been found to present substantial information indicating the requested action may be warranted. The USFWS has commenced a formal review of the species' status. Species petitioned for listing do not benefit from greater protection under the Endangered Species Act but should be considered more sensitive as the status may change.

State

SE: Listed as endangered under the California Endangered Species Act.

CSC: Considered by the California Department of Fish and Game to be a species of special concern. These species fall into one or more of the following categories: species that are biologically rare, very restricted in distribution, or declining throughout their range; populations in California that may be peripheral to the major portion of the species' range but which are threatened with extirpation in California; species closely associated with a habitat that is declining in California at an alarming rate.

Appendix B: Proposed Treatment of National Historic Landmark Structures

This appendix contains a list of historic structures that contribute to the significance of the Presidio as a national historic landmark, along with the proposed treatments for future management of each building under each alternative.

A comprehensive listing of all contributing and noncontributing buildings, structures, and features can be found in the "National Historic Landmark Update" of April 1993.



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Presidio Building Numbers

Presidio of San Francisco • Golden Gate National Recreation Area • United States Department of the Interior • National Park Service

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TABLE B-1: PRESIDIO OF SAN FRANCISCO
TREATMENTS PROPOSED FOR HISTORIC BUILDINGS
ACCORDING TO EACH ALTERNATIVE

		Treatment by Alternative			
Number	**Structure Name**	**A**	**B**	**C**	**D**
1	Commanding general's quarters	RH	RH	RH	RH
2	Post hospital/army museum	RH	RH	RH	RH
3	Temporary barracks	RH	RH	RH	RH
4	Officers' quarters, officer family housing	RH	RH	RH	RH
5	Officers' quarters, officer family housing	RH	RH	RH	RH
6	Officers' quarters, officer family housing	RH	RH	RH	RH
7	Officers' quarters, officer family housing	RH	RH	RH	RH
8	Officers' quarters, officer family housing	RH	RH	RH	RH
9	Officers' quarters, officer family housing	RH	RH	RH	RH
10	Officers' quarters, officer family housing	RH	RH	RH	RH
11	Officers' quarters, officer family housing	RR	RH	RR	RR
12	Officer family housing	RH	RH	RH	RH
13	Officers' quarters, officer family housing	RH	RH	RH	RH
14	Officers' quarters, officer family housing	RH	RH	RH	RH
15	Officers' quarters, officer family housing	RH	RH	RH	RH
16	Officers' quarters, officer family housing	RH	RH	RH	RH
35	Enlisted men's barracks with mess hall	RH	RH	RH	RH
36	Artillery barracks/Military Police office	RH	RH	RH	RH
37	Administration building, now pao/cpo civilian personnel bldg.	RH	RH	RH	RH
38	Enlisted men's barracks with mess hall	RH	RH	RH	RH
39	Enlisted men's barracks with mess hall	RH	RH	RH	RH
40	Bachelor officers' quarters	RH	RH	RH	RH
41	Bachelor officers' quarters	RH	RH	RH	RH
42	Pershing Hall	RH	RH	RH	RH
44	Four-vehicle garage	ST	ST	ST	ST
45	Chapel of Our Lady, post chapel	RH	RH	RR	RH
46	Storage shed	ST	ST	ST	ST
47	Six-vehicle garage	ST	ST	ST	ST
48	Six-vehicle garage	ST	ST	ST	ST
49	Officer's family housing	RH	RH	RH	RH
50	Officers' club, Commandancia	RH	RH	RH	RH
51	Officers' quarters, officer family housing	RH	RH	RH	RH

NO = not included within park boundary; RH = rehabilitate; RM = remove;
RR = restore to a historic time period; ST = stabilize and preserve in existing form.

Number	Structure Name	Treatment by Alternative A	B	C	D
53	Water pressure reducing station	ST	ST	ST	ST
56	Officers' quarters, officer family housing	RR	RH	RR	RH
57	Officers' quarters, officer family housing	RH	RH	RH	RH
58	Officers' quarters, officer family housing	RH	RH	RH	RH
59	Officers' quarters, officer family housing	RH	RH	RH	RH
64	Officers' quarters, officer family housing	RH	RH	RH	RH
65	Officers' quarters, officer family housing	RH	RH	RH	RH
67	Main telephone exchange	RH	RH	RH	RH
85	Lavatory, latrine	RH	RH	RH	RH
86	Wagon shop; enlisted men's barracks with mess	RH	RH	RH	RH
87	Quartermaster; enlisted men's barracks with mess	RH	RH	RH	RH
95	Ammunition magazine	RH	RH	RH	RH
97	Red Cross building	RH	RH	RH	RH
99	WPA theater	RH	RH	RH	RH
100	Enlisted men's barracks with mess hall	RH	RH	RH	RH
101	Enlisted men's barracks with mess hall	RH	RH	RH	RH
102	Enlisted men's barracks with mess hall	RH	RH	RH	RH
103	Enlisted men's barracks with mess hall	RH	RH	RH	RH
104	Enlisted men's barracks with mess hall	RH	RH	RH	RH
105	Enlisted men's barracks with mess hall	RH	RH	RH	RH
106	Band barracks	RH	RH	RH	RH
107	Switching station	RH	RH	RH	RH
108	Storage, electric shop	RH	RH	RH	RH
113	Five-vehicle garage	RM	ST	RM	RM
116	Post trader, sutler's house	RH	RH	RR	RH
118	General purpose storage shed, five-vehicle garage	RM	ST	RM	RM
122	Gymnasium	RH	RH	RH	RH
123	Garage	ST	ST	ST	ST
124	Enlisted family quarters	RH	RH	RH	RH
125	Enlisted family quarters	RH	RH	RH	RH
126	Enlisted family housing	RH	RH	RH	RH
127	Enlisted family housing	RH	RH	RH	RH
128	Enlisted family housing	RH	RH	RH	RH
129	Enlisted family housing	RH	RH	RH	RH
130	Chapel	RH	RH	RH	RH
135	Service club E.M. (later NCO club)	RH	RH	RH	RH
150	S.F. National Military Cemetery admin. building; mortuary C.H.P	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative A	B	C	D
151	Cemetery Lodge, San Francisco National Military Cemetery	RH	RH	RH	RH
152	Restroom, San Francisco National Military Cemetery	RH	RH	RH	RH
153	Garage, San Francisco National Military Cemetery	RH	RH	RH	RH
154	Service maintenance shed	RH	RH	RH	RH
201	Exchange store and administration	RH	RH	RH	RH
204	Exchange store and administration (thrift shop)	RH	RH	RH	RH
210	Guardhouse (bank and post office)	RH	RH	RH	RH
218	Fire station	RH	RH	RR	RH
220	Baker's and cook's school; barracks with mess	RH	RH	RH	RH
222	Warehouse (military courtroom)	RH	RH	RH	RH
223	Warehouse (post headquarters)	RH	RH	RH	RH
224	Flammable materials storage	ST	ST	ST	ST
225	Storehouse	RH	RH	RH	RH
227	Warehouse (general purpose administration)	RH	RH	RH	RH
228	Bakery (now exchange laundry)	RH	RH	RH	RH
229	Bakery	RH	RH	RH	RH
230	Warehouse	RH	RH	RH	RH
274	WWII temporary storeroom and orderly room	RM	RH	RM	RM
275	WWII temporary mess hall	RM	RH	RM	RM
277	WWII temporary rec hall, NPS Presidio planning office	RM	RH	RM	RM
280	Engineering administration building	RM	RH	RM	RM
282	Shop	RM	RH	RM	RM
283	Warehouse (DEH offices)	RM	RH	RM	RM
284	Electric shop, maintenance shop	RM	RH	RM	RM
285	Paint and sign shops, maintenance shop	RM	RH	RM	RM
288	Maintenance shop, carpenter shop	RM	RH	RM	RM
310	Valve house	ST	ST	ST	ST
311	Pumphouse	ST	ST	ST	ST
312	Radio receiving station and school	RH	RH	RH	RH
314	Mars station	RH	RH	RH	RH
315	Water pumphouse (city pump)	ST	ST	ST	ST
316	Water pump, nonpotable	ST	ST	ST	ST
325	30th infantry officers' quarters	RH	RH	RH	RH
326	30th infantry officers' quarters	RH	RH	RH	RH
327	30th infantry officers' quarters	RH	RH	RH	RH
328	30th infantry officers' quarters	RH	RH	RH	RH
329	30th infantry officers' quarters	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative A	B	C	D
330	30th infantry officers' quarters	RH	RH	RH	RH
331	30th infantry officers' quarters	RH	RH	RH	RH
332	30th infantry officers' quarters	RH	RH	RH	RH
333	30th infantry officers' quarters	RH	RH	RH	RH
334	30th infantry officers' quarters	RH	RH	RH	RH
335	30th infantry officers' quarters	RH	RH	RH	RH
336	30th infantry officers' quarters	RH	RH	RH	RH
337	30th infantry officers' quarters	RH	RH	RH	RH
338	30th infantry officers' quarters	RH	RH	RH	RH
339	30th infantry officers' quarters	RH	RH	RH	RH
340	30th infantry officers' quarters	RH	RH	RH	RH
341	30th infantry officers' quarters	RH	RH	RH	RH
342	30th infantry officers' quarters	RH	RH	RH	RH
343	30th infantry officers' quarters	RH	RH	RH	RH
344	30th infantry officers' quarters	RH	RH	RH	RH
345	30th infantry officers' quarters	RH	RH	RH	RH
375	Detached garage	ST	ST	ST	ST
376	Detached garage	ST	ST	ST	ST
377	Detached garage	ST	ST	ST	ST
378	Detached garage	ST	ST	ST	ST
379	Detached garage	ST	ST	ST	ST
380	Detached garage	ST	ST	ST	ST
381	Detached garage	ST	ST	ST	ST
382	Detached garage	ST	ST	ST	ST
383	Detached garage	ST	ST	ST	ST
510	Officer family housing	RH	RH	RH	RH
511	Officer family housing	RH	RH	RH	RH
512	Officer family housing	RH	RH	RH	RH
513	Officer family housing	RH	RH	RH	RH
514	Officer family housing	RH	RH	RH	RH
517	Detached garage	ST	ST	ST	ST
530	Officer family housing	RH	RH	RH	RH
531	Officer family housing	RH	RH	RH	RH
532	Officer family housing	RH	RH	RH	RH
533	Officer family housing	RH	RH	RH	RH
534	Officer family housing	RH	RH	RH	RH
535	Officer family housing	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative			
		A	B	C	D
536	Officer family housing	RH	RH	RH	RH
537	Officer family housing	RH	RH	RH	RH
538	Officer family housing	RH	RH	RH	RH
539	Officer family housing	RH	RH	RH	RH
540	Officer family housing	RH	RH	RH	RH
541	Officer family housing	RH	RH	RH	RH
542	Officer family housing	RH	RH	RH	RH
543	Officer family housing	RH	RH	RH	RH
544	Officer family housing	RH	RH	RH	RH
545	Officer family housing	RH	RH	RH	RH
546	Officer family housing	RH	RH	RH	RH
547	Officer family housing	RH	RH	RH	RH
548	Officer family housing	RH	RH	RH	RH
549	Officer family housing	RH	RH	RH	RH
550	Officer family housing	RH	RH	RH	RH
551	Officer family housing	RH	RH	RH	RH
552	Detached garage	ST	ST	ST	ST
553	Detached garage	ST	ST	ST	ST
554	Detached garage	ST	ST	ST	ST
555	Detached garage	ST	ST	ST	ST
556	Detached garage	ST	ST	ST	ST
557	Detached garage	ST	ST	ST	ST
558	Post exchange and restaurant	RH	RH	RH	RH
559	Comfort station, public toilet	ST	ST	ST	ST
563	Enlisted men's barracks	RH	RH	RH	RH
565	Electric substation	ST	ST	ST	ST
567	Enlisted men's barracks	RH	RH	RH	RH
569	Enlisted men's barracks	RH	RH	RH	RH
572	Enlisted men's barracks	RH	RH	RH	RH
603	Commissary (photo lab, graphics, television)	RH	RH	RH	RH
631	Ammunition magazine	ST	ST	ST	ST
632	Ammunition magazine	ST	ST	ST	ST
633	Ammunition magazine	ST	ST	ST	ST
635	Battery Blaney	ST	ST	ST	ST
636	Battery Sherwood	ST	ST	ST	ST
640	Hangar (warehouse)	RH	RH	RH	RH
641	Latrine, AC trainer building	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative A	B	C	D
643	Aircraft hangar	RH	RH	RH	RH
650	Stillwell Hall, enlisted barracks with mess	RH	RH	RH	RH
651	Administration building	RH	RH	RH	RH
652	Transformer vault	ST	ST	ST	ST
654	Guardhouse	RH	RH	RH	RH
661	Stable for 102 animals	RR	RH	RR	RH
662	Stable for 102 animals	RH	RH	RH	RH
663	Stable for 102 animals	RH	RH	RH	RH
667	Stable for 102 animals	RH	RH	RH	RH
668	Stables for veterinary hospital	RH	RH	RH	RH
669	Animal crematory — post incinerator	RH	RH	RH	RH
670	Cable house (chemical storehouse)	ST	ST	ST	ST
671	Flammable materials storage	ST	ST	ST	ST
680	Electrical substation	RH	RH	RH	RH
681	Barracks	RH	RH	RH	RH
682	Religious activities center	RH	RH	RH	RH
683	Day room	RH	RH	RH	RH
705	Detached four-vehicle garage	ST	ST	ST	ST
715	Enlisted family housing	RH	RH	RH	RH
716	Enlisted family housing	RH	RH	RH	RH
717	Enlisted family housing	RH	RH	RH	RH
718	Enlisted family housing	RH	RH	RH	RH
719	Enlisted family housing	RH	RH	RH	RH
720	Enlisted family housing	RH	RH	RH	RH
721	Enlisted family housing	RH	RH	RH	RH
722	Enlisted family housing	RH	RH	RH	RH
723	Enlisted family housing	RH	RH	RH	RH
724	Enlisted family housing	RH	RH	RH	RH
725	Enlisted family housing	RH	RH	RH	RH
726	Enlisted family housing	RH	RH	RH	RH
727	Enlisted family housing	RH	RH	RH	RH
728	Enlisted family housing	RH	RH	RH	RH
729	Enlisted family housing	RH	RH	RH	RH
730	Enlisted family housing	RH	RH	RH	RH
731	Enlisted family housing	RH	RH	RH	RH
732	Enlisted family housing	RH	RH	RH	RH
733	Enlisted family housing	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative			
		A	B	C	D
734	Detached garage	ST	ST	ST	ST
735	Detached garage	ST	ST	ST	ST
736	Detached garage	ST	ST	ST	ST
737	Detached garage	ST	ST	ST	ST
742	Enlisted family housing	RH	RH	RH	RH
743	Enlisted family housing	RH	RH	RH	RH
744	NCO housing	RH	RH	RH	RH
745	Enlisted family housing	RH	RH	RH	RH
746	Enlisted family housing	RH	RH	RH	RH
747	Enlisted family housing	RH	RH	RH	RH
748	Enlisted family housing	RH	RH	RH	RH
749	Enlisted family housing	RH	RH	RH	RH
750	Enlisted family housing	RH	RH	RH	RH
751	Enlisted family housing	RH	RH	RH	RH
752	Enlisted family housing	RH	RH	RH	RH
753	Enlisted family housing	RH	RH	RH	RH
754	Enlisted family housing	RH	RH	RH	RH
755	Enlisted family housing	RH	RH	RH	RH
756	Enlisted family housing	RH	RH	RH	RH
757	Enlisted family housing	RH	RH	RH	RH
758	Enlisted family housing	RH	RH	RH	RH
759	Enlisted family housing	RH	RH	RH	RH
760	Enlisted family housing	RH	RH	RH	RH
761	Detached six-vehicle garage	ST	ST	ST	ST
762	Detached five-vehicle garage	ST	ST	ST	ST
763	Detached four-vehicle garage	ST	ST	ST	ST
901	Temporary warehouse, general purpose warehouse	RM	RH	RM	RM
902	WWII structure, two-story barracks	RM	RH	RM	RM
903	WWII structure, two-story barracks	RM	RH	RM	RM
904	WWII structure, one-story dayroom, administration building	RM	RH	RM	RM
905	WWII structure, two-story barracks	RM	RH	RM	RM
906	WWII structure, two-story barracks	RM	ST	RM	RM
907	WWII structure, one-story dayroom, Army reserve center hosp.	RM	RH	RM	RM
908	WWII structure, one-story admin. general purpose	RM	RH	RM	RM
909	WWII structure, two-story barracks	RM	RH	RM	RM
910	WWII structure, two-story barracks	RM	RH	RM	RM
911	WWII structure, one-story dayroom, administration building	RM	RH	RM	RM

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		Treatment by Alternative			
Number	Structure Name	A	B	C	D
912	WWII structure, one-story post restaurant	RM	RH	RM	RM
913	WWII structure, two-story barracks, supply service administration	RM	RH	RM	RM
914	WWII structure, two-story barracks, supply service administration	RM	RH	RM	RM
915	WWII structure, one-story dayroom, Army reserve center	RM	RH	RM	RM
916	WWII structure, one-story army reserve center	RM	RH	RM	RM
917	WWII structure, two-story barracks, TC administration building	RM	RH	RM	RM
918	WWII structure, two-story barracks, admin., general purpose	RM	RH	RM	RM
919	WWII structure, one-story dayroom	RM	RH	RM	RM
920	Parachute shop, motor repair shop	RH	RH	RH	RH
922	Transformer vault	ST	ST	ST	ST
923	Transformer vault	ST	ST	ST	ST
926	Vehicle maintenance shop, hangar	RH	RH	RH	RH
929	Gas pumphouse, compressed air plant	ST	ST	ST	ST
931	Armourer's building, flammable materials storage	ST	ST	ST	ST
933	Dope shop and boiler hses, storehouse for spare parts	RH	RH	RH	RH
934	Motor test building	RH	RH	RH	RH
935	Aero storehouse	RH	RH	RH	RH
936	Transformer vault	ST	ST	ST	ST
937	Hangar	RH	RH	RH	RH
946	Signal cable hut, cable house	ST	ST	ST	ST
949	Storage shed, hazardous waste, vehicle storage	RM	RH	RM	RM
950	Storage shed, hazardous waste, vehicle storage	RM	RH	RM	RM
951	Scott Hall — bachelor officers' quarters	RH	RH	RH	RH
952	Officers' family housing (pilots)	RH	RH	RH	RH
953	Officers' family housing (pilots)	RH	RH	RH	RH
954	Officers' family housing (pilots)	RH	RH	RH	RH
955	Officers' family housing (pilots)	RH	RH	RH	RH
956	Officers' family housing (pilots)	RH	RH	RH	RH
957	Officers' family housing (pilots)	RH	RH	RH	RH
958	Officers' family housing (pilots)	RH	RH	RH	RH
959	Officers' family housing (pilots)	RH	RH	RH	RH
960	Officers' family housing (pilots)	RH	RH	RH	RH
961	Officers' family housing (pilots)	RH	RH	RH	RH
962	Officers' family housing (pilots)	RH	RH	RH	RH
963	Officers' family housing (pilots)	RH	RH	RH	RH
964	Officers' family housing (pilots)	RH	RH	RH	RH
966	Radio receiving station (now officers' family housing)	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative A	B	C	D
967	Detached storage building	ST	ST	ST	ST
968	Garage	ST	RH	ST	ST
969	Garage	ST	RH	ST	ST
973	Garage, vehicle storage	RM	RH	RM	RM
974	Garage, vehicle storage	RM	RH	RM	RM
983	Warehouse	RH	RH	RH	RH
985	Mine loading house	RH	RH	RH	RH
986	Mine loading house	RH	RH	RH	RH
988	Guard station	RH	RH	RH	RH
989	Plumbing shop/Ft. Point NPS hdqrs. info office/Ft. Point museum	RH	RH	RH	RH
990	Flammable materials storage	ST	ST	ST	ST
998	Battery Lancaster	ST	ST	ST	ST
999	Fort Point National Historic Site	ST	ST	ST	ST
1000	Officers' quarters, officer family housing	RH	RH	RH	RH
1001	Officers' quarters, officer family housing	RH	RH	RH	RH
1002	Officers' quarters, officer family housing	RH	RH	RH	RH
1003	Officers' quarters, officer family housing	RH	RH	RH	RH
1004	Officers' quarters, officer family housing	RH	RH	RH	RH
1006	Bacteriology laboratory (morgue)	RM	ST	RM	RM
1007	Enlisted women's barracks — Letterman	RH	RH	RH	RH
1008	Ward, 76 beds — LAMC	RH	RH	RH	RH
1009	Ward, 80 beds — LAMC	RH	RH	RH	RH
1012	Ward, Letterman General Hospital	RH	RH	RH	RH
1013	Ward, 22 beds — receiving office, LAMC	RH	RH	RH	RH
1014	Outpatient clinic — Letterman	RH	RH	RH	RH
1016	Administration building, LAMC	RH	RH	RH	RH
1040	Powerhouse and steam plant	RH	RH	RH	RH
1047	Laundry	RH	RH	RH	RH
1049	Ward, 20 beds; post bakery	RM	RH	RM	RM
1050	Ward, 80 beds — psychiatric ward	RH	RH	RH	RH
1051	Detention ward	RH	RH	RH	RH
1055	Seven-vehicle garage	ST	ST	ST	ST
1056	Animal house, animal hospital	RH	RH	RH	RH
1059	Storage for combustibles	RH	RH	RH	RH
1060	Medical and surgical warehouse/administration building	RH	RH	RH	RH
1061	Acid storage	ST	ST	ST	ST
1062	Quartermaster shops, medical supply warehouse	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative A	B	C	D
1063	Medical supply warehouse	RH	RH	RH	RH
1065	Post exchange; service station, FE maintenance shop	RH	RH	RH	RH
1076	LAMC garage (garage)	ST	ST	ST	ST
1151	Indoor swimming pool	RH	RH	RH	RH
1152	Gymnasium	RH	RH	RH	RH
1160	Warehouse	RH	RH	RH	RH
1161	Storage warehouse	RH	RH	RH	RH
1162	Warehouse	RH	RH	RH	RH
1163	Warehouse	RH	RH	RH	RH
1167	Warehouse (Gorgas Avenue)	RH	RH	RH	RH
1168	Acid storage, flammable material storage	ST	ST	ST	ST
1169	Warehouse	RH	RH	RH	RH
1170	Warehouse	RH	RH	RH	RH
1182	Warehouse	RH	RH	RH	RH
1183	Warehouse	RH	RH	RH	RH
1184	Storage warehouse	RH	RH	RH	RH
1185	Warehouse	RH	RH	RH	RH
1186	Storage warehouse	RH	RH	RH	RH
1187	Commissary (warehouse)	RH	RH	RH	RH
1188	Storage warehouse	RH	RH	RH	RH
1201	Fort Winfield Scott headquarters	RH	RH	RH	RH
1202	Enlisted men's barracks	RH	RH	RH	RH
1203	Enlisted men's barracks	RH	RH	RH	RH
1204	Enlisted men's barracks	RH	RH	RH	RH
1205	Enlisted men's barracks	RH	RH	RH	RH
1206	Enlisted men's barracks	RH	RH	RH	RH
1207	Enlisted men's barracks	RH	RH	RH	RH
1208	Enlisted men's barracks	RH	RH	RH	RH
1213	Post stockade	RH	RH	RH	RH
1214	Artillery band barracks, general purpose headquarters	RH	RH	RH	RH
1216	Enlisted men's barracks with mess	RH	RH	RH	RH
1217	Enlisted men's barracks with mess	RH	RH	RH	RH
1218	Enlisted men's barracks with mess	RH	RH	RH	RH
1219	Quartermaster's storehouse, warehouse	RH	RH	RH	RH
1220	Quartermaster's office	RH	RH	RH	RH
1221	Storage shed, vehicle maintenance shop	RH	RH	RH	RH
1221A	Storage shed	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative A	B	C	D
1224	Infirmary, general purpose headquarters building	RH	RH	RH	RH
1225	Post exchange storehouse	RH	RH	RH	RH
1226	Post exchange assembly hall/gymnasium	RH	RH	RH	RH
1227	Quartermaster's shop; print shop; self-help center	RH	RH	RH	RH
1230	Warehouse	RH	RH	RH	RH
1231	Blacksmith shop	RH	RH	RH	RH
1233	Storehouse, storage shed	RH	RH	RH	RH
1237	Post office	RH	RH	RH	RH
1239	Offices, general purpose headquarters	RH	RH	RH	RH
1240	Enlisted family housing	RH	RH	RH	RH
1241	Post exchange utility warehouse	RH	RH	RH	RH
1242	Quartermaster's warehouse	RH	RH	RH	RH
1243	Quartermaster's warehouse	RH	RH	RH	RH
1245	Storage shed for flammable materials	ST	ST	ST	ST
1246	Detached four-vehicle garage	ST	ST	ST	ST
1247	Detached four-vehicle garage	ST	ST	ST	ST
1248	Detached four-vehicle garage	ST	ST	ST	ST
1250	Detached garage	ST	ST	ST	ST
1261	Enlisted family housing	RH	RH	RH	RH
1262	Enlisted family housing	RH	RH	RH	RH
1263	Enlisted family housing	RH	RH	RH	RH
1265	Enlisted family housing	RH	RH	RH	RH
1266	NCO housing	RH	RH	RH	RH
1268	Enlisted family housing	RH	RH	RH	RH
1270	NCO housing	RH	RH	RH	RH
1272	Enlisted family housing	RH	RH	RH	RH
1273	Enlisted family housing	RH	RH	RH	RH
1274	Enlisted family housing	RH	RH	RH	RH
1275	Enlisted family housing	RH	RH	RH	RH
1276	Enlisted family housing	RH	RH	RH	RH
1277	Enlisted family housing	RH	RH	RH	RH
1283	Fire control Battery Wagner	ST	ST	ST	ST
1285	Garage	ST	ST	ST	ST
1287	Battery Howe-Wagner	RR	ST	RR	RR
1289	Enlisted family housing	RH	RH	RH	RH
1290	Enlisted family housing	RH	RH	RH	RH
1291	Family housing	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative A	B	C	D
1293	Enlisted family housing	RH	RH	RH	RH
1294	Enlisted family housing	RH	RH	RH	RH
1295	Enlisted family housing	RH	RH	RH	RH
1297	Enlisted family housing	RH	RH	RH	RH
1298	Enlisted family housing	RH	RH	RH	RH
1299	Noncommissioned officers' club; NCO open mess/community ctr.	RH	RH	RH	RH
1300	Officers' quarters, officer family housing	RH	RH	RH	RH
1301	Detached one-vehicle garage	ST	ST	ST	ST
1302	Officer family housing	RH	RH	RH	RH
1303	Detached one-vehicle garage	ST	ST	ST	ST
1304	Officers' quarters, officer family housing	RH	RH	RH	RH
1305	Detached two-vehicle garage	ST	ST	ST	ST
1307	Detached two-vehicle garage	ST	ST	ST	ST
1308	Officers' quarters, officer family housing	RH	RH	RH	RH
1309	Detached four-vehicle garage	ST	ST	ST	ST
1310	Officers' quarters, officer family housing	RH	RH	RH	RH
1311	Detached two-vehicle garage	ST	ST	ST	ST
1313	Detached garage	ST	ST	ST	ST
1314	Officers' quarters, officer family housing	RH	RH	RH	RH
1315	Detached garage	ST	ST	ST	ST
1317	Detached garage	ST	ST	ST	ST
1319	Detached garage	ST	ST	ST	ST
1320	Officers' quarters, officer family housing	RH	RH	RH	RH
1321	Detached one-vehicle garage	ST	ST	ST	ST
1322	Officer family housing	RH	RH	RH	RH
1323	Detached garage	ST	ST	ST	ST
1324	Officers' quarters, officer family housing	RH	RH	RH	RH
1326	Officers' quarters, officer family housing	RH	RH	RH	RH
1327	Detached one-vehicle garage	ST	ST	ST	ST
1328	Officers' quarters, officer family housing	RH	RH	RH	RH
1330	Bachelor officer quarters (Barnard Hall)	RH	RH	RH	RH
1331	Officer's recreation center — Fort Scott	RH	RH	RH	RH
1332	Officer family housing	RH	RH	RH	RH
1334	Officer family housing	RH	RH	RH	RH
1335	Detached garage	ST	ST	ST	ST
1337	Officer family housing	RH	RH	RH	RH
1338	Flammable materials storage	RH	RH	RH	RH

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Number	Structure Name	Treatment by Alternative			
		A	B	C	D
1339	Ordnance repair shop	RH	RH	RH	RH
1340	Ordnance storage	RH	RH	RH	RH
1325	Detached garage	ST	ST	ST	ST
1344	Command fire control station	ST	ST	ST	ST
1347	WWII bachelor officers' quarters; enlisted quarters	RH	RH	RH	RH
1353	Searchlight repair shop, small arms repair shop	RH	RH	RH	RH
1354	Battery Saffold	ST	ST	ST	ST
1355	Ordnance repair shop/radar maintenance shop	RH	RH	RH	RH
1359	Compressed air plant	ST	ST	ST	ST
1363	Ordnance shop	RH	RH	RH	RH
1365	Machine shop storage shed	RH	RH	RH	RH
1369	Indoor shooting/firing range	RH	RH	RH	RH
1387	War Department theater, cafeteria/bowling center	RM	RH	RM	RM
1389	Post chapel	RH	RH	RH	RH
1390	Religious educational facility (nursery)	RH	RH	RH	RH
1398	Coast artillery/Battery Dynamite powerhouse	RH	ST	RH	RH
1399	Battery Dynamite	ST	ST	ST	ST
1430	Battery McKinnon-Stotsenberg	RR	ST	RR	RR
1444	Radio station, transmitter	ST	ST	ST	ST
1450	Radio transmitter warhead supply shop	RH	RH	RH	RH
1451	Generator building, power plant	RH	RH	RH	RH
1470	Central magazine	ST	ST	ST	ST
1471	Central magazine	ST	ST	ST	ST
1600	Old mine casement	ST	ST	ST	ST
1601	New mine casement	ST	ST	ST	ST
1621	Battery Chamberlin	ST	ST	ST	ST
1622	Fire control, Battery Chamberlin	ST	ST	ST	ST
1630	Battery Crosby	ST	ST	ST	ST
1640	Magazine, Battery West	ST	ST	ST	ST
1643	Magazine, Battery West	ST	ST	ST	ST
1644	Radio hut, old fire control station	ST	ST	ST	ST
1646	Magazine, Battery Godfrey	ST	ST	ST	ST
1647	Battery Godfrey	ST	ST	ST	ST
1651	Battery Boutelle	ST	ST	ST	ST
1658	Battery Marcus Miller (south)	ST	ST	ST	ST
1659	Ordnance storehouse	RH	RH	RH	RH
1660	Battery Marcus Miller	ST	ST	ST	ST

NO = not included within park boundary; RH = rehabilitate; RM = remove;
RR = restore to a historic time period; ST = stabilize and preserve in existing form.

Number	Structure Name	Treatment by Alternative A	B	C	D
1661	Battery Cranston	ST	ST	ST	ST
1662	Fire control station	ST	ST	ST	ST
1663	Fire control station	ST	ST	ST	ST
1664	Fire control station	ST	ST	ST	ST
1665	Searchlight shelter	ST	ST	ST	ST
1771	Water valve house	ST	ST	ST	ST
1773	Water filtration plant	RH	RH	RH	RH
1776	Water treatment plant	ST	ST	ST	ST
1779	Water treatment plant	ST	ST	ST	ST
1781	Civilian family housing	RH	RH	RH	RH
1801	Hospital wards, public health hospital	RH	NO	NO	RH
1802	Engineering maintenance shop	RH	NO	NO	RH
1805	Recreation center	RH	NO	NO	RH
1806	Senior enlisted quarters	RH	NO	NO	RH
1807	Senior enlisted quarters	RH	NO	NO	RH
1808	Nurses' quarters	RH	NO	NO	RH
1809	Officer family housing	RH	NO	NO	RH
1810	Officer family housing	RH	NO	NO	RH
1811	Officer family housing	RH	NO	NO	RH
1812	Officer family housing	RH	NO	NO	RH
1813	Officer family housing	RH	NO	NO	RH
1814	Officer family housing	RH	NO	NO	RH
1815	Officer family housing	RH	NO	NO	RH
1818	Laboratories	RH	NO	NO	RH
1819	Laboratories	RH	NO	NO	RH
1828	Transformer/meter house	ST	NO	NO	ST
1901	Family housing	RH	RH	RH	RH
1902	Storage	RH	RH	RH	RH
1903	Dormitory	RH	RH	RH	RH
1905	U.S. Coast Guard boathouse	RH	RH	RH	RH
1906	Automatic tide gage	ST	ST	ST	ST
1907	U.S. Coast Guard garage	RH	RH	RH	RH
Total number of buildings					510
Total square footage					3,682,501

NO = not included within park boundary; RH = rehabilitate; RM = remove;
RR = restore to a historic time period; ST = stabilize and preserve in existing form.

Appendix C: Methodologies Used in Impact Analysis

Regional Economy and Employment

A number of assumptions underlie the projections of effects on the regional economy and employment for each alternative, as described in the "Presidio Revenue Generation Model" appendix to *Presidio Planning Socioeconomic Analysis Technical Report*, Jones & Jones,Inc., 1993.

Estimates of Direct Employment and Payroll

Employment. The first step in estimating future employment levels at the Presidio was to determine the different types of uses that would likely generate jobs and the total building space available for those uses. The seven selected use categories are described below.

The *dormitory* category includes building space that would be used for short- and long-term lodging for park visitors and staff. The employment generated by this use would be primarily housekeeping jobs.

The *industrial* category includes various types of buildings that were formerly used by the Army as machine and repair shops. Future uses of these buildings might include job skills training centers, building rehabilitation workshops, and maintenance areas. Employment would be primarily in skilled labor in various trades.

The *institution* category encompasses various types of educational uses including museums, interpretive centers, and other types of educational and visitor facilities. People employed under this category would include NPS staff, museum docents, interpretive guides, researchers, and training staff.

The most significant component of the *medical* category would be the Letterman complex. Future users of the facility would be involved in medical research activities, and employment would be in a range of occupations, including research, technical support, administration, and other support.

The *office* category would be the largest category of employment in the Presidio. Offices would be in many different buildings and would house a variety of organizations in keeping with the programmatic goals of the various reuse alternatives. Park tenant offices may be general business, public service outreach, governmental, or administrative. Employment in this use category could be expected to range from professional and administrative staff to a variety of support personnel.

The *retail* category would primarily include dining and convenience shopping facilities for Presidio visitors, employees, and residents. Destination shopping facilities to serve residents of San Francisco and the rest of the region are not proposed at the Presidio. Employees would include food service workers, cashiers, salespeople, managers, and other service-related workers.

Most activities in the *warehouse* category would be of a very low intensity, involving long-term storage of materials rather than intensive distribution. Relatively little employment is expected to be generated to maintain the Presidio's warehouse spaces. Employment in this category might include equipment operators and security guards.

Tables 10 and 11 in the text indicate the amount of building space available in each use category to accommodate new employment in the years 2000 and 2010. These numbers were multiplied by the assumed occupancy rate to determine the occupied space for each use at a given time. The total occupancy rate for each use category was assumed to be 90% in both 2000 and 2010. These occupancy assumptions represent stabilized occupancy and therefore the "best case" (largest quantity) assumption of potential Presidio employment. This is an optimistic assumption based on the recession and low absorption of vacant leasable space in San Francisco over the past few years, however, the assumption was used for consistency with the transportation analysis.

The second step in estimating employment was to develop assumed average employment densities for each of the use categories. These densities were based on average employment density data published by the Institute of Traffic Engineers, in *Trip Generation,* 5th ed. Table 12 in the text lists the assumed average employment density for each category. Finally, the potential space for each use was divided by the assumed average employment density to obtain the total number of jobs.

Under NPS management, the Presidio would house many organizations employing substantial numbers of Bay Area residents. This employment would translate into income, which would in turn contribute to the Bay Area economy. The baseline used for this analysis was the estimate of $70 million in annual wages to Presidio employees as reported in the Army's base closure EIS (USACE 1991).

To estimate total Presidio payroll from the number of jobs projected, assumptions were made about average annual wages in each use category. The U.S. Bureau of the Census *1989 County Business Patterns* reports total employment and total payroll for Standard Industrial Classifications (SIC) in San Francisco County. It provides an estimate of total employment in various job categories as of the first quarter payroll, which was multiplied by four to estimate annual Presidio wages. Total annual payroll was then divided by total employment to obtain an average annual wage figure for each use. The 1989 average wage estimates were adjusted to 1992 levels using the U.S. Bureau of Labor Statistics' *Consumer Price Index*.

Table 12 in the text also shows the estimated annual employee wages. These are merely average annual wage estimates of the Presidio payroll for each alternative. Generally speaking, the uses with a preponderance of professional and technical employment are expected to have the highest average wages. The retail use category can be expected to have fewer skilled workers, and more part-time entry-level workers who would generally be paid lower wages.

State Sales and Use Tax

The sales and use tax is collected and distributed by the California Board of Equalization. Of the 8.50% tax currently levied in San Francisco, 0.50% was imposed as a temporary statewide rate, to expire in July 1993, and 0.25% was imposed for San Francisco schools, also to be removed in late 1993. Following the expiration of these levies during the projection period, the jurisdictions receiving a share of the sale and use tax levy would be the state's general fund (5.50%), the city's general fund (1.00%), the Bay Area Rapid Transit District (0.50%), and the city's Municipal Railway (0.50%), and the county transportation tax fund (0.25%). The part of the tax levy that is apportioned to the city of San Francisco was excluded from the state tax analysis. The fiscal impacts associated with state sales and use tax were estimated based on the state's general fund allocation (5.50%).

Sales tax revenue is a product of the square footage of space utilized for retail times average sales per square foot times the tax rate. The square footage of retail space is derived from the total available square footage times a factor representing the proportion of space devoted to retail activity. The factors for nonretail building types account for small ancillary gift or sales activities. The retail sales per square foot value used in the analysis was $200. This figure represents an average based on Urban Land Institute data for a number of types of retail use that would likely be present in the park, including convenience food services and markets and small gift shops. Actual retail sales might vary from the estimates, depending on the following variables: building space devoted to such activities, number of park visitors, and types of retail sales

Resident, Employee, and Visitor Expenditures

A combination of industry factors and Presidio land use and population data was used to estimate future revenues for each concession type. The analysis was performed in four steps, summarized below.

Step 1 — Various data sources were used to estimate the number of residents, employees, day visitors, and overnight visitors. These sources included transportation mode use, employee and resident estimates, and anticipated overnight use in barracks, dormitories, and guest houses.

Step 2 — The user markets were isolated into four primary categories — residents, employees, visitors, and overnight guests — to estimate annual user spending at the Presidio. The revenues associated with food, beverage, and retail sales and lodging were determined by applying average spending habits for each market segment.

Estimated annual spending for residents was determined by taking the aggregate amount of retail, food, and beverage spending reported in 1991 to the State Board of Equalization for the city of San Francisco — approximately $2.9 billion. The reported spending by San Francisco visitors for the same revenue categories (about $1.9 billion) was subtracted out, resulting in an adjusted total of $1 billion spent by San Francisco residents in 1991 (San Francisco Convention and Visitors Bureau 1992). The adjusted total was divided by the total number San Francisco residents to derive a per capita spending total of approximately $1,500.

It is estimated that Presidio residents would spend about 50% of their retail, food, and beverage dollars in the stores and restaurants at the Presidio and the remaining 50% in commercial establishments outside the Presidio. Thus, estimated average annual spending per resident in Presidio retail, food, and beverage outlets

would be $750. Based on historical data of consumer spending in San Francisco, it was estimated that the residents would spend 43% of their dollars on food and beverage and the remaining 57% on retail items.

Estimated annual spending for Presidio employees was calculated using the average annual spending figure of $1,600 per office worker (for downtown locations with limited retail) as a foundation (International Council of Shopping Centers 1988). Because the Presidio is within five minutes' travel time of the Marina district, it was estimated that 50% of employee spending would occur at the Presidio and 50% in the Marina district (a portion of this figure might actually be spent in the Richmond district or in other nearby neighborhoods). Therefore, estimated average annual spending per employee in Presidio retail, food, and beverage outlets would be about $800. Office worker retail spending habits indicate that 55% of their dollars would be spent on food and beverage and the remaining 45% on retail items.

Daytime visitor spending habits were estimated by comparing several concessions in other national parks to determine average spending by visitors on retail, food, and beverage items. Based on the data collected, spending per visitor was estimated to be $2.50 at the various retail, food, and beverage outlets. It was also estimated that 30% of the dollars would be spent on food and beverage and 70% on retail merchandise.

The last market segment, lodging, was determined by multiplying the proposed guest beds by the current occupancy and room rate levels for limited-service hotels in San Francisco. The average daily rate was estimated by taking the 1989 estimated average per capita daily spending on accommodations by San Francisco visitors and inflating the figure to 1993 dollars (3% compounded annually). The resulting total was $68 per night for each visitor (Economics Research Associates 1989). The occupancy percentage was derived from 1992 ratios, which show a 64% occupancy rate for limited-service hotels (Arthur Anderson 1992). Projected occupancy rates for the Presidio were increased from the year 2000 to the year 2010 by the same percentage as the visitor estimates during the same period. Retail, food, and beverage spending were not included in the lodging figures because they were accounted for in the daytime visitor spending calculations.

Additional revenues could also be expected in the retail, food and beverage, and hotel industries outside the Presidio. It is presumed that visits to multiple destinations including the Presidio are built into tourist industry figures, so these indirect expenditures were not estimated.

Step 3 — Expenditure projections within the Presidio were compared to industry data to determine the sales potential to yield sufficient revenues to support operations. Figures were derived using the square footage allocated for each concession type and the dollar per square foot figures as a measure of capacity. The dollar capacity per square foot was compared to that of concessions in other national parks and to data from industry operation reports. It was assumed that the sales per square foot would support operations if they ranged between $150 and $300 per year for merchandise and between $100 and $325 per year for food and beverage outlets. Additionally, a range of $4,125-$6,500 per seat per year was used as an acceptable level of sales for restaurant uses (National Restaurant Association 1992). These ranges were used to assess the performance of the identified Presidio food and beverage concessions.

Step 4 — Revenues were allocated on a square footage basis, and sales were distributed by the square footage of each building and its proposed uses.

City Services

Cost Estimates

Police, Fire, and Emergency Medical Services. Data regarding the provision of these public safety services is from the *Presidio Public Safety Analysis* (Jones & Jones, Inc. 1993b). The costs of providing these services were analyzed, and findings concerning city involvement in the Presidio were presented in the analysis.

Water Supply. The first step in determining the fiscal impacts to the city associated with meeting the needs for water was to estimate total projected water consumption and sewer discharge at the Presidio under each alternative. Total potable water consumption was derived by applying average water consumption figures to the various proposed uses, as shown in table 19 in the text. Total water consumption was determined by adding total potable water consumption to total irrigation water consumption (estimated at approximately 1.0 million gallons per

day by the Department of Housing and Engineering, U.S. Army Presidio), as shown in table 20 in the text. These water needs were then subtracted from water available onsite (approximately 1.6 million gallons per day as estimated by the Department of Housing and Engineering, U.S. Army Presidio).

Sanitary Sewer Discharge Estimates. Total sewage generated at the Presidio was estimated by multiplying total potable water consumption by 85%, which is an engineering standard commonly used to estimate sewage discharge (*Wastewater Engineering: Treatment, Disposal, and Reuse*, Metcalfe and Eddy, Inc. 1991).

Revenue Estimates

A number of assumptions underlie the revenue projections. Revenues to the city generated by onsite activities were calculated for each of the alternatives using the revenue model described in the "Presidio Revenue Generation Model" appendix to the *Presidio Planning Socioeconomic Analysis Technical Report* (Jones & Jones, Inc. 1993a).

Property Tax. Under California law, publicly owned land is generally not subject to property taxation. However, property on such land that is leased to a taxable entity may be taxable. The taxable entity is said to have a possessory interest in the property, defined by the entity's right to exclusive beneficial use of the property. For the purposes of this analysis, it is assumed that possessory interests on the Presidio would be taxable; however, this might not be the case and the question is currently under legal review.

Possessory interests are valued for tax purposes on the basis of the market rental value using standard appraisal methods. Property leased to an entity that is itself exempt from taxation — for example, a nonprofit educational institution — may carry an assessed value but not be subject to a property tax. State law permits exemptions from property tax for a number of specific types of property as well as a broad welfare exemption for properties used exclusively for religious, hospital, scientific, or charitable purposes. Generally, to receive a welfare exemption, the owner of — or, in the case of publicly owned land, the holder of a possessory interest in — the property must annually meet federal requirements for exemption from income taxation. Although welfare exemptions are applied on a case-by-case basis, for the purposes of this analysis it was assumed that a percentage of the occupants would receive some form of property tax exemption. The percentages are based on the expected types of activities in each building category. Building types occupied entirely by governmental agencies would be 100% exempt from taxation; other building types are expected to have a mixture of activities, some of which would be taxable. An occupancy factor of 90% was applied to the total building square footage to adjust for potential vacant space.

Based on discussions with staff of the San Francisco Assessor's Office, the methods and factors most likely to be applied to possessory interests in park properties were used in projecting property tax revenues. For the purposes of this economic analysis, lease terms of 10 years were assumed for all leases, and lease rates were developed for each building type based on a preliminary review of current market conditions. Calculations of present values were based on lease inflation factors of 5% and a discount rate of 10%. The Assessor's Office applies an adjustment factor for administrative expenses related to possessory interests, which is 15%. Finally, a property tax rate of 1.12% was applied to obtain the projected property tax. Calculations of property tax revenues generated are summarized by alternative in the "Environmental Consequences" section.

Sales and Use Taxes. Total sales and use taxes were itemized in the "Regional Economy and Employment" methodology section. For the purposes of the city services analysis, the fiscal impacts associated with sales and use taxes were limited to the three levies specific to the city and county of San Francisco, totaling 1.75%.

The methodology for estimating sales tax revenues was also described in the regional section and assumed full use of facilities. The results of the sales tax revenue calculations are summarized by alternative in the "Environmental Consequences" section.

Business Tax. The city of San Francisco imposes a business tax and a registration fee on eligible businesses operating in the city. The registration fee is $150 and is payable by all businesses. The business tax is based on gross receipts or on payroll. For the purposes of this analysis, payroll is used to estimate potential business tax, although percentage of sales is the more appropriate method of taxation on businesses within federal properties. Businesses that are exempt from federal income taxation are generally also exempt from payment of the city business tax. The revenue impact analysis in the EIS was based on the business payroll tax, calculated by applying the 1.50% tax rate to the payroll of taxable

businesses operating in the Presidio following conversion. The percentages of tax-exempt occupants were applied to the payroll to determine the payroll amount eligible for the payroll tax. Total business tax revenues are summarized by alternative in the "Environmental Consequences" section.

Hotel Tax. Hotel rooms rented in the city of San Francisco are subject to a tax of 11.00%. To calculate the value of the revenue generated by this tax in the Presidio, projections of the dormitory and residential building space rented for transient occupancy were multiplied by estimated room rates and vacancy factors. It was assumed that a portion of the dormitory space would be used for overnight lodging and that portions of the residential units would be occupied by hotel operations similar to bed-and-breakfast establishments. The rate in constant dollars for overnight stays in the dormitory facilities was estimated to be $20 per bed; rates for overnight stays in the residential units were estimated at $40 per bed, double occupancy. The occupancy rate used in the analysis was 70%. The number of rooms varied by alternative and by time period. Hotel tax revenue calculations are summarized by alternative in the "Environmental Consequences" section.

Other Revenue Sources. There are a number of taxes, fines, fees, and forfeitures that produce revenue for the city of San Francisco and that derive from activities of the general populace or, in the case of the utility use tax, from business activities. These might be applicable, so they were included in the analysis. The utility use tax might require adjustment for Presidio activities because some utility services would be managed solely by the federal government.

The calculation of "general government" revenue sources was conducted in two steps. First, revenue generated for the city by motor vehicle in-lieu payments, the gas tax, fines and forfeitures, the tobacco tax from Proposition 99, and general government activity (as such revenue appears in the city's appropriation budget) was added and then divided by the population to obtain a per capita revenue figure. Revenue from the utility use tax was divided by the employment base to obtain a per-job figure. The per capita revenue from the population-driven revenue sources was estimated at $230; the utility use tax was $48 on a per-job basis. As a second step, the baseline revenue figures were multiplied by the projected population and employment for the Presidio in 2000 and 2010 to obtain projected revenue from these sources. Revenues derived from these sources are summarized by alternative in the "Environmental Consequences" section.

Housing

For the baseline condition, it was assumed that the existing 1,184 housing units and 1,415 dormitory beds (some two or more to a room) were fully occupied; for this analysis, one dorm bed per room was assumed. The impacts of reuse were compared to this baseline.

Housing Stock Use

To assist with analysis, the numbers of housing units and dormitory beds to be removed or reused were determined and the potential users of the reused housing units and dormitories were identified. Table 21 in the text shows the number of residential housing units and dormitory beds to be removed or reused under each of the alternatives. The decrease in available housing units would be due to building demolition. The decrease in dormitory space would be largely due to its unsuitability for civilian use, the allocation of one person to a room rather than several people, or the removal of the building containing the dormitory space; similarly, the conversion of dormitory space would be due to its unsuitability for civilian use or its anticipated use for program purposes.

Table 22 in the text indicates the potential reuse of Presidio housing units and dormitory and barracks beds by type of user. The beds in dormitory buildings are a low-cost housing resource that could be used by guests to the Presidio (for example, persons attending conferences or training programs) or by NPS staff and staff of park partners. For the purposes of this analysis, each dormitory room was assumed to accommodate only one person.

Housing Demand Estimates

A process was developed for estimating the housing demand at the Presidio and in the surrounding region as a result of Presidio employment. Presidio housing demand was calculated to estimate how many individuals or families from the eligible pool would in fact seek housing at the Presidio; those eligible for staff housing include NPS and park partner/tenant staff. Bay Area housing demand was examined to assess the potential effects on the regional housing market. The same set of assumptions was used for all alternatives. The process was modified from Association of Bay Area Governments and city housing planning procedures.

The following procedure was used to determine the percentage of housing demand created by new employment at the Presidio that would be satisfied by housing provided at the Presidio. First, the total employment was derived by

projecting job generation of the various land uses. Then, the total households that the jobs would represent were estimated using 1.3 Presidio workers per household, assuming some doubling up and some married couples both employed at the Presidio. It was assumed that 75% of the people hired to work at the Presidio would already reside in San Francisco or the Bay Area and that 25% of the people hired would reside outside the region at the time of employment and would consequently require housing in the Bay Area. Considering these two employment groups, it was estimated that 30% of employees already living in the Bay Area would choose to live in Presidio housing if it was available (this was based on input from a 1989 GGNRA employee survey) and that 75% of the employees living outside the region would prefer Presidio housing. The total Presidio housing demand was calculated as the sum of the employees who would wish to live at the Presidio. The percentage of housing demand was determined by dividing the available housing by the total Presidio housing demand.

The next step was to determine the net new regional demand for housing units for new Presidio employees. To derive the net new demand, the number of new employee households estimated to come from outside the Bay Area was compared to the available employee housing units at the Presidio. It was assumed that Presidio employees who currently live in the Bay Area already have housing. To determine the regional distribution of housing demand by Presidio employees, the residence patterns of existing park personnel were examined. It was estimated that 40% of the work force not residing in the Presidio would choose to live in San Francisco, 36% would choose Marin County or areas farther north, 13% would choose the peninsula south of the city, and 11% would choose the East Bay.

Table 23 in the text shows projected housing demand met by Presidio housing under each of the alternatives. Military personnel, who would be employed elsewhere, were not included in the demand analysis. Although some new housing demand would simply replace existing Presidio civilian and military demand, no estimate was made of the effect of this phenomenon. Table 24 in the text provides estimates of new regional housing demand by Presidio employees relocating to the Bay Area.

Traffic and Transportation Systems

Methodology

Vehicle Trip Modeling. The vehicle trip modeling process for future Presidio land uses builds on an "existing conditions" model that was developed for the base year, 1988. At that time the Presidio was still under Army management, and transition of personnel and activities had not begun. The transportation modeling process is fully described in Robert Peccia & Associates' 1993 *Presidio Transportation Planning and Analysis Technical Report.*

Additional traffic models were developed for each of four park management alternatives. The models indicate expected traffic volumes on the Presidio's main roadways and at each of its entrances. Each alternative was modeled for three analysis periods, projecting conditions for the years 2000 and 2010. The first analysis period was the weekday p.m. peak hour, to be used primarily for intersection and roadway capacity analyses. The second analysis period was the weekday average daily traffic (ADT), to be used primarily for overall traffic volume comparisons and for roadway capacity and congestion assessment. The final analysis period was the weekend ADT. This analysis served the same purpose as the weekday ADT, except that it examined conditions when recreational activities on the Presidio might be expected to generate the most traffic.

The Presidio traffic models relied on land use information about the facilities and attractions that would generate traffic. The building database provided information about each building under each of the alternatives, including square footages, existing use, interim use (for 2000), and ultimate use (for 2010). Because many of the land use categories would generate trips in much the same way, the NPS categories were combined into 21 traffic modeling land use categories using a set of equivalency tables. In addition, trip generators at the Presidio that would not be related to buildings (such as the golf course, cemetery, trails, vistas, and beaches) were defined separately.

Proposed future land uses would include some differences from the 1988 base condition; these differences were reflected the equivalency tables, and adjustments were made to accurately model traffic generation under the various alternatives.

Trip generation rates are essential to the forecasting process; each of the land use categories listed in the database is assumed to generate vehicle trips at a given rate during the weekday p.m. peak hour and the weekday and weekend ADT

periods. Applicable vehicle trip rates were multiplied by the square footage of each land use category to yield the estimated number of trips generated. This in turn was used to model traffic volumes on major roadways, as defined in the computer model.

By comparing the ADT volumes on each roadway to standards of road capacity, one can understand the effects of projected traffic conditions. For instance, a 25-30 mph, two-lane urban roadway with good design elements (gentle curvature, good sight distance, and relatively few intersections) should generally be able to carry about 8,000-10,000 vehicles per day before traffic congestion becomes much of a problem. At about 12,000-15,000 vehicles per day, the same roadway would be very congested and much more dangerous. At somewhere around 18,000-20,000 vehicles, the same roadway would be completely gridlocked. These threshold levels increase and decrease slightly along with travel speeds. The threshold levels drop dramatically as design elements become less favorable, as is the condition on many of the Presidio's roadways.

Transportation Mode Use Estimates. Transportation system management (TSM) techniques would be implemented at the Presidio to encourage non-auto travel. This would reduce noise and air quality impacts and accomplish other goals like less congestion, less need for expensive roadway improvements, and less dependence on fossil fuels.

Improvements and management policies at the Presidio could influence future travel mode choices and might cause significant shifts in the mode split as analyzed. Anticipated effects of these measures are incorporated into mode split calculations in the form of growth rates for charter services and bicycle and pedestrian trips. However, implementation of measures to encourage transit/bicycle/pedestrian travel could result in noticeable increases in the nonauto travel shares above what has been projected.

The TSM measures that would most likely be implemented at the Presidio with quantifiable results were used in the mode split projections. The implementation of TSM measures would cause some vehicle trips to be eliminated or replaced with transit, bicycle, or pedestrian trips. Quantified mode split changes were reflected in the future condition traffic models by removing a number of vehicle trips from each model based on the number of trips expected to shift to alternate modes. Each trip was represented in the model as a round trip with two trip ends — one at the beginning and one at the end.

The mode split projections reflect major travel movements but do not reflect local, short trips. The pedestrian and bicycle shares of travel would be expected to be greater for local trips. Some parts of the Presidio, such as the main post and Fort Scott, would likely have bicycle and pedestrian shares that equaled or exceeded the vehicle share of trips within the area. These same areas would also be likely to generate a larger share of the MUNI patronage, so their local mode splits would be different than that for the entire Presidio.

The calculations started with modeled vehicle trip volumes at the Presidio entrances. Through-trips were then removed, and the resulting in/out volumes were multiplied by an auto occupancy factor to estimate the number of person-trips into and out of the Presidio. The person-trips by vehicle were combined with transit, bicycle, and pedestrian trips to yield estimates of the total number of trips into and out of the park. Percentages of the total were then calculated for each mode.

Mode split adjustments were made to the year 2000 model under alternative A because of proposals to use the Presidio Hill planning area in the short term for military housing. A TSM provision would require a military shuttle to carry personnel to and from work as a condition of their use of these housing facilities. This was estimated to result in a 50% decrease in the home-based work (HBW) trips by private vehicle; Presidio Hill trip reductions are mirrored, with reduced external trip ends at several gateways. Parking availability would likely be a problem on the main post by 2000, and parking areas on Crissy Field would be expected to provide overflow capacity. Therefore, vehicle trips produced in or attracted by main post facilities were diverted to Crissy Field in the year 2000 and 2010 models.

Other TSM measures were applied only to the 2010 models because it was assumed that transit service improvements and internal park shuttles would not be effective in reducing auto trips before that time. All reductions to the 2010 model volumes were distributed among the trip purposes in similar proportions.

Alternative A calls for extending MUNI lines 41 and 45 to the main post by 2010. This would result in increased transit patronage to/from this area and improved access to Crissy Field. The main post and Crissy Field mode shifts would all be on internal-external trips to areas east of the Presidio; therefore, vehicle trip reductions in these areas are mirrored in external trip end reductions at nearby gateways.

Estimated vehicle trips confirm that Fort Point would be overwhelmed with visitor traffic by 2010, requiring implementation of mandatory shuttle service to the area with parking on Crissy Field. Vehicle trip ends were shifted from Fort Point to the

west end of Crissy Field in the 2010 model, leaving only shuttle trips and work-related trips to and from Fort Point.

Because of the park shuttle, improved transit information services, and improved awareness of transit opportunities, the Golden Gate Bridge, Fort Scott, cavalry stables, and coastal bluffs areas would experience minor shifts from vehicle trips to transit trips, as factored into the 2010 model.

Visitor-Attributable Traffic Estimates. Calculations were made based on modelling of trip purposes to determine the percentage of estimated traffic attributable to all visitors rather than residents and employees. Visit estimates were generated by using transportation mode use data to forecast to the years 2000 and 2010. First, total person-trips were projected, and the percentage of total trips made by visitors was estimated. To calculate this, estimates of the different types and purposes of trips produced and attracted by the Presidio were broken down into resident, employee, and visitor trips. Visitor trips were adjusted to reflect the number of trips made by each visitor each day; however, no adjustments were made for multiple-day visits or extended stays by an individual. As a result, the visitation estimates give daily visits per year, which is expected to be higher than the actual number of visitors per year.

The estimates were based on an assumption of how many trips would be made into or out of the Presidio per visit. Each visitor would have to make one round trip. These visits would be made by a variety of visitors, including people visiting outdoor recreation areas, people visiting offices, and overnight guests or conference participants. Some, but not all, visitors would be expected to make additional trips to and from the Presidio in a single day; for example, trips to nearby amenities. Lacking data to support specific conclusions about this phenomenon, a mid-range value of 1.5 round trips per visitor per day was used to estimate average conditions.

Parking Estimates. The Presidio management alternatives call for differing use patterns, which would allow and in some cases require changes to the parking system. Changes would include removal, addition, or renovation of parking areas throughout the park and adoption of parking policies and regulations. These were developed by analyzing the existing provision of parking and future demand analysis from the Presidio traffic models for each traffic zone. Then the parking actions were specified, acknowledging resource management concerns, transportation systems management measures, and other factors.

Future parking demand at the Presidio was estimated using numbers of vehicle trips to or from each traffizone in the Presidio traffic models. The vehicle trips were converted to numbers of parking spaces required using parking turnover rates or the average duration a vehicle would remain parked. Average parking durations were used to estimate how many vehicles could be accommodated in a day by each parking space. Three parking turnover rates were used in this analysis since the expected duration of visits would vary at different locations. The rates were based on general parking turnover trends at similar national park facilities.

The number of vehicles parking in each area was assumed to equal one-half the number of vehicle trip ends produced in or attracted by that area. These data were obtained from preliminary calculations from the Presidio traffic modeling process, which projected average conditions. Parking requirements for the Exploratorium/ Palace of Fine Arts complex were estimated by the staff of that facility.

Intersection Capacity Estimates. Intersection turning movement counts were obtained during a.m. and p.m. peak periods in the summer of 1991 for exterior intersections near each of the Presidio's gateways. These data were used to calculate the existing condition level of service (LOS) in each intersection. A similar study was conducted for the U.S. Army in 1988, addressing the interior gateway intersections and several other interior intersections. These studies were documented in the U.S. Army Corps of Engineers' *Road System Study* in January 1988 and in Robert Peccia & Associates' *Presidio Traffic Analysis* in February 1992. The level of service determined in each of these analyses is a rating or "grade" assigned to each intersection to describe the average amount of delay encountered by each vehicle passing though the intersection. Table C-1 describes each level of service rating.

The Presidio traffic modeling process yielded estimated future traffic volumes at each of these intersections for 2000 and 2010 for each of the management alternatives. This traffic volume data was used to estimate traffic conditions in each of the previously analyzed intersections near the gateways and at the highest volume intersections within the Presidio. This process resulted in an LOS rating for each scenario during the p.m. peak period, as summarized along with existing condition LOS values in tables C-3 and C-4 in the "Modeling Results" section below. Since the p.m. peak is usually the most congested, the p.m. peak analyses should adequately reflect expected problems.

TABLE C-1: INTERSECTION LEVEL OF SERVICE

Level of Service — Signalized Intersections	Description
A	Operations with very low delay (i.e., less than 5.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all.
B	Operations with delay in the range of 5.1 to 15.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
C	Operations with delay in the range of 15.1 to 25.0 seconds per vehicle. These higher delays might result from fair progression and/or longer cycle lengths. Individual cycle failures might begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Operations with delay in the range of 25.1 to 40.0 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays might result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (V/C) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Operations with delay in the range of 40.1 to 60.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.
F	Operations with delay in excess of 60.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths might also be major contributing causes to such delay levels.
Level of Service — Unsignalized Intersections	
A	Little or no delay.
B	Short traffic delays.
C	Average traffic delays.
D	Long traffic delays.
E	Very long traffic delays.
F	When demand volume exceeds the capacity of the lane, extreme delays would be encountered with the queuing which might cause severe congestion affecting other traffic movements in the intersection. This condition usually warrants improvement to the intersection.

SOURCE: 1985 Highway Capacity Manual

Levels of service below C are generally considered unacceptable for new construction or planned improvements. Existing intersections, however, are often allowed to degrade to level of service D or sometimes E before improvements are planned. Level of service F is highly undesirable.

Modeling Results

Vehicle Trips. The modeling process yielded estimated numbers of vehicle trips on each of the main roadways in the Presidio. This provided the basis for evaluating the adequacy of roadways and intersections for future conditions. A total of 24 different analyses described traffic volumes for the four NPS management alternatives during the p.m. peak hour and the weekday average daily traffic (ADT) and the weekend ADT periods for the years 2000 and 2010.

The p.m. peak hour models estimated maximum hourly traffic volumes to assess adequacy of the system. The results were also used to analyze roadway and intersection capacities and calculate levels of service (LOS). Weekday p.m. peak hour travel at the Presidio is currently about 9% of the daily traffic. Weekend peak hours at the Presidio are also about 9% of the weekend daily traffic, with hourly volumes approaching but generally not exceeding weekday peaks.

Weekday and weekend ADT models were used to address conditions in more general terms. The ADT volumes illustrated overall traffic conditions on a per-day basis and were used to compare projected traffic growth through to 2010 for the proposed management alternatives. Since other travel mode data was expressed in estimated trips per day, the ADT volumes were used for mode split analysis.

Figures C-1 through C-9 summarize traffic data for the Presidio for comparison of several different conditions. Figures C-1, C-2, and C-3 show overall growth in p.m. peak hour, weekday ADT, and weekend ADT traffic volumes at the Presidio gateways for each management alternative and for a "No NPS" scenario. The "No NPS" scenario illustrates future traffic volumes that the base might produce with continued military use and an assumed 1% annual growth in background traffic. The comparisons in these figures show that each of the proposed management alternatives would generate more traffic than continued military operations would with 1% annual growth. Comparison of figures C-2 and C-3 illustrates that overall Presidio weekday traffic volumes would generally be 6%-8% higher than weekend volumes for each scenario.

Figures C-4 through C-9 compare traffic volumes at each Presidio entrance for existing conditions, normal (1%) growth, and each of the proposed park management alternatives. These figures illustrate that travel demand would be greatest at the Lombard entrance and smallest at the 15th Avenue entrance for all scenarios. The figures show that weekday traffic would exceed weekend traffic at the Gorgas, Lombard, Presidio, Arguello, and 15th Avenue entrances, while the opposite would be true at the Mason, Lincoln, and Golden Gate viewing area entrances. This pattern indicates that the coastal entrances would probably be supporting a larger share of recreational trips, while the interior gateways would be more influenced by weekday traffic demand, which would probably be greatest at the main post.

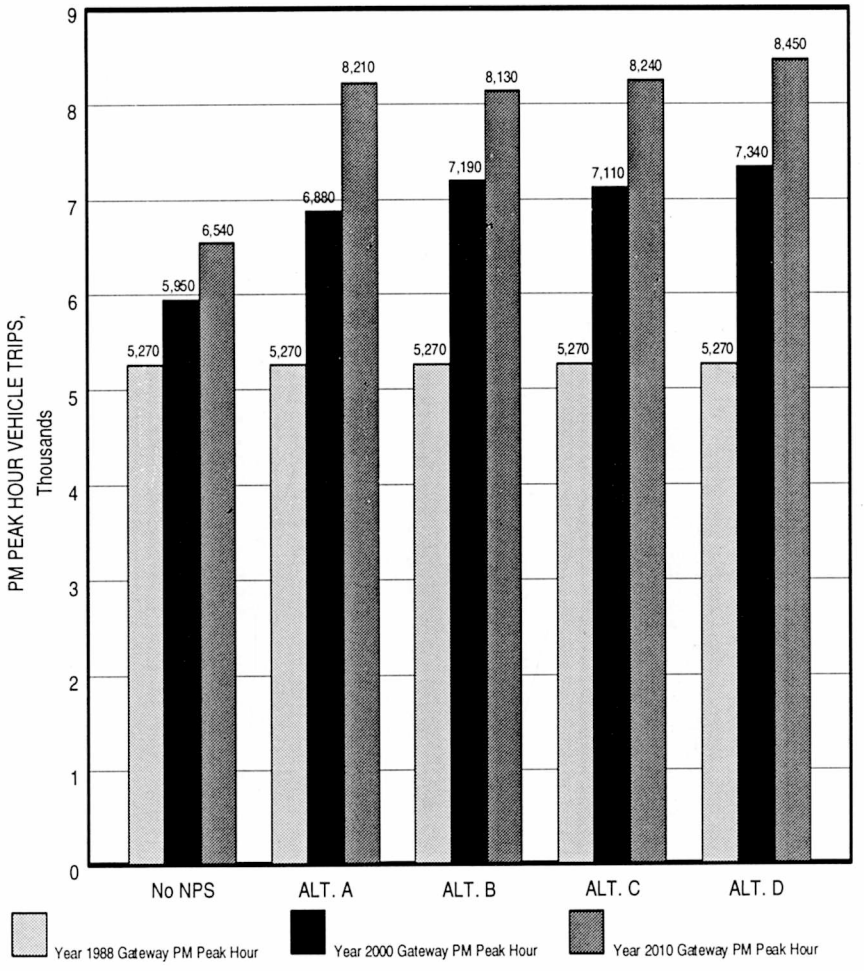
The models indicate that all four of the proposed management alternatives would generally increase traffic volumes throughout the Presidio. Most roadways would have traffic volumes of less than 10,000 vehicles per day, indicating that they would need minor improvements to provide acceptable levels of safety and convenience.

Alternative Mode Splits. Projected volumes for average daily auto traffic were combined with estimated transit ridership, bicycle trips, and pedestrian trips into and out of the Presidio to estimate mode splits, which describe the share of travel by each of these different modes. The mode split data was used to assess the relative success of alternative mode provisions and incentives under each alternative and provide a basis for planning and justifying infrastructure improvements to accommodate demand for each type of travel.

Table 26 in the text summarizes mode split calculations for weekday and weekend travel under existing (1988) conditions and future conditions for each of the proposed management alternatives. The table shows how auto, transit, bicycle, and pedestrian data were combined to estimate the number of trips into or out of the Presidio each day. The relative percentages of travel by each mode were then calculated for each condition.

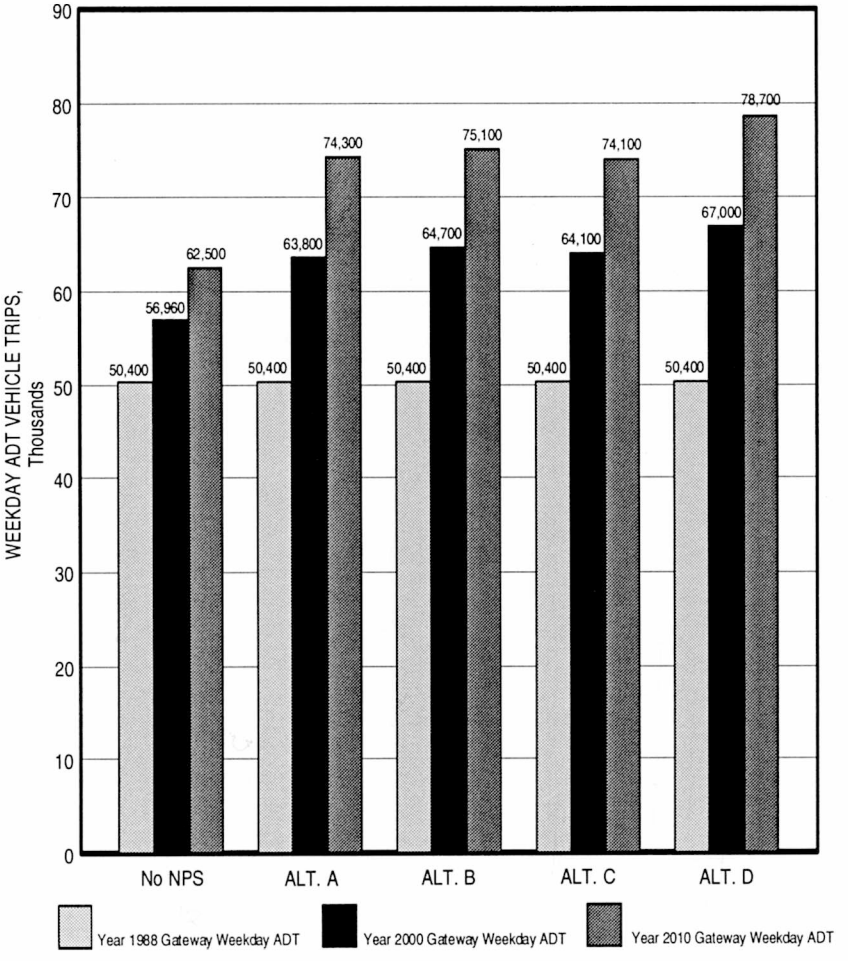
Under 1988 conditions about 71,100 person trips were made into and out of the Presidio on each weekday. Of these, 79% were made by private automobile, 9% by transit, and 12% on bicycle or on foot. On weekends about 70,900 person trips were made into or out of the Presidio daily. About 72% of the weekend travel was by auto, 6% by transit, and 22% by bicyclists and pedestrians.

FIGURE C-1: 1988/2000/2010 P.M. PEAK HOUR TRAFFIC AT GATEWAYS



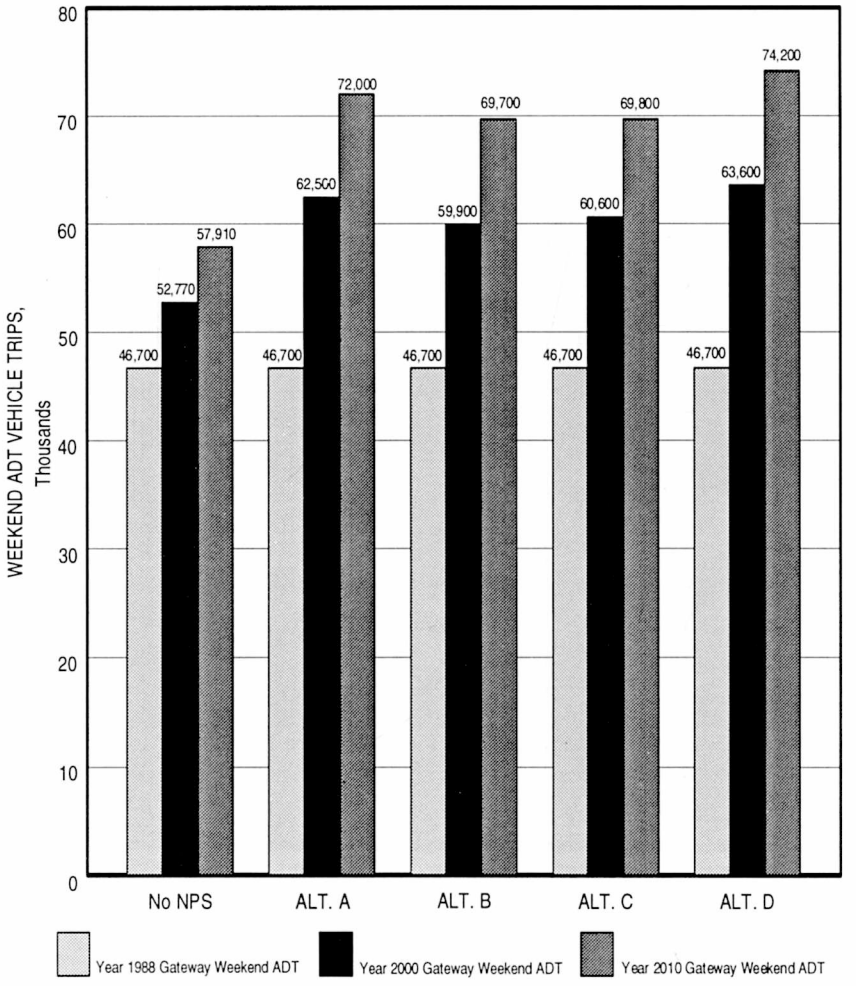
Alternative C volumes include 400 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-2: 1988/2000/2010 WEEKDAY ADT AT GATEWAYS



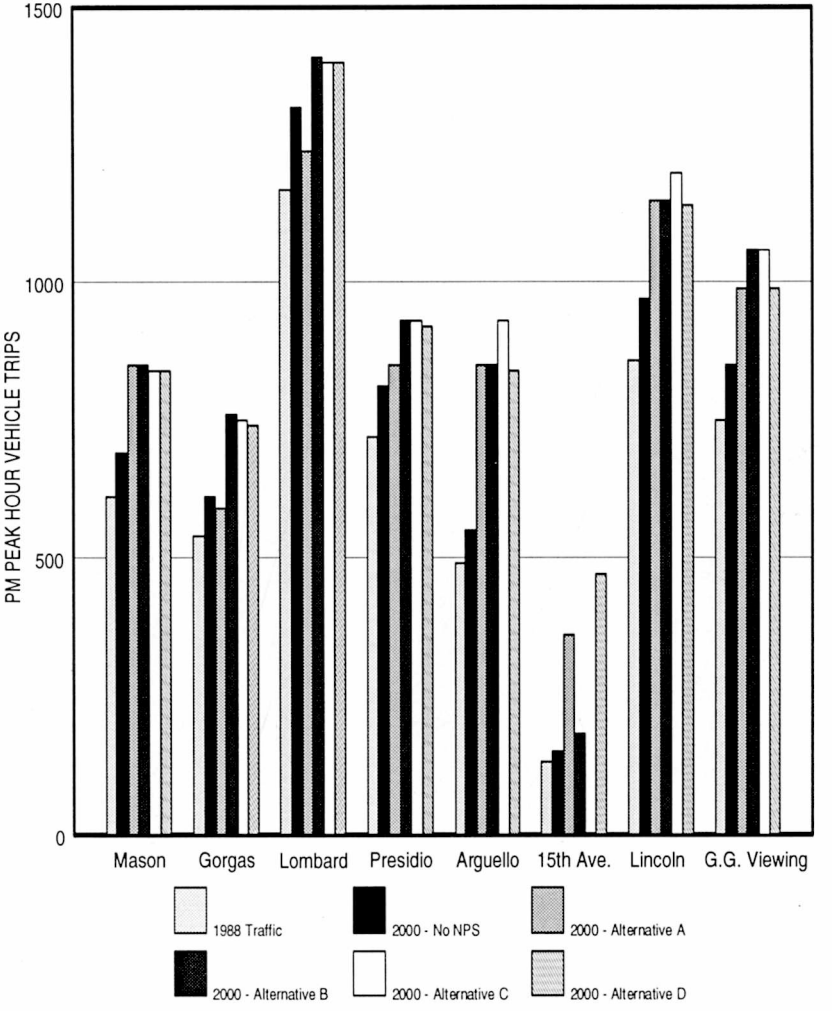
Alternative C volumes include 2,800 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-3: 1988/2000/2010 WEEKEND ADT AT GATEWAYS



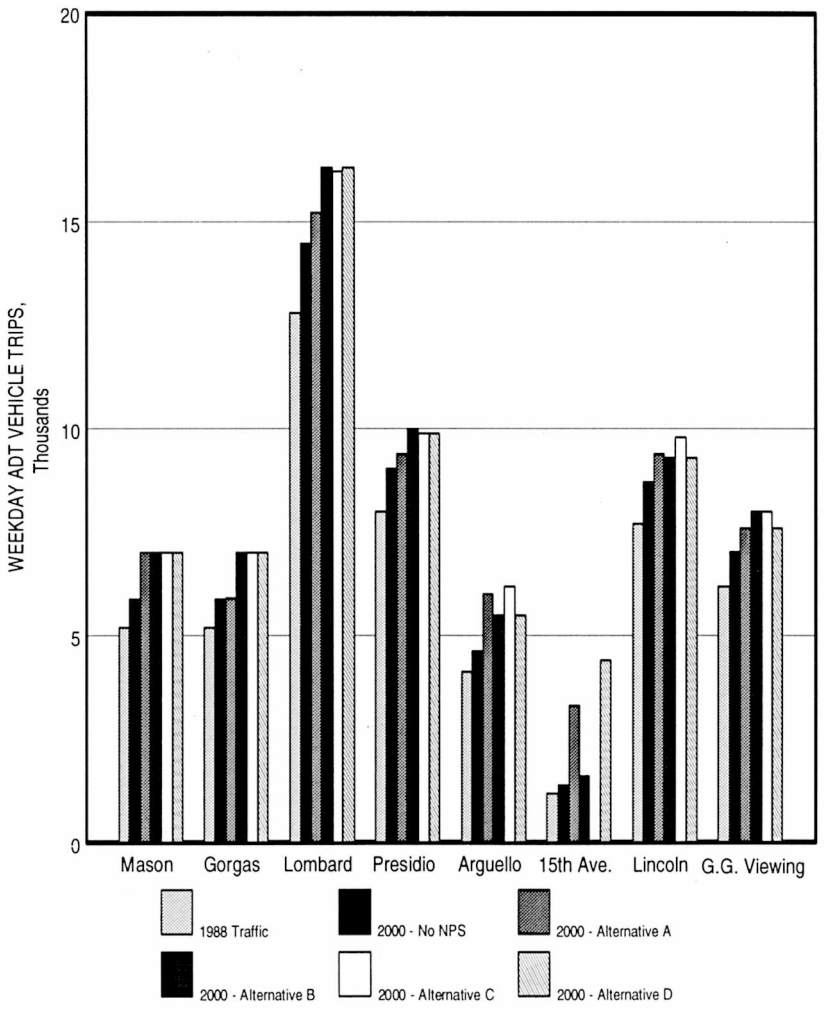
Alternative C volumes include 700 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-4: 2000 P.M. PEAK HOUR TRAFFIC AT GATEWAYS



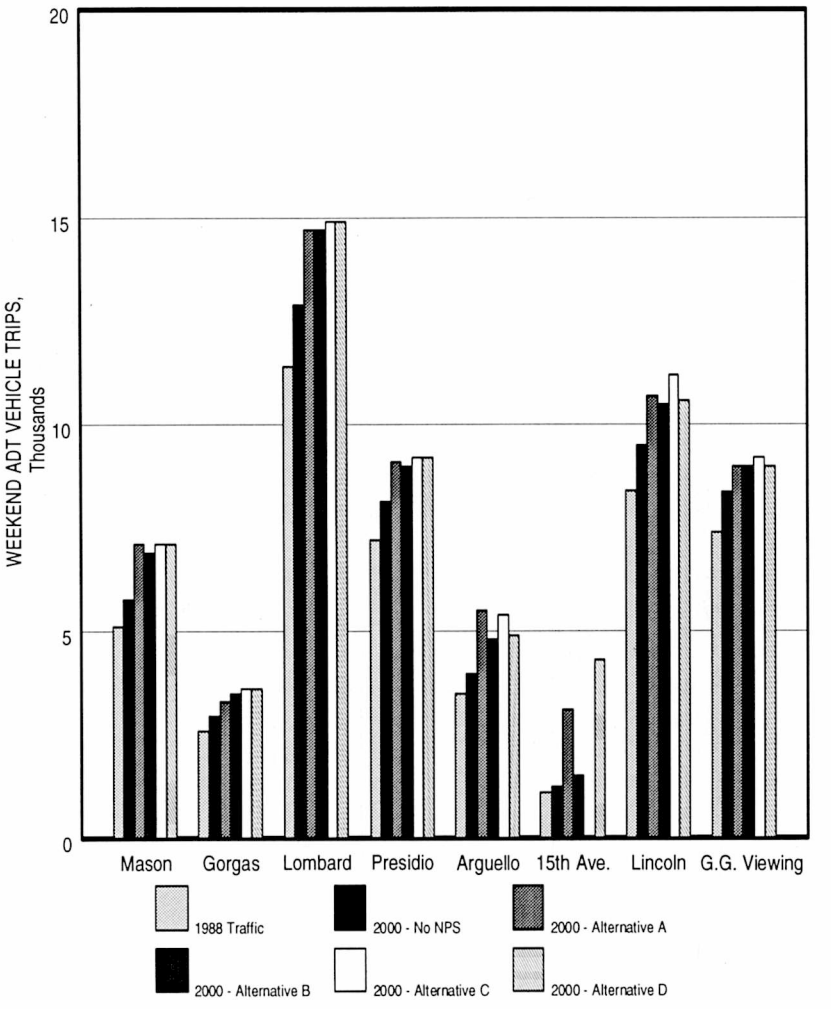
Alternative C volumes include 400 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-5: 2000 WEEKDAY ADT AT GATEWAYS



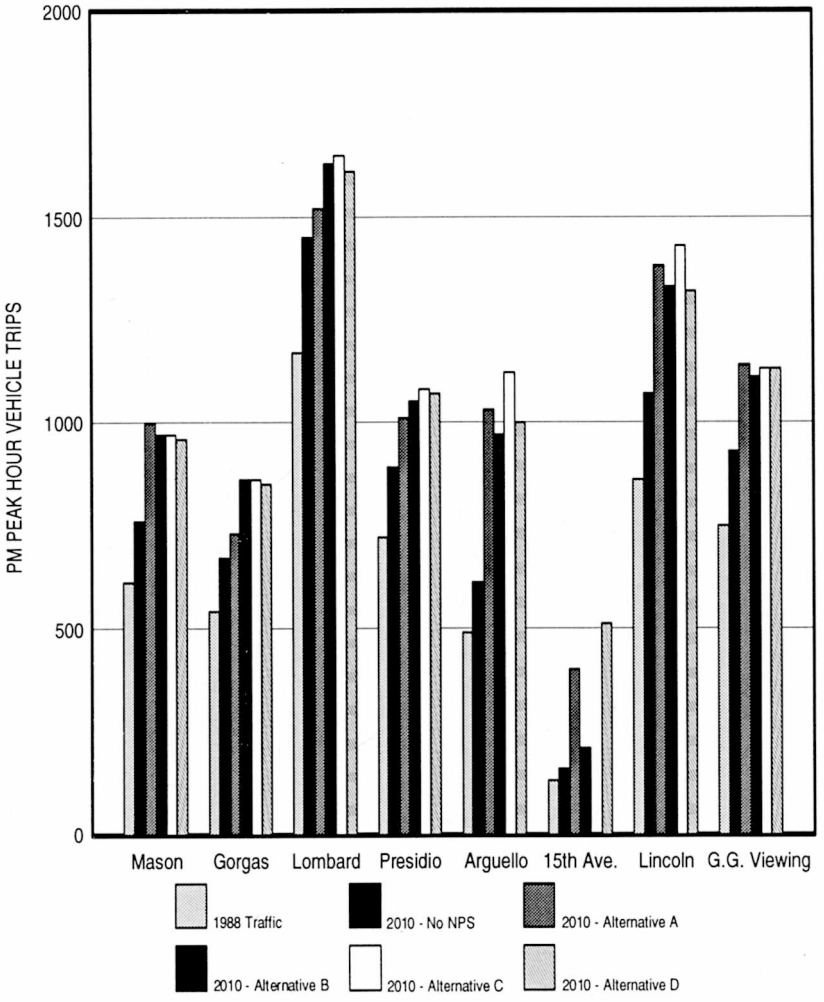
Alternative C volumes include 2,800 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-6: 2000 WEEKEND ADT AT GATEWAYS



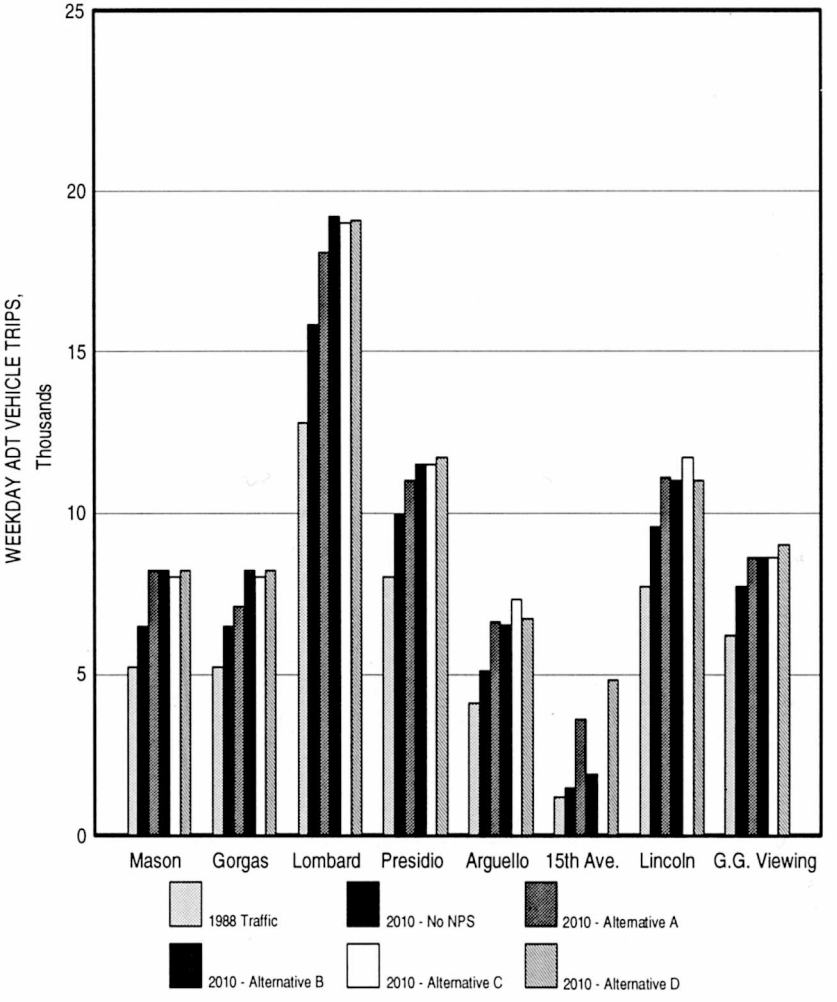
Alternative C volumes include 700 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-7: 2010 P.M., PEAK HOUR TRAFFIC AT GATEWAYS



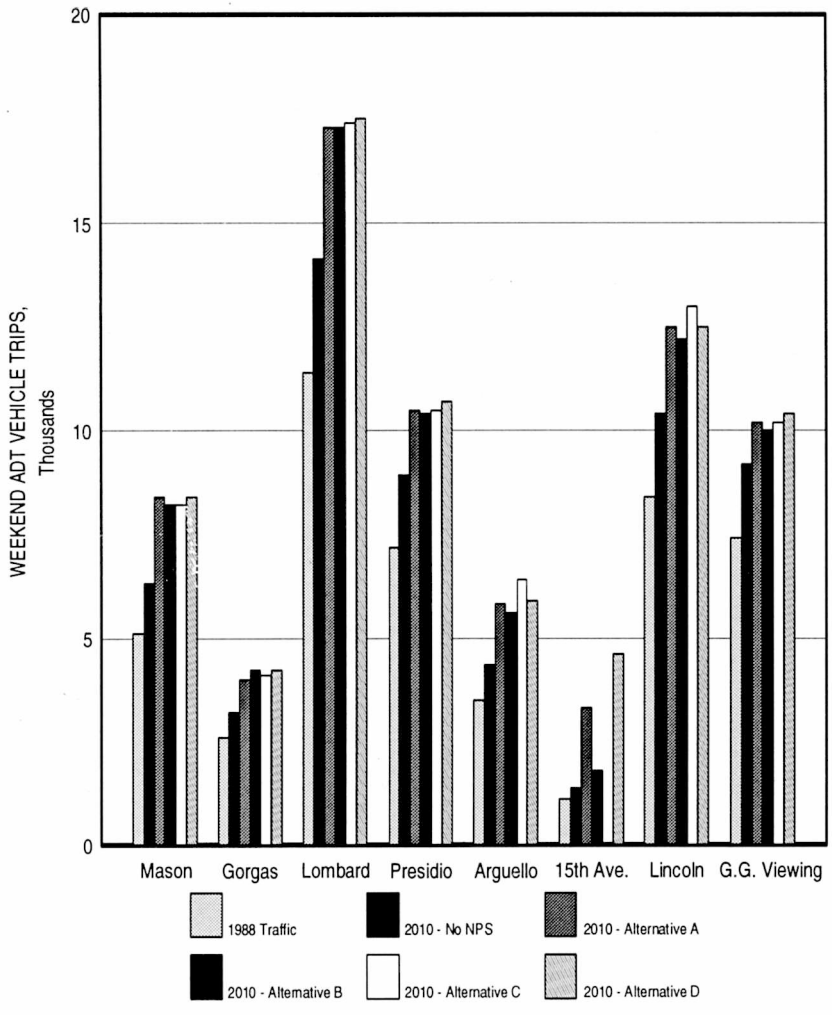
Alternative C volumes include 400 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-8: 2010 WEEKDAY ADT AT GATEWAYS



Alternative C volumes include 2,800 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-9: 2010 WEEKEND ADT AT GATEWAYS



Alternative C volumes include 700 vehicle trips to/from LAMC/LAIR.
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

The existing condition mode split illustrates two common travel patterns at the Presidio. About 30% fewer transit trips are provided to the Presidio on weekends than on weekdays. This difference in service, combined with the tendency of recreational travelers to avoid using transit, results in about 2,600 fewer person trips by transit on weekend days than on weekdays. The existing condition mode splits also illustrate that bicycle and pedestrian trips increase on weekends, when recreational travel is expected to be higher.

The mode split projections for 2000 and 2010 account for increased travel demand that would be generated by new uses at the Presidio. Because travel demand would be expected to grow, the existing mode split would not be sustainable without improvements in transit service and bicycle and pedestrian facilities. The mode split projections reflect proposed improvements to encourage nonauto travel, allowing transit, bicycle, and pedestrian modes to accommodate their existing share of the increased travel demand and claim greater shares of projected travel where possible.

Mode split revisions included in the projections were based on improvements that could be reasonably assured to occur. Additional improvements in transit service and bicycle and pedestrian facilities could result in further reductions in auto travel, but they were not included in the projections because the likelihood of their receiving funding and their effectiveness once implemented are not known at this time.

Visitor-Attributable Trips. Transportation data were used to estimate daily and annual visitation at the Presidio based on existing visitation and proposed land use changes. The visitation estimates were generated from data on daily auto, transit, bicycle, and pedestrian trips across the Presidio boundaries. The total number of in/out trips was then adjusted to remove estimated trips by Presidio residents and employees, resulting in estimated trips by visitors. Assuming that an average visitor makes 1.5 round trips into and out of the Presidio each day, this number of trips was converted into a number of Presidio visitors per day. The resultant projections are listed in table C-2.

On the basis of the analysis, 1988 Presidio visitation was estimated at 3.5 million daily visitors per year, with about 8,800 per weekday and 11,600 per weekend day. Visitation in the year 2000 under alternative A was projected at 5.9 million

daily visitors, with about 14,600 per weekday and 20,100 per weekend day. This would amount to an increase of 2.4 million visitors, or 68% over 1988 levels. Visitation in 2010 under alternative A would be about 7.9 million daily visitors, with about 19,600 per weekday and 27,200 per weekend day. This would amount to an increase of 2.0 million visitors over 2000 levels, or 4.4 million visitors over 1988 levels. Table C-2 summarizes projected visitation for the Presidio under each of the alternatives

Intersection Capacities. Intersection capacity analyses were performed for existing and projected future traffic volumes to estimate level of service conditions at intersections around the Presidio's perimeter and at key intersections within the Presidio. This analysis was conducted to determine the impacts of increased travel demand at these locations. Table C-1 in the methodology portion of this section describes the LOS ratings applied at signalized and unsignalized intersections. Tables C-3 and C-4 summarize results of the LOS analysis for the Presidio.

TABLE C-2: ESTIMATED VISITOR PROJECTIONS

		Alternative			
Year/Period	**Existing**	**A**	**B**	**C**	**D**
Per Day					
1988, weekday	8,800				
1988, weekend	11,600				
2000, weekday		14,600	10,500	12,400	14,900
2000, weekend		20,100	17,300	19,000	20,800
2010, weekday		19,600	17,400	17,600	20,100
2010, weekend		27,200	22,300	26,000	26,700
Annual (in millions)					
1988	3.5				
2000		5.9	4.5	5.2	6.1
2010		7.9	6.9	7.3	8.0

TABLE C-3: SUMMARY OF LOS ANALYSIS - 1

INTERIOR INTERSECTIONS

Intersecting Streets	Movement	1988 Peak Hours AM	1988 Peak Hours PM	2010 PM Peak Hour Models Alt. A	Alt. B	Alt. C	Alt. D	2010 PM Peak Hour with Recommended Improvements
Presidio / Lombard								B
	WB-L	D	E	F	F	F	F	B
	WB-R	A	A	B	B	B	B	B
	NB-TR	A	A	A	A	A	A	A
	SB-L	A	A	E	E	E	E	A
	SB-T	A	A	A	A	A	A	A
Mason/Halleck (Graham)								B
	NB-L	A	C	F	F	F	F	A
	NB-T	A	B	-	-	-	-	-
	NB-R	A	A	B	B	B	B	A
	SB-L	A	D	-	-	-	-	-
	SB-T	A	A	-	-	-	-	-
	SB-R	A	A	-	-	-	-	-
	EB-L	A	A	-	-	-	-	-
	EB-T	A	A	A	A	A	A	B
	EB-R	A	A	A	A	A	A	A
	WB-L	A	A	C	C	C	C	B
	WB-T	A	A	A	A	A	A	B
Lincoln/Halleck (Graham)								B
	NB-L	-	-	F	F	F	F	B
	NB-T	-	-	F	F	F	F	B
	NB-R	-	-	A	A	A	A	B
	SB-L	C	F	F	F	F	F	B
	SB-T	-	-	E	E	E	E	B
	SB-R	A	A	A	A	A	A	B
	EB-L	A	A	B	B	B	B	B
	EB-TR	A	A	A	A	A	A	B
	WB-L	-	-	A	A	A	A	B
	WB-T	A	A	A	A	A	A	B
	WB-R	-	-	A	A	A	A	B
Graham-Arguello/Moraga								B
	NB-L	A	A	-	-	-	-	-
	NB-T	A	A	F	E	F	F	B
	NB-R	A	A	A	A	A	A	B
	SB-L	A	A	F	E	F	F	B
	SB-T	A	A	E	C	E	E	B
	SB-R	A	A	-	-	-	-	-
	EB-L	A	A	A	A	A	A	A
	EB-TR	A	A	A	A	A	A	B
	WB-L	A	B	A	A	A	A	B
	WB-R	A	A	A	A	A	A	A
Lincoln/McDowell-Park								B
	NB-L	A	A	C	C	C	D	B
	NB-T	A	A	B	B	A	B	B
	NB-R	A	A	A	A	A	A	B
	SB-L	A	A	D	D	C	D	B
	SB-TR	A	A	A	A	A	A	B
	EB-LTR	A	A	A	A	A	A	A
	WB-LTR	A	A	A	A	A	A	A
Lincoln / Crissy Field Ave.				B	B	B	B	B
	NB-T			A	A	A	A	A
	SB-L			B	D	B	B	B
	SB-T			A	A	A	A	A
Lincoln / G.G. Viewing								B
	EB-L			E	E	E	E	B
	EB-R			A	A	A	A	B
	NB-LT			A	A	A	A	A
	SB-TR			A	A	A	A	A
Lincoln/Merchant-Storey								B
	WB-L	B	B	D	E	D	E	B
	WB-T	B	D	C	C	C	C	B
	WB-R	B	B	A	A	A	A	B
	EB-L	A	A	E	E	E	E	B
	EB-T	A	A	C	C	C	C	B
	EB-R	A	A	A	A	A	A	B
	NB-LTR	A	A	A	A	A	A	A
	SB-LTR	A	A	A	A	A	A	A
Lincoln/Kobbe-Washington								B
	WB-L	B	D	E	F	E	F	B
	WB-R	B	D	A	A	A	A	B
	SB-LT	A	A	A	A	A	A	A
	NB-TR	A	A	A	A	A	A	B

EB = Eastbound
WB = Westbound
NB = Northbound
SB = Southbound

L = Left turn
T = Through (straight ahead)
R = Right turn
- Movement not allowed.

TABLE C-4: SUMMARY OF LOS ANALYSIS - 2

GATEWAY INTERSECTIONS

Intersecting Streets	Movement	1991 Peak Hours AM	1991 Peak Hours PM	2010 PM Peak Hour Models Alt. A	Alt. B	Alt. C	Alt. D	2010 PM Peak Hour with Recommended Improvements
Mason / Marina / Doyle		C	E	F	F	F	F	D
	EB-TR	C	A	B	B	B	B	A
	WB-T	A	F	F	F	F	F	D
	WB-R	A	A	A	A	A	A	A
	NB-R	B	B	A	A	A	A	A
	SB-L	B	B	B	B	B	B	D
	SB-R	B	B	A	A	A	A	A
Lombard / Richardson		E	F	F	F	F	F	E
	EB-TR	F	A	A	A	A	A	A
	WB-L	C	E	F	F	F	F	B
	WB-T	A	F	F	F	F	F	F
	NB-R	A	A	A	A	A	A	A
Gorgas / Francisco / Lyon		A	A	D	D	D	D	B
	NB-L	A	A	D	D	D	D	B
	NB-R	A	A	A	A	A	A	A
	SB-LT	A	A	B	B	B	B	B
	SB-R	A	A	A	A	A	A	A
	EB-L	-	-	-	-	-	-	-
	EB-T	A	A	C	B	B	B	B
	EB-R	A	A	A	A	A	A	B
	WB-L	A	A	E	D	D	D	E
	WB-T	A	A	A	A	A	A	B
	WB-R	-	-	-	-	-	-	-
Presidio / Pacific		C	E	F	F	F	F	B
	WB-L	A	D	E	E	E	E	B
	WB-T	A	C	D	D	D	D	B
	WB-R	A	A	A	A	A	A	B
	EB-L	B	D	E	E	E	E	B
	EB-T	A	C	D	D	D	D	B
	EB-R	A	A	A	A	A	A	B
	NB-L	A	D	E	E	E	E	B
	NB-T	A	B	D	D	D	D	B
	NB-R	A	A	A	A	A	A	B
	SB-L	B	D	E	E	E	E	B
	SB-T	A	C	E	F	F	F	B
	SB-R	A	A	A	A	A	A	B

Intersecting Streets	Movement	1991 Peak Hours AM	1991 Peak Hours PM	2010 PM Peak Hour Models Alt. A	Alt. B	Alt. C	Alt. D	2010 PM Peak Hour with Recommended Improvements
Arguello / Jackson		A	B	B	B	B	B	A
	WB-L	A	C	F	E	F	F	A
	WB-R	A	A	A	A	A	A	A
	NB	A	A	A	A	A	A	A
	SB-L	A	A	A	A	A	A	A
	SB-T	A	A	A	A	A	A	B
15th / Lake		A	A	E	B	-	E	C
(& 14th/Lake in Alt. A)	NB-L	A	A	C	C	-	D	C
	NB-T	A	A	C	B	-	C	C
	NB-R	A	A	A	A	-	A	A
	SB-L	A	A	D	C	-	E	C
	SB-T	A	A	B	A	-	C	B
	SB-R	A	A	A	A	-	A	A
	EB-L	A	A	E	D	-	F	D
	EB-T	A	A	A	A	-	A	A
	EB-R	A	A	A	A	-	A	A
	WB-L	A	A	B	A	-	C	B
	WB-T	A	A	D	B	-	E	C
	WB-R	A	A	A	A	-	A	A
Lincoln / 25th		B	D	F	F	F	F	B
	NB-L	A	C	E	E	E	E	C
	NB-T	A	C	E	E	E	E	C
	NB-R	A	A	A	A	A	A	A
	SB-L	B	D	F	F	F	F	C
	SB-T	A	C	E	E	E	E	C
	SB-R	A	A	A	A	A	A	C
	EB-L	A	A	D	C	D	C	B
	EB-T	A	A	C	C	D	C	B
	EB-R	A	A	A	A	A	A	A
	WB-L	A	E	F	F	F	F	A
	WB-T	A	A	B	B	B	B	A
	WB-R	A	A	A	A	A	A	A

EB = Eastbound
WB = Westbound
NB = Northbound
SB = Southbound

L = Left turns
T = Through (straight ahead)
R = Right turns
- Movement not allowed.

Doyle Drive Reconstruction

Because the ultimate design for Doyle Drive could be based on several design options, traffic modeling concentrated on two general approaches to new Presidio access. Both would provide direct access to and from Doyle Drive in the main post/Crissy Field area. One option would combine this access with the Doyle Drive connections to Marina Drive, using a single, grade-separated interchange; the other would provide the Presidio access separately from the Marina access. The latter option would require a grade-separated interchange for the Presidio traffic and a single crossover (similar to existing conditions) for the marina traffic. Traffic modeling for Doyle Drive was conducted by revising models that were already completed for the existing system. The roadway network along Doyle Drive, Marina Boulevard, Richardson Avenue and in the general vicinity of the main post and Crissy Field was modified to reflect the roadway changes inherent in the two interchange designs.

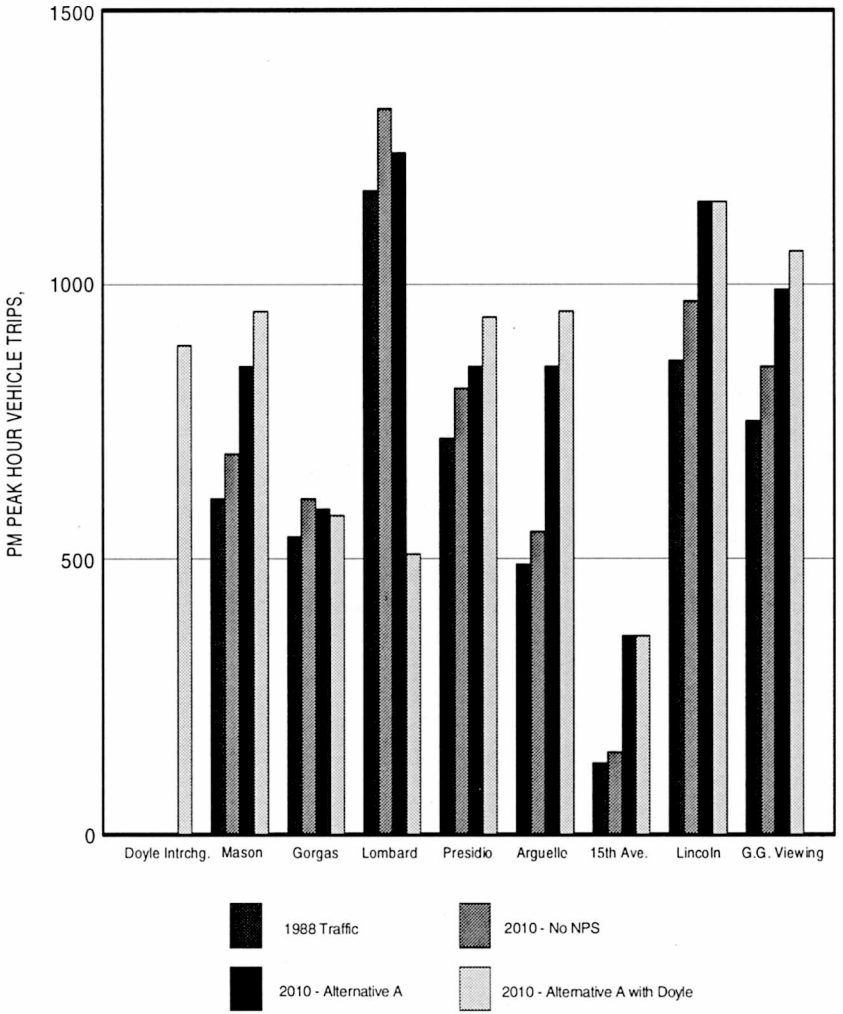
The purpose of this preliminary analysis was to identify the effects of the reconstruction project on the Presidio and the effects of Presidio-bound traffic on the future conditions of Doyle Drive; it was not intended to provide a full environmental impact analysis for the road project. For this purpose, the model was limited to measuring vehicle trips that would begin or end within the Presidio. As a result, only a small fraction of the total traffic on Doyle Drive, Richardson Avenue, and Marina Boulevard was analyzed. Traffic originating outside the Presidio but passing through the Presidio to other points was not included in the model volumes and would need to be added in order to analyze Doyle Drive operations.

Metropolitan Transportation Commission (MTC) planning staff were consulted to assist in estimating the neighborhood areas that would be expected to use the Presidio to access Highway 101 via Presidio and Arguello boulevards, thus avoiding Highway 1, as compared to those already using Lincoln Boulevard. Based on those discussions, the new access was assumed to serve a neighborhood in the Pacific and Presidio Heights and the Richmond district about one-half the size of the Richmond district neighborhood that is currently using Lincoln Boulevard. Accordingly, the model assumed that Arguello and Presidio boulevards would carry about one-half as much cut-through traffic (combined) as does Lincoln Boulevard now.

Traffic impacts resulting from the new Doyle Drive interchange were assumed to be similar for management alternatives being considered. Given this similarity and the acknowledged limitations of the designs available for analysis of Doyle Drive at this stage, the model was applied only to alternative A. The model was run for the year 2010.

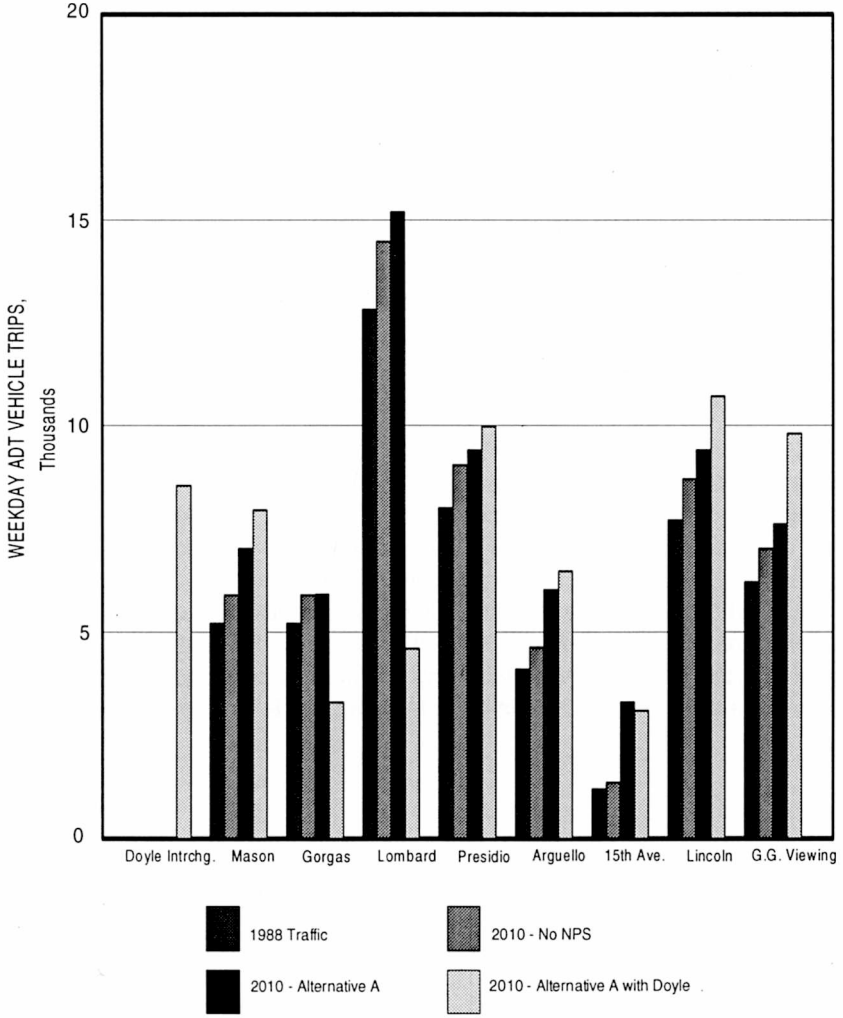
Scaled drawings of illustrative design concepts of the new Doyle Drive were drawn up to help assess potential physical impacts of the highway project. The Autocad plans were used to estimate how many additional acres would be needed to accommodate the widened roadway, the number and nature of buildings affected, and compatibility of the roadway with riparian corridor and wetlands restoration at Crissy Field.

FIGURE C-10: 2000 P.M. PEAK HOUR TRAFFIC AT GATEWAYS



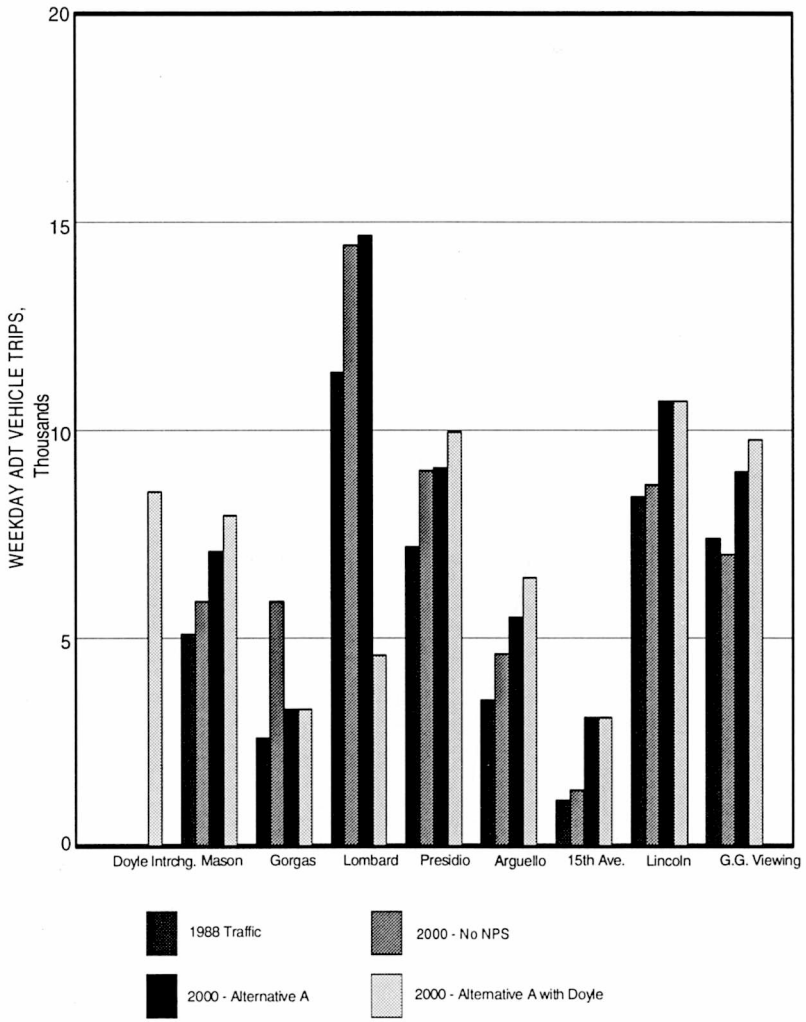
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-11: 2000 WEEKDAY ADT AT GATEWAYS



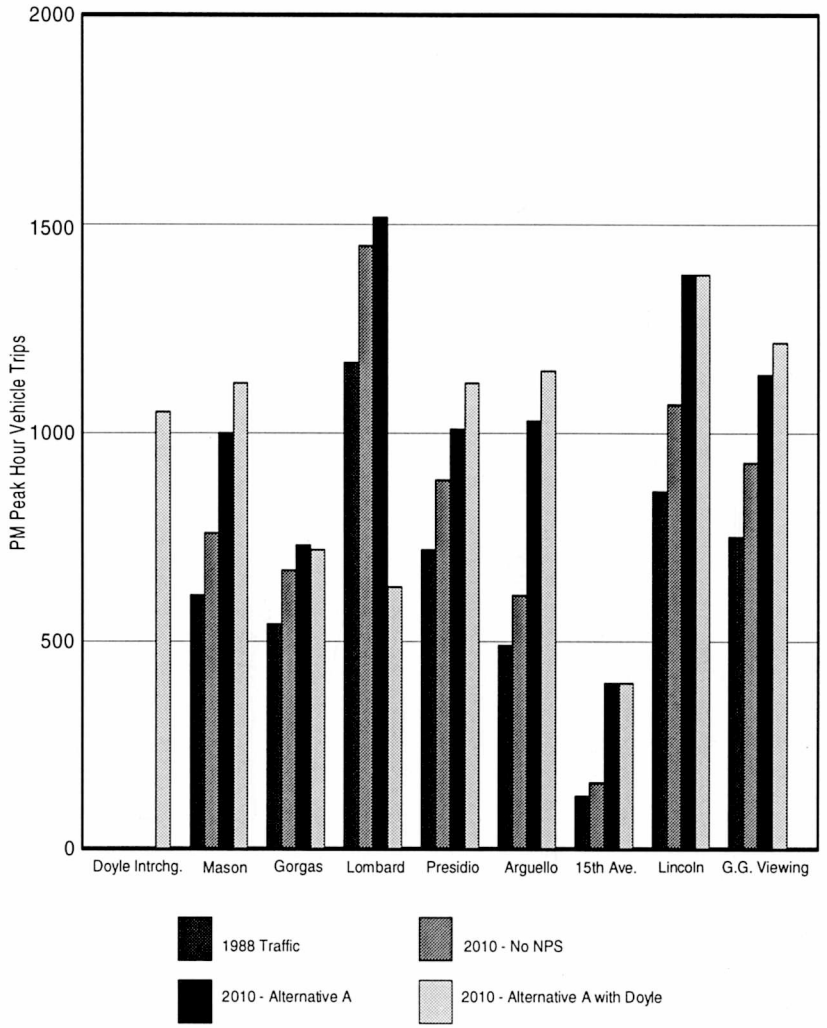
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-12: 2000 WEEKEND ADT AT GATEWAYS



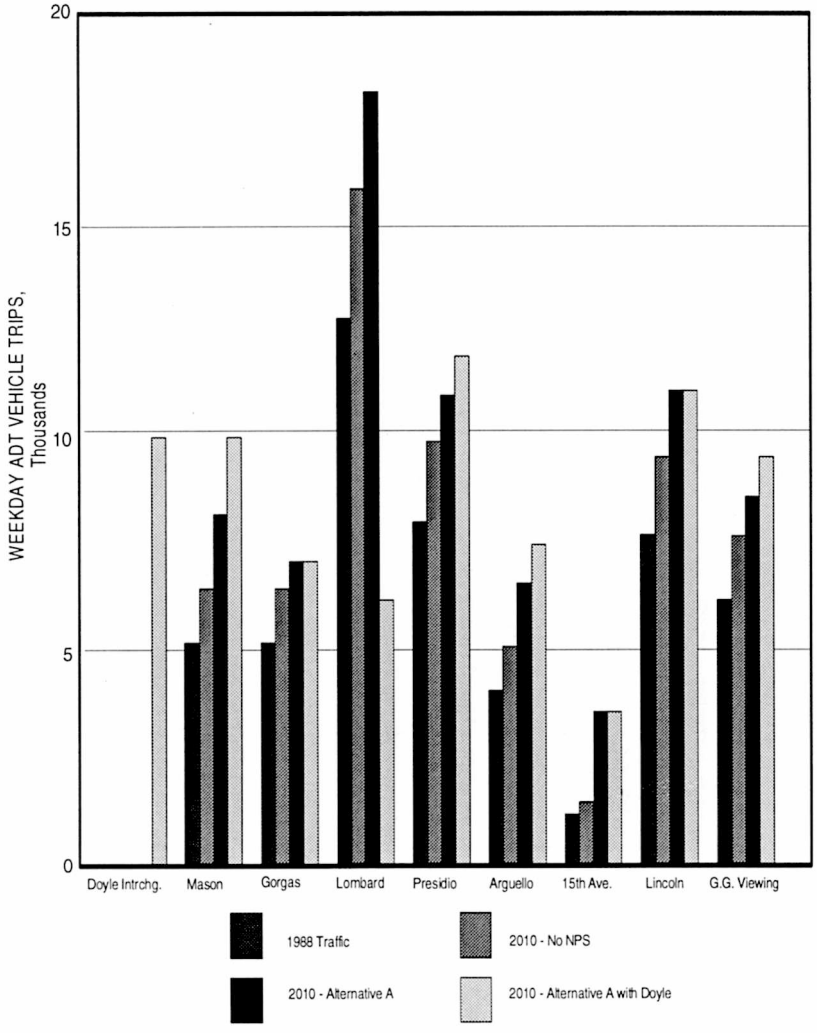
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-13: 2010 P.M. PEAK HOUR TRAFFIC AT GATEWAYS



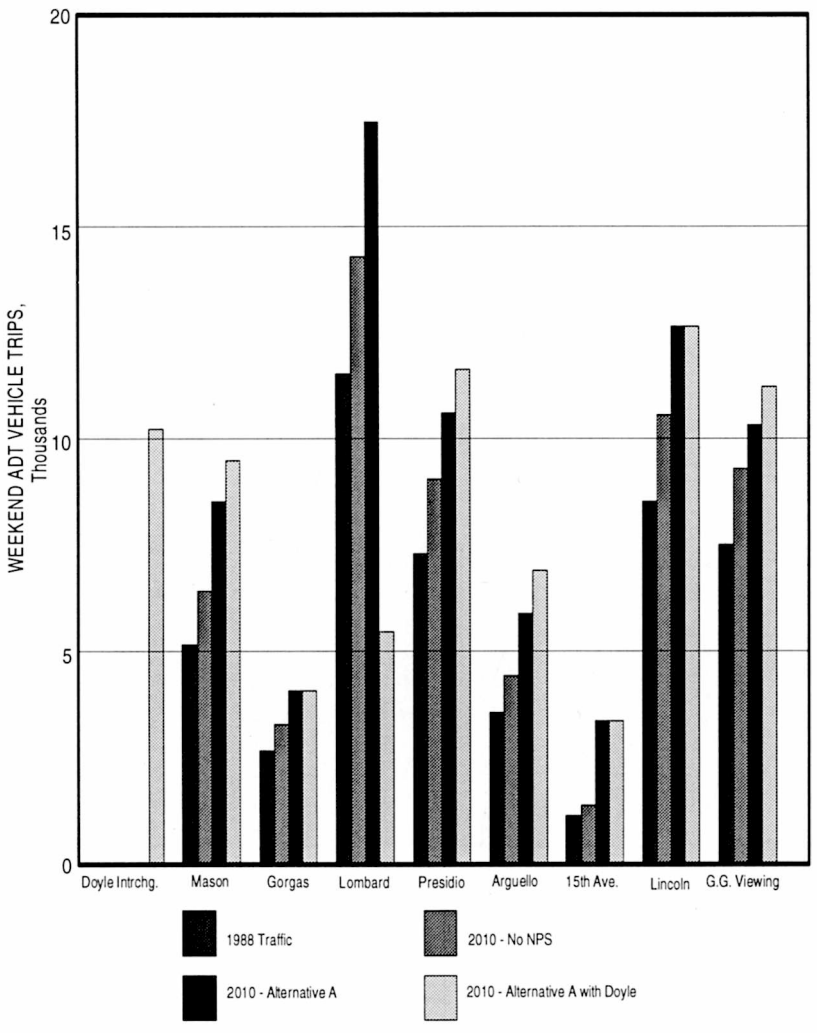
"No NPS" Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-14: 2010 WEEKDAY ADT AT GATEWAYS



No NPS Gateway Traffic is based on 1988 traffic models, plus 1% per year.

FIGURE C-15: 2010 WEEKEND ADT AT GATEWAYS



No NPS Gateway Traffic is based on 1988 traffic models, plus 1% per year.

Presidio Population Estimates

Estimates of future Presidio resident population were based on the number and sizes of housing units available in the Presidio under each of the reuse alternatives. The number of residential housing units available under the alternatives would vary substantially, ranging from about 300 units up to over 1,100, as described in the "Impacts on Housing" sections in the text.

To estimate the number of future Presidio residents, the total square feet of dwelling space was divided by an average floor area per occupant, taking into account available housing types. The current statewide average household size was used as a benchmark to test the reasonableness of the chosen average residential density factors. The Presidio housing stock composition would vary depending on the reuse alternative.

To estimate the number of residents who would be housed in the Presidio housing units, total floor area of residential space was divided by an average population density factor. Two different population density factors were used. For alternatives A and C the density factor was 700 square feet; for alternatives B and D it was 650 square feet. The lower density factor was used for alternatives A and C because the housing stock would have larger average sizes than under the other two alternatives (fewer buildings, larger square footage). If a 650-square-foot density factor was applied to alternatives A and C, the resulting average household size would be about 3.8 persons per unit. In comparison, the 1990 statewide average for California was only 2.8 persons per household. Thus, the density factor was adjusted to account for the larger size of the housing stock under these two alternatives. The following average household sizes were used in the analysis:

Alternative A	3.2 persons per household
Alternative B	2.7 persons per household
Alternative C	3.5 persons per household
Alternative D	2.6 persons per household

Dormitory occupancy was estimated on the basis of one occupant per bed instead of on a per square foot basis.

The total number of beds under each alternative was estimated for the years 2000 and 2010.

Air Quality

Measures of Significance for Predicted Air Quality Effects

The details of the air quality analysis done for the Presidio DEIS are contained in *Presidio Transportation Planning and Analysis Technical Report* (Peccia & Associates1993).

A significant air quality effect can be defined as a project or plan that would violate an ambient air quality standard, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations.

Several criteria of significance for air quality impacts have been identified in the Bay Area Air Quality Management District (BAAQMD) 1985 *Air Quality and Urban Development: Guidelines for Assessing Impacts of Projects and Plans.* The three criteria described below are directly applicable to the air quality effects of the National Park Service's proposed actions at the Presidio. According to the guidelines, a significant air quality effect would occur when

> a project or plan would generate CO concentrations (including appropriate background levels) above state or federal CO standards
>
> the level of emissions from a total of direct and indirect sources for any contaminant would equal or exceed the emissions levels set by BAAQMD to trigger best available control technology (BACT) requirements for a stationary source (The BACT threshold levels for HC, SO2, NOx, and particulates is 0.075 tons/day. The threshold for CO levels is when the state [1 hour, 20 ppm/8 hour, 9 ppm] or federal [1 hour, 35 ppm/8 hour, 9 ppm] ambient CO standard is exceeded.)
>
> the level of emissions from direct and indirect sources for any contaminant would reach or exceed 1% of the county emissions for that contaminant, or, for indirect sources only, the level of emissions would equal or exceed 1% of the transportation-related emissions of the county

The results of the CO and total emissions modeling done for this evaluation were compared to the three criteria to determine the significance of the predicted air quality effects at the Presidio. According to the BAAQMD guidelines, "a project or plan which violates the air quality standards or is estimated to lead to violations in the future, is recommended for mitigation or alternatives (or denial of approval) by the lead agency. Ideally the mitigations and/or alternatives would reduce the

impacts to the point where the project or plan would no longer lead to violations; it therefore would no longer be classified as of significant effect."

Affected Intersections and Road Links

The following intersections and road segments were identified as the locations where traffic volumes and congestion might produce localized CO impacts:

Intersections

- Doyle Drive and Merchant Road
- Doyle Drive and Park-Presidio Boulevard
- Lombard Street (East/West) and Richardson Avenue
- Marina Boulevard/Doyle Drive/Lyon Street/Mason Street
- Presidio Boulevard and Pacific Avenue
- Arguello Boulevard and Jackson Street
- Lake Street and 15th Avenue
- Lincoln Boulevard/El Camino Del Mar/25th Avenue
- Arguello Boulevard and Moraga Avenue
- Lincoln Boulevard and Halleck Street
- Presidio Boulevard and Lombard Street
- Lincoln Boulevard and McDowell Avenue
- Lincoln Boulevard and Kobbe Avenue

Road Segments

- Highway 101 (Doyle Drive) between Merchant Road and Highway 1
- Highway 101 between Highway 1 (Park-Presidio Boulevard) and Richardson Avenue
- Highway 1 south of Highway 101
- Marina Boulevard east of Richardson Avenue

Traffic Considerations. Three traffic scenarios were considered in the CO screening model. These scenarios included existing (1992) traffic conditions, future (2010) traffic volumes based on existing growth trends for the affected road network, and future (2010) traffic volumes with NPS uses and activities in place at the Presidio. The weekday afternoon peak hour is the period of interest for the CO analyses; therefore, the 1-hour levels were crucial in determining level of effect. Traffic data collected on major roads for this period during 1992 was used as a model input. Older traffic volumes were adjusted to current conditions; adjustments were based on a traffic growth rate of 1% per year.

As a means of comparing future CO levels at the Presidio with and without the proposed NPS activities, year 2010 traffic volumes were necessary for all affected roads. Year 2010 traffic volumes without further NPS activities or uses at the Presidio were projected on the basis of historical annual increases in traffic volumes for area roads. In general, it was assumed that 2010 volumes without NPS activities would be about 20% higher than 1992 volumes. Adjustments were made to the screening model inputs to account for slower travel speeds and congestion at locations where lower levels of service would be expected. These assumptions are very conservative and could show worse impacts than would actually occur.

Vehicle trip modeling for the Presidio road network based on projected land uses for the year 2010 was used to identify traffic conditions for the management alternatives. The NPS Presidio planning team identified proposed land uses for the Presidio in this year. The NPS is considering four alternatives (A, B, C, and D) for management of the Presidio. Each alternative involves differing land uses and trip-producing characteristics. The CO screening analysis focused on the year 2010 because all planned facilities would be in their final locations and fully used by this date. Traffic volume data based on the vehicle trip modeling for management alternative A was used in the assessment of 2010 CO levels because this alternative would generally produce numbers of future trips to the Presidio similar to those of the other alternatives; the variation between alternatives is less than 15%, which is within the range of accuracy of the model.

Computer CO Dispersion Modeling

The BAAQMD guidelines recommend that the CALINE4 model be used to calculate CO concentrations. The CALINE4 dispersion model, included in the California Air Resources Board's air quality analysis tools (AQAT-3), was used to perform CO calculations for road/freeway segments and intersections at the Presidio. CALINE4 provides a means for converting vehicle emissions from a specified mix and volume of traffic into pollutant concentrations. Pollutant emission factors for moving and idling traffic under baseline conditions and in the year 2010 were taken from composite emission factors calculated by EMFAC7EP, a computer model developed by the California Air Resource Board in 1991. These emission factors are summarized in the BAAQMD guidelines, which were also updated.

The CO analyses focused on a 1-hour "worst-case" situation for meteorological traffic conditions at Highway 101 and Merchant Road and at the Highway 101/ Highway 1 interchange, the two locations identified through the screening analysis

as having the highest 1-hour and 8-hour CO levels based on current and future traffic conditions. The worst hour for CO production was assumed to occur during weekday p.m. peak hour traffic at these locations. Background CO concentrations similar to those used in the CO screening model of each site were assumed for the analyses.

Since the highest CO concentrations in the Bay Area usually occur on cold, clear winter days and nights with little wind, meteorological conditions for the model were assumed to be very light winds (0.5 meters per second) and an assumed temperature of 50°F for the Presidio area.

CALINE4 requires that links be designated to represent segments of roadway with similar widths, height, traffic volumes, and emission factors. Average traffic speeds and vehicle delays were defined for each link under current and future conditions. The dispersion model also requires that receptors be established around the site being analyzed. These receptor locations were positioned around the intersections at locations where the highest CO concentrations would be expected to occur.

Estimates of CO concentrations were made for each receptor under the worst-case conditions for traffic and local meteorology. The CALINE4 model is capable of selecting the wind bearing that yields the highest 1-hour CO concentrations at each receptor. The CO levels calculated by the model were then compared to the 1-hour federal and state standards for CO, the BAAQMD's measures of significance for CO.

The CO dispersion modeling assumptions for the two intersections analyzed are briefly discussed below.

Highway 101 and Merchant Road. This site is unique because the intersection of Highway 101 and Merchant Road is just southeast of the toll plaza for the Golden Gate Bridge. Vehicles southbound on Highway 101 (entering the city) must stop and pay a toll at one of the many booths at the toll plaza. Northbound traffic must slow down while passing through the toll plaza area but is not required to stop. The intersection is extremely wide (about 14 lanes) because of the configuration of lanes necessary to handle traffic entering and leaving the toll booths. Only right turns are permitted from Merchant Road onto Highway 101 and from Highway 101 onto Merchant Road. Left turns between Highway 101 and Merchant Road are not permitted.

For CO modeling, 9 roadway links were identified and 10 receptors were positioned around the intersection of Highway 101 and Merchant Road. It was also assumed that a maximum of eleven travel lanes would be available through the toll plaza during the p.m. peak hour. Free-flow travel speeds on Highway 101 were reduced to account for the more congested conditions that would be likely on Highway 101 in 2010.

Highway 101 and Highway 1. The intersection of Highway 101 and Highway 1 in the Presidio is a complex interchange consisting of four ramps. Traffic is not required to stop at any location here. Two ramps, the southbound Highway 1 ramp from westbound Highway 101 and the eastbound Highway 101 ramp from Highway 1, have sharp changes in alignment that restrict travel speeds to 20 mph and 25 mph, respectively.

Twelve receptors and 12 links were established at the intersection for CO modeling purposes. Table 25 in the text summarizes the worst-case CO concentrations for the receptors identified at this site using the CALINE4 model for current and future conditions at the Presidio.

Total Emissions from Mobile Sources

The BAAQMD guidelines recommend that in addition to estimating concentrations of local contaminants like CO, total emissions be calculated for the pollutants of concern based on the number of motor vehicle trips generated by the proposed activities or project. Necessary data for this calculation are estimates of average trip lengths and trip generation rates, emissions per mile for the year of concern, vehicle speeds, and correction factors for hot and cold starts. The guidelines also suggest that total emissions for air contaminants be calculated and compared to the total amount of pollutants generated in the air quality district and county in which the project is located.

The BAAQMD guidelines recommends that the URBEMIS model be used for any project or planned development that would generate 10,000 or more vehicle trips per day. URBEMIS 3 was obtained from the California Air Resources Board and used to calculate vehicle emissions for land uses and activities at the Presidio under current and future conditions. Total emissions for base conditions (1990) were calculated and compared to year 2010 emissions if current uses continued at the Presidio and for 2010 emissions under each of the NPS management alternatives.

The emissions analysis relied on the land use database and future land use changes developed by the NPS's Presidio planning team and the trip generation rates used in the Presidio traffic model as key inputs to the URBEMIS 3 model. Values provided by the model for trip lengths, percentage of cold starts, and vehicle fleet mix for the years 1990 and 2010 were used as other key inputs to the calculation of vehicle emissions.

Criterion 2 of the BAAQMD's measures of significance indicates that emission levels for all mobile-source contaminants except carbon monoxide are considered significant whenever they equal or exceed the levels set by the agency to trigger best available control technology (BACT) requirements. The emission levels presented in table 39 in the text were compared with the BACT threshold levels of 0.075 tons per day to determine significance. The results of the computer modeling presented in the table were also used to assess the relative impacts of the proposed NPS management alternatives on the major vehicle-generated air contaminants.

Noise

Key Noise Terms and Noise Descriptors

Sound level measurements are established according to a logarithmic scale of decibels (dB). Separate measurements can be made for different sound frequency ranges, the most common being the "A-weighted" decibel scale that approximates the way the human ear responds to noise levels. Measurements on the A-weighted scale are expressed as dBA.

Noise descriptors commonly used in impact assessments and in environmental documents include L_{10}, L_{eq}, and L_{dn}. These descriptors are defined below:

> L_{10} - the sound level that is exceeded 10% of the time for the period under consideration. This value is an indicator of both the magnitude and frequency of occurrence of the loudest noise events.
>
> L_{eq} - the equivalent steady-state sound level that in a designated period of time (often 1 hour and expressed as $L_{eq}(h)$) would contain the same amount of sound energy as the varying levels of the noise source during the same time period
>
> L_{dn} - a 24-hour L_{eq}, with a 10 dB penalty applied to nighttime levels. This descriptor presents a day-night average noise level.

The L_{10} descriptor is easily understood. The Leq descriptor is harder to understand but has advantages over L_{10} because it is more reliable for low-volume roadways, and noise levels from various sources can be added to one another for inclusion in noise analyses. The L_{eq} is typically about 3 dBA less than the L_{10} for the same conditions.

Applicable Federal, State, and Local Noise Compatibility Guidelines

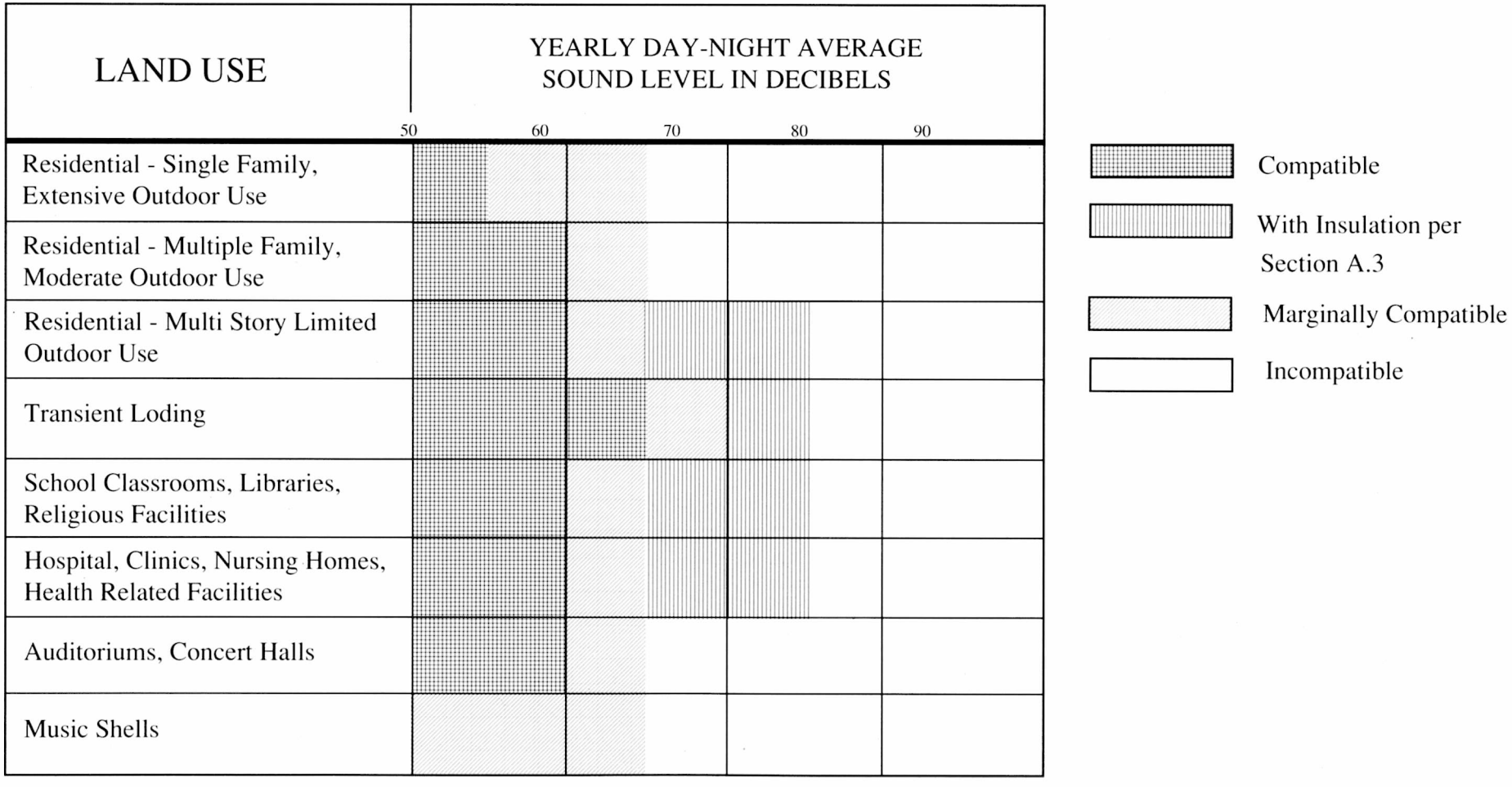
Because vehicular traffic is the major source of noise and future NPS activities at the Presidio are expected to increase vehicle traffic, guidelines for assessing traffic-related noise impacts are of primary interest. Noise compatibility guidelines and standards for various land uses have been promulgated by federal, state, and local agencies.

Federal Guidelines. Several federal guidelines are applicable to the assessment of noise impacts. The first is the American National Standard Institute's *Sound Level Descriptors for Determination of Compatible Land Use* (ANSI 1990). The ANSI standard specifies that the L_{dn} descriptor should be used when addressing the issue of noise and land use compatibility. Figure C-16 shows L_{dn} for various land uses and indicates when the noise level is compatible or incompatible with a particular use.

A second noise standard, the "Federal Interagency Guidelines for Considering Noise in Land Use Planning and Control", was agreed to by the Department of Housing and Urban Development (HUD), the U.S. Department of Transportation, the U.S. Environmental Protection Agency, and the U.S. Department of Defense in 1980. These guidelines provide the basis for the ANSI noise guidelines.

Guidelines for assessing noise impacts due to traffic have been established by the Federal Highway Administration (FHWA). These standards, known as noise abatement criteria (NAC) and contained in 23 CFR 772, must be followed by an agency when doing noise studies for projects involving federal-aid funds. The standards identify design noise levels and relate them to various land uses and/or activities. Of primary importance at the Presidio are land uses included in categories A and B of the NAC. Category A includes those areas where quiet is essential for enjoyment, such as nature sanctuaries; category B includes noise-sensitive receptors like residences, schools, churches, hotels, motels, and outdoor recreation areas.

FIGURE C-16: ANSI S12.40-1990 COMPATIBLE NOISE LEVELS



LAND USE (CONTINUED)	YEARLY DAY-NIGHT AVERAGE SOUND LEVEL IN DECIBELS				
	50	60	70	80	90
Sport Arenas, Outdoor Spectator Sports					
Neighborhood Parks					
Playgrounds, Golf Courses, Riding Stables, Water Rec., Cemeteries					
Office Buildings, Personal Services, Business and Professional					
Commercial - Retail, Movie Theaters, Restaurants					
Commercial - Wholesale, Some Retail, Ind., Mfg., Utilities					
Livestock Farming, Animal Breeding					
Agriculture (Except Livestock)					
Extensive Natural Wildlife and Recreational Area					

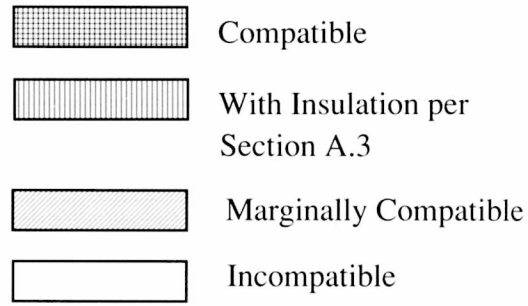


TABLE C-5: FHWA NOISE ABATEMENT CRITERIA (NAC)

Activity Category	Design Noise Level (L_{eq} 1-hour)	Design Noise Level (L_{10} 1-hour)	Description
A	57 dBA (exterior)	60 dBA (exterior)	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67 dBA (exterior)	70 dBA (exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sport areas, and parks
C	72 dBA (exterior)	75 dBA (exterior)	Developed land properties or activities not included in categories A and B above (for example, commercial and industrial development)
D	—	—	Undeveloped lands
E	52 dBA (interior)	55 dBA (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums

As indicated in table C-5, the FHWA standards specify design noise levels for specific receptors and land use types. This standard is in terms of the L_{eq} sound level, which is the average sound level for the hour of measurement and in terms of L_{10}, the noise level exceeded during 10% of the hour of measurement. The FHWA standards state that noise impacts are serious enough to warrant consideration of abatement when noise levels from the project approach or exceed the NAC or when they substantially exceed existing noise levels. "Substantially" is typically defined as a 10 dB increase by many state highway agencies.

State of California Guidelines. The California Department of Transportation also relies on the FHWA noise abatement criteria as its evaluation standard for assessing traffic noise impacts. Chapter 1100 of the Caltrans *Highway Design Manual* (4th edition, July 1990) outlines the procedures and guidelines for assessing noise impacts. The design manual also contains a discussion of when noise reduction measures should be considered. It indicates that noise abatement must be considered on all construction or reconstruction projects where the predicted design-year noise level increases by 12 dB over the ambient level and the design-year level equals or exceeds 65 dBA L_{eq}.

Local Noise Standards. Article 29 of the *Police Code of the City and County of San Francisco Ordinances* (City of County of San Francisco 1972) is devoted to the regulation of noise. Specific sections of article 29 address vehicle-related noise levels, fixed-source noise levels, construction noise, and limits on property line sound levels for daytime and nighttime periods. The article also contains provisions for enforcing noise regulations. Noise standards are presented in dBA in article 29. The ordinance indicates that it is unlawful for a person to operate a motor vehicle that emits noise in excess of 80 dBA on street and highway rights-of-way. Property-line limitations on vehicle noise range from 50 to 60 dBA for residential zones and between 60 and 75 dBA for commercial and manufacturing zones. Permissible nighttime property line noise levels are 5 to 10 dBA less than daytime limits.

Appendix D: Analysis of Health Hazards Related to Hazardous Wastes

Hazards at the Presidio are largely due to chemical contamination. The potential hazards of chemical contamination are discussed here alphabetically by chemical, with information on where they are found at the Presidio, a summary of their toxicology, and risk assessments for human health and environmental effects.

Antimony

Chronic oral exposure to antimony causes vomiting and diarrhea. Antimony accumulates in the seeds of some plants.

Antimony was found in surface water at the Nike facility (up to 281 parts per billion [ppb] [Watkins-Johnson 1993) and in groundwater near building 937 (up to 143 ppb). In 1992 the EPA lowered the MCL[1] for antimony in drinking water to 0.006 ppm (6 ppb) (EPA 1992b). The groundwater near building 937 will not be used for drinking water or irrigation.

Antimony was found in the soil at landfill 2 (164 ppm, compared to a normal soil level of 0.2-0.5 mg/kg [ppm]), and in soil in the DEH area (up to 166 ppb). Antimony in soil is responsible for an oral exposure hazard at landfill 2. The hazard is mainly to children, who may put their fingers into their mouths after playing in the dirt.

Antimony trioxide, which is used in paint, rubber, and inks, causes cancer of the liver, lungs, and skin. According to the International Agency for Research on Cancer (IARC), antimony trioxide is a 2B carcinogen.[2,3]

Arsenic

Excess arsenic levels were found in soil near building 643 (6.79 ppm), in sediments at Lobos Creek, in groundwater near building 937 (31.2 ppb), and in Lobos Creek (15 ppb in one of three 1990 samples). The background soil level at the Presidio is 4 ppm (Stollar et al. 1991a).

Inorganic arsenic compounds are EPA group A carcinogens.[4] The California applied action level (AAL)[5] for protection of saltwater organisms is 69 ppb, and for protection of freshwater organisms it is 70 ppb (California Department of Toxic Substances Control [DTSC] 1991). The EPA has recommended that drinking water not exceed 50 ppb, which results in a risk of 1 in a million for persons deriving all their water from the arsenic-containing source. Under any alternative, arsenic-contaminated well water will not be used for drinking or irrigation, which will eliminate the risk of cancer from drinking water. Remediation has been carried out in the area where the highest arsenic level in groundwater was found (Buck 1993).

Arsenic in soil is the primary reason for the cumulative cancer risks for residential land use of 2 in 100,000 at landfill 1 and 4 in 100,000 at disturbed area E (Watkins-Johnson 1993a) west of Hicks Road.

Chronic exposure to inorganic arsenic compounds causes noncancer effects of anemia; nerve damage to fingers and toes; damage to the heart, kidney, and liver; and skin disorders. Sodium arsenate is a teratogen (causes birth defects) in hamsters, causing major brain defects and defects in the genitourinary tract.

Arsenic accumulates in mammalian hair and nails, probably in brown algae, and in some marine invertebrates (Bowen 1979). Some algae are sensitive to arsenic at

1. MCL=maximum contaminant limit, the federal drinking water standard.

2. Group B: probable human carcinogen - an agent for which the weight of evidence of human carcinogenicity based on epidemiologic studies is "limited," or an agent for which the weight of evidence of carcinogenicity based on animal studies is "sufficient." This group is divided into two subgroups: group 2B - the agent is possibly carcinogenic to humans based on (1) limited evidence in humans in the absence of sufficient evidence in experimental animals; (2) inadequate or no evidence of carcinogenicity in humans but sufficient evidence of carcinogenicity in animals; or (3) inadequate or no evidence of carcinogenicity in humans, limited evidence of carcinogenicity in animals, but supporting evidence from other relevant data.

3. The cancer hazards of antimony exposure were not considered in the risk analysis for the Presidio (Stollar et al. 1992b) because antimony has not been listed as a carcinogen by the EPA. The EPA regulates antimony as a priority pollutant, and antimony and its compounds are on the SARA 313 toxic chemical list.

4. Group A: human carcinogen - used only when there is sufficient evidence from epidemiologic studies to support a causal association between exposure to the agents and cancer.

5. AALs are maximum acceptable exposure levels to the toxic substances. AALs cited in this document are from California Department of Toxic Substances Control *Applied Action Level (AAL) List* 91-1 (1 August 1991). These levels are not legally enforceable, but they are indications of a level of concern and triggers requiring detailed analysis by the state of California.

10 ppb (SWRCB 1990). Excess arsenic levels can be expected to affect ecological balance. The groundwater near building 937 exceeds the AAL for saltwater organisms and, even if diluted, may pose a threat to organisms in the wetlands to be created at Crissy Field. Remediation of arsenic contamination by the Army may delay NPS management actions or require closure of contaminated areas.

Asbestos

Stollar et al. (1991b) stated that "a remediation program is currently underway to abate friable [crumbling] asbestos that may present a threat to human health. This asbestos abatement program for buildings is being conducted separately from the RI/Feasibility [remedial investigation/feasibility] Study." Nonfriable asbestos remaining in buildings will have to be removed by the Park Service if the buildings are to be remodeled. The multimillion dollar estimate for removal of asbestos from buildings to be demolished has led the Park Service to reexamine its options for handling asbestos.

There may be some naturally occurring asbestos in rock and soil at the site because of the presence of serpentine rocks that contain asbestos. No investigation of naturally occurring asbestos has been made (Macievich 1991a). There is a potential hazard to human health under all of the alternatives as a result of inhalation of asbestos fibers in areas where the ground is disturbed by grading, excavation, etc

Benzene

There have been numerous releases of petroleum hydrocarbons, most commonly gasoline, at the Presidio. In the past, when many of the gasoline leaks at the Presidio occurred, 5% benzene was common in gasoline. Currently, 2%-3% is common. Groundwater near building 937 was found to have up to 570 ppb of benzene in 1984[6] and up to 430 ppm in 1990. Groundwater near building 979 had up to 62 ppb of benzene in 1990. In 1992 the maximum concentration of benzene near building 937 was 1,000 ppb; the maximum level at building 979 had dropped to 0.07 ppb.

The AAL for freshwater and marine organisms is 1 ppb. Groundwater containing benzene poses a potential human health and ecological hazard. Under any of the alternatives, this water would not be used for drinking water or irrigation.

About 50% of inhaled benzene is absorbed. Less is absorbed through the skin (ORNL 1989). Benzene is an IARC group 1,[7] EPA group A, carcinogen that causes human leukemia and lymphoma. Where groundwater is relatively close to the surface, some unvolatized benzene may move through the soil to be inhaled by persons lying on the ground.

The bacterium *Pseudomonas* is about 10 times as sensitive to the volatile gasoline components benzene, methyl benzene (toluene), and ethyl benzene as are the green alga *Scenedesmus* and the protozoan *Entosiphon* (Bringman and Kuehn 1988). The varying sensitivity of soil and water microorganisms to low level benzene contamination results in selective depression of less tolerant species and alters the ecological balance. These effects may be difficult to correlate with the original cause because of complex food web interrelationships. Since groundwater samples closest to the bay do not contain benzene (Buck 1993), the risk of benzene effects from groundwater reaching bay organisms is probably low.

Cadmium

Cadmium was found in storm drain sediments in the 900 series buildings area (up to 30 ppm); in soil near buildings 930,931 (87.3 ppm), near building 950 (9.89 ppm), at landfills 2 (415 ppm, 1992) and 9 (17.6 ppm), and in disturbed area E (65 ppm); and in groundwater near building 937 (up to 31 ppb). The cadmium near buildings 930,931 is due to surface contamination, since no cadmium was found at a depth of 2 feet (Buck 1993). The Army will make additional tests for metal in soil, including cadmium, near building 931, at the request of the California Department of Toxic Substance Control (CDTSC 1992).

6. 1984 data cited in Stollar et al. 1991a.

7. Group 1 - The agent is carcinogenic to humans based on a determination that there is sufficient evidence of carcinogenicity and a causal relationship has been established between exposure to the agent and human cancer.

Cadmium is excreted slowly, so that it tends to accumulate in exposed persons. About 10%-60% of inhaled cadmium is absorbed. Cadmium accumulates in the mammalian kidney where it causes noncancer damage. Cigarette smokers are close to the limit of safe cadmium intake from routine food, drink, and cigarette smoke, so that any additional exposure puts them at risk of kidney damage. Cadmium is accumulated by fungi and by mollusks such as scallops (Bowen 1979) so that bioconcentration can affect ecological balance on land and in the sea. Cadmium is an EPA class B1 carcinogen[8] that causes lung cancer. The MCL is 0.5 ppb (EPA 1992b). The AAL is 0.2 ppb for freshwater organisms and 5 ppb for saltwater species. The groundwater cadmium level near building 937 exceeds these AALs, and the cadmium contaminated soils represent a human inhalation and ingestion hazard.

Remediation of cadmium contamination by the Army may delay NPS management actions or require closure of contaminated areas.

Chromium

Excess total chromium levels were found in soils near buildings 637 (up to 1,800 ppm in 1992), 931 and 950 (915 ppm in 1992), the DEH area (1,040 ppm in 1992), the petroleum, oil, and lubricants storage area (POL area) near the commissary on Crissy Field (1,360 ppm) and near building 1351 (1,270 ppm), in a wipe sample from building 926 (32.5 Êg/m[9]/cm2), and in groundwater near building 937 (up to 0.546 ppm). The last- named area has been remediated (Buck 1993). High chromium levels are naturally found in some serpentine in San Francisco. This is probably responsible for the chromium level of 812 ppm found in one "background" soil sample when the other four background samples taken by the Army's consultant were in the range of 41 to 110 ppm (Stollar et al. 1991a). Anthropogenic chromium sources include paint, particularly when the paint is sprayed.

Chromium is bioaccumulated by some trees. Trace amounts of chromium are essential for mammalian survival. Chromium is toxic to plants at 0.5 to 10 ppm in water. The MCL for chromium is 0.1 ppm. The AALs for saltwater and freshwater organisms are 0.002 ppm and 0.05 ppm, respectively.

Chromium is an IARC Group 1 human lung carcinogen. Excess chromium levels in soil present a human inhalation and ingestion hazard.

Remediation of chromium contamination by the Army may delay NPS management actions or require closure of contaminated areas.

Copper

Above normal copper levels are shown in table D-1. Soluble copper compounds in dust can cause vomiting, dizziness, exhaustion, red blood cell damage, and damage to the nervous system and kidneys. Copper is bioaccumulated by some mosses; some members of the mustard, sunflower, mint, and linden tree families; some sponges; and in the blood of crustaceans and mollusks. Copper is accumulated 10,000-fold by green algae (Stary et al. 1983). Copper is toxic to a marine diatom at 20 ppb (Stauber and Florence 1987). People are less sensitive to copper than plants and animals, with the AAL for drinking water being 4,000 ppb compared to AALs for freshwater and saltwater organisms of 4 and 6 ppb, respectively. Concentrations of 0.5 to 8 ppm are toxic to higher plants.

The copper level in groundwater near building 937 exceeds the AALs to protect freshwater and marine organisms. This water is diluted before it reaches San Francisco Bay but, in view of the number of chemicals that exceed applicable AALs or other standards, this water may represent an ecological hazard. High soil copper areas may affect soil microbiology and plant growth.

Remediation of copper contamination in groundwater by the Army may delay NPS management actions such as the restoration of Crissy Field wetlands or require closure of contaminated areas.

8. Group B1 includes agents for which there is limited evidence of carcinogenicity from epidemiologic studies. It is reasonable, for practical purposes, to regard an agent for which there is "sufficient" evidence of carcinogenicity in animals as if it presented a carcinogenic risk to humans.

9. ug = microgram; there are 1,000,000 micrograms in a gram.

TABLE D-1: COPPER-CONTAMINATED SITES

Site	Contaminated Medium	Maximum Copper Level (ppm)
Near buildings 930/1	soil	476
Landfill F (1992)	soil	215
Near building 924	soil	205
900s buildings area	storm drain sediments	144
Landfill E (1992)	soil	121
Near building 110 (before remediation)	soil	110
Near building 637	soil	70
Background	soil	5
Building 638	soil	na
Building 926	wipe sample	76
Near building 937	groundwater	116 ppb

DEHP

DEHP (bis(2-ethylhexyl)phthalate, dioctylphthalate) was found in storm drain sediments in the 900 series buildings area (120 ppm), in soils near buildings 937 (12 ppm) and 1351 (44 ppb), in soils at landfill 3 (49 ppm), in groundwater near building 937 (79 ppb), in building 283 (19 Êg/cm2 of surface), and at lower concentrations in other locations. This IARC 2B, E&A 2B carcinogen is ubiquitous. Its major use as a plasticizer for polyvinyl chloride plastics (PVC), where its presence in naugahyde-type and other common plastics is responsible for "new car odor."

DEHP is bioconcentrated 54,000-fold by the alga *Oedogonium*, 22,000-fold by the land snail Physa, 12,000- fold by mosquito larvae, 9,400-fold by mosquito fish, and 275-fold by the freshwater plant Elodea. DEHP causes birth defects in rats and mice. The federal MCL for drinking water is 6 ppb, an order of magnitude less than in groundwater near building 937. Groundwater near building 937 will not be used for drinking water or irrigation. The cancer risk of skin contact with soils near buildings 924 and 925 was calculated to be 2 in 1,000,000, primarily because of DEHP exposure (Stollar et al. 1991b). Phthalates are the main source of soil- based cancer risk in recreational use at Landfill 3 (4 in 1,000,000) and residential use cancer risk (2 in 100,000) (Stollar et al. 1991b). Because of the human health risk, NPS management actions such as soil disturbance will not occur until the Army has removed contaminated soils.

1,4-Dichlorobenzene

1,4-Dichlorobenzene (paradichlorobenzene) was found in soils near buildings 930/931 (7.4 ppm). The main use of paradichlorobenzene is as a pesticide to control mildew, molds, and moths. This compound causes kidney and liver cancer in rodents and is an IARC 2B carcinogen (Anon. 1991a). It causes noncancer risks in the central nervous system, kidneys, and liver in humans and animals. The MCL is 0.0075 ppm. The California Department of Health Services (CADHS) no significant risk level (as defined by Proposition 65, 1 in 100,000 excess cancer risk) is 18 micrograms/day (Pease et al. 1990), or 2.4 grams of soil near buildings 930/931. The 1 in 1,000,000 risk would be caused by 0.24 grams of this soil.

Remediation of paradichlorobenzene contamination in soils by the Army may delay NPS management actions at the eastern end of Crissy Field or require closure of contaminated areas.

1,2-Dichloroethane

1,2-Dichloroethane (Dichloroethane and dichloroethylene) was found in storm drain sediments near building 640 at Crissy Field (1,900 ppb) and in groundwater near building 937 (up to 390 ppb in 1984). This substance is used as a metal degreaser and fumigant and is found in paint, varnish, and other finish removers. It is toxic to guppies and some algae at 105 ppm, to bacteria at 135 ppm, and kills frogs at 110 ppm in air. It is an IARC 2B carcinogen. The MCL is 5 ppb. Remediation of the groundwater near building 937 has been carried out. If the groundwater near building 640 can move into the proposed wetland, it should be cleaned up before the wetland is established to avoid toxic effects on wetlands organisms. The 1,2-Dichloroethane in storm drain sediments may contribute to the level of carcinogens in the new wetland.

1,1-Dichloroethene

1,1-Dichloroethene (vinylidene chloride or 1,1-dichloroethylene) is found in groundwater near building 937 (over 150 ppb) and in groundwater near building 979 (1.8 ppb). 1,1-Dichloroethene kills fish at 250 ppm; affects the human central nervous system, kidney, and liver; causes major injury to liver and kidneys in animals at 25 ppm in air; and causes reproductive damage in rats at 55 ppm in air. This substance is an RTECS carcinogen.[10] The MCL is 7 ppb. Acute effects would not be expected from the levels found in groundwater but chronic exposure could result in induction of cancer in organisms, including people. Groundwater near building 937 and 979 will not be used for drinking water or irrigation.

Trans-1,2-dichloroethene

The solvent 1,2-dichloroethene is found in groundwater near building 937 (over 150 ppb in a new well) and in groundwater near building 979 (81 ppb). In 1984, groundwater near building 937 had a maximum of 80 ppb of 1,2-dichloroethene. The latter well had less than 80 ppb in 1990, indicating either increasing contamination or movement of the groundwater plume. The MCL for the trans form (the two chlorine atoms on opposite sides of the molecule) is 100 ppb and for the cis form (both chlorine atoms on the same side of the molecule) is 70 ppb.[11] Further testing will be required to determine the source of the contamination and appropriate cleanup and impact. Some remediation has been carried out in the area of building 937 (Buck 1993).

10. A chemical is considered "carcinogenic by RTECS criteria" when review of an article reveals that all of the following criteria are satisfied:

(a) there is a statistically significant increase in the incidence of tumors in the test animals. If no statistical analysis results are reported, a Fisher's Exact Test is applied with significance at the 0.05 level or better, unless the author makes a strong case for significance at some other level.
(b) A control group of animals is used and the treated and control animals are maintained under identical conditions.
(c) The sole experimental variable between the groups is the administration of the test substance.
(d) The tumors consist of autonomous populations of cells of abnormal cytology capable of invading and destroying normal tissues, or the tumors metastasize as confirmed by histopathology.

11. Some analyses are indicated as trans, and others do not indicate whether the cis- or trans- form or both were analyzed.

2,4-Dimethylphenol

2,4-Dimethylphenol (2,4-xylenol) is found in groundwater near building 937 (up to 2.2 ppm) and inside building 283 in the DEH study area (16 µg/cm2 of surface). This compound is used in insecticides and fungicides and automotive cleaning products and is a natural constituent of asphalt. This dimethylphenol kills fish at 13 to 30 ppm and is an RTECS carcinogen. The level of dimethylphenol in groundwater near building 937 is probably not great enough to cause acute toxic effects in the environment but would contribute to the cumulative carcinogenic risk of this water.

Lead

Excess levels of lead are found scattered over the Presidio, see table D-2). The chronic ambient water quality criterion for lead was exceeded in one of five samples collected from Lobos Creek. Lead and its compounds have relatively low water solubility and tend to bind to soil particles, so they migrate slowly in soil.

Lead was a common paint constituent in the past. A May 1992 study (Davis et al. 1992) found that old paint from the Golden Gate Bridge has contaminated nearby areas of the Presidio, and lead levels have been found to be 2,100 ppm at the Coastal Trail east of the bridge, 3,700 ppm at the Fort Point overlook, and 10,700 at Lighthouse Keeper's Bluff at Fort Point. The California EPA has required installation of chain-link fencing to close the Lime Point fishing area to protect people from lead exposure (Anon. 1992a).

Lead at or above 1,000 ppm in soil is classified as a hazardous waste by the state of California (title 25, *California Administrative Code*). The California MCL for lead is 50 ppb.

The federal Lead-Based Paint Poisoning Prevention Act (Public Law 91-695) provides that

> the Secretary of Health, Education, and Welfare shall take such steps and impose such conditions as may be necessary or appropriate to prohibit the use of lead-based paint in residential structures constructed or rehabilitated after the date of enactment of this Act by the Federal government, or with Federal assistance in any form.

Lead paint abatement involves total removal of contaminated materials, paint stripping of surfaces in place, temporary removal of architectural features for stripping elsewhere, or encapsulation of surfaces with new materials. Selection of abatement procedures for historic structures requires particular care.

> Since the optimal abatement treatment from a public health standpoint appears to require total removal and disposal of contaminated material, cultural resource managers are faced with a difficult dilemma between environmental responsibility and the protection of physical cultural patrimony (Marione and Park 1990).

Nothing has been done to abate lead paint in Presidio housing (Swanson 1993), where children could be exposed to peeling lead paint. Lead causes the same toxic effects by any route of exposure. Lead is a neurotoxin that particularly affects the brains of children. Several federal agencies agree that 10 Êg of lead/ deciliter of blood is a level of concern for adverse health effects; these agencies include the Agency for Toxic Substances and Disease Registry, Centers for Disease Control, Consumer Product Safety Commission, and Environmental Protection Agency. The amount of lead required to cause a decrease in intelligence is regularly revised downward as more sensitive tests and more careful studies are performed. In adults, lead slows reaction time, impairs decision making, and causes lapses in concentration (Stollery 1991). Lead poisoning may result after lead has accumulated in the body over time, mostly in the bone. After exposure has ceased, some physiological event such as illness or pregnancy may result in the release of the stored lead from bone and produce health effects such as anemia, damage to the central and peripheral nervous systems, high blood pressure, damage to the developing fetus, prematurity, decreased birth weight, and decreased stature (National Institute of Occupational Safety and Health 1992; Consumer Product Safety Commission 1992). Lead is also an EPA group B2 carcinogen that causes kidney, lung, and bone cancers in animals.[12]

The AALs for saltwater and freshwater organisms are 4 and 10 ppb, respectively. Lead accumulates in mammalian bone, in some lichens (Bowen 1979), and in ragweed. Lichens are found on some rocks at the Presidio and serve as food for some Presidio animals. Lead is concentrated 1,600-fold by freshwater algae (Mann 1988). The U.S. EPA has set an action level of 15 ppb for drinking water at the tap. The lead levels at landfills 3 and 4 are hazardous for birds and small mammals; the level at landfill 4 is also deleterious for plants. Lead is a potential human health and environmental hazard in some areas of the Presidio.

TABLE D-2: LEAD-CONTAMINATED SITES

Site	Contaminated Medium	Maximum Lead Level (ppm)
Landfill 2	soil	12,100
Disturbed area E (1992)	soil	8,200
Disturbed area E (1990)	soil	3,890
Near buildings 930/931	surface soil	2,400
Near building 950	soil	1,760
Near building 643	surface soil	1,430
Landfill 9	soil	1,400
900s buildings area	storm drain sediment	1,290
Near building 283	surface soil	1,200 (confirmed)
Near building 929	soil	873
Near building 973	soil	829
Near building 924	soil	768
Near building 737	soil	731
Near building 925	soil	729
Near building 268	soil	713
Landfill 3	surface soil	559
Landfill 4	soil	559
Near building 935	soil	516
Toxic to plants	soil	400
Coast Guard station	soil	387
Near building 637	soil	348
Near building 933	soil	339
Near building 1351	soil	321
Near building 638	soil	311
Near building 662	soil	55
Background	soil	27
Inside building 283	surface	166µg/cm^2
Inside building 643	surface	44µg/cm^2
Inside building 926	surface	30µg/cm^2
Near building 937	groundwater	1.71 ppm
Lobos Creek	water	8.55 ppb
POL area	groundwater	0.0478

12. Animal carcinogens are assumed to be human carcinogens but the sites and types of cancer may be different.

Manganese

Table D-3 shows areas with excess manganese levels. Manganese accumulates in plants of the heather family, in some diatoms (small marine algae), some sponges, marine worms (annelids), mollusks, and other marine invertebrates (Bowen 1979). Because of the variety of marine organisms that accumulate manganese, it would be expected to particularly affect the balance of organisms in a marine ecosystem. The drinking water standard for manganese is 0.1 ppm (EPA 1992c), which is below the levels found in groundwater shown in table D-3.

Inhalation of manganese-containing dust can cause a neurological syndrome similar to Parkinson's disease. Building 926 is to be reused by the Park Service; therefore, it will have to be cleaned up to the point that there is no hazard to building occupants from manganese in dust.

TABLE D-3: MANGANESE-CONTAMINATED SITES

Site	Contaminated Medium	Maximum Manganese Level (ppm)
Landfill 4	soil	1,717
Landfill 5	soil	1,680
Near building 643	soil	1,280
900s buildings area	storm drain sediment	1,200
Landfill 3	soil	1,170
Near building 1351	soil	1,020
Landfill 9	soil	912
Background	soil	853
Building 926	surface	83.5 $\mu g/cm^2$
Landfill 7	soil	1.44 $\mu g/cm^2$
Near building 637	groundwater	86.3 ppm
Near building 937	groundwater	1.8 ppm

Mercury

Excess mercury levels were found in various parts of the Presidio (see table D-4). Organic mercury compounds are more toxic than inorganic or elemental mercury. The analytical method used on Presidio soil samples does not distinguish between organic, inorganic, and elemental mercury. Organic mercury compounds most likely to be found in Presidio soil are pesticides, including compounds used to prevent mold growth in paint. Natural mercury could be present, probably in the form of inorganic mercuric sulfide which occurs in some parts of California. Elemental mercury from laboratory equipment and thermometers could be present in waste disposal areas that have received hospital wastes

TABLE D-4: MERCURY-CONTAMINATED SITES

Site	Contaminated Medium	Maximum Mercury Level (ppm)
Near building 933	soil	6.82
Landfill 3	soil	4.27
Near building 950	soil	1.56
Disturbed area E	soil	1.5 (1992)
Near building 937	soil	0.894
Landfill 2	soil	0.881
900 buildings area	storm drain sediments	0.794
Near building 638	soil	0.478
Landfill 9	soil	0.206
Background	soil	0.071

Elemental mercury reacts with enzymes (biological catalysts) to cause kidney and nerve damage. Elemental mercury and inorganic mercury compounds can be converted to the more toxic monomethyl and dimethyl mercury compounds by some organisms. All forms of mercury tend to accumulate in many kinds of organisms, so that the larger organisms at the top of the food chain pyramid are particularly at risk from eating organisms that have accumulated mercury. Organic mercury compounds cause nerve and chromosome (Betti et al. 1992) damage. Mercury is accumulated by the mammalian kidney and preferentially

concentrates in the human fetus. Babies with cerebral palsy and mental retardation may be borne by asymptomatic mothers.

The California AALs to protect people from inorganic mercury in drinking water and air are 2 ppb and 0.07 ppb, respectively. Mercury is generally detectable in air over soil, sediment, or rock that contains mercury or its compounds. Excess soil mercury levels could lead to air levels near the soil surface that would exceed the air AAL. No air measurements of mercury have been made. Children playing in areas with high soil mercury levels and people lying on grass over soil with high mercury levels would be at particular risk of excess mercury inhalation.

Remediation of mercury contamination in soils by the Army may delay NPS management actions at the eastern end of Crissy Field and in other areas or require closure of these areas to the public. Contaminated groundwater will not be used for irrigation or drinking water.

Methylene Chloride

The carcinogen methylene chloride (dichloromethane) was found in soil near building 933 (5.7 ppm) and near buildings 929, 930,931, 935, and 937 (all greater than 10 ppm). Methylene chloride is used in degreasing, paint stripping, and as a refrigerant, fumigant, and solvent. It is toxic to the green alga Scenedesmus at 125 ppm, kills fathead minnows at 193 ppm, and causes central nervous system effects in humans at 500 ppm in air.

This substance is an IARC 2B carcinogen. Nonacute effects would be expected at the concentrations found in the soil near building 935. Since there is no threshold for carcinogenic effects, exposure to this soil carries a risk of cancer induction. The Army will make additional tests for volatile organic compounds in soil near buildings 929 and 931, which are expected to include methylene chloride (CDTSC 1992). Methylene chloride is a common laboratory contaminant, so confirmation testing is needed wherever methylene chloride has been detected.

Remediation of methylene chloride contamination in soils by the Army may delay NPS management actions at the eastern end of Crissy Field or require closure of these areas to the public.

2-Methyl Naphthalene

2-Methyl naphthalene was found in soil near buildings 937 (1.7 ppm) and 979 (3.2 ppm), in soil at landfills 3 (0.089 ppm) and 7 (0.53 ppm), in soil at disturbed area E (1.0 ppm, 1992), and in groundwater near building 937 (0.170 ppm). The source is probably gasoline leaks. Remediation has been carried out in the area near building 937. 2-Methyl naphthalene is bioaccumulated 23,500-fold in rainbow trout bile and 190-fold in salmon. Because of the potential for bioaccumulation by fish, this compound may be an ecological problem.

Remediation of 2-Methyl naphthalene contamination in soils by the Army may delay NPS management actions at the eastern end of Crissy Field. Closure of these areas to the public may be required until cleanup is completed.

Nickel

Excess nickel levels were found in various areas of the Presidio (see table D-5).

TABLE D-5: NICKEL-CONTAMINATED SITES

Site	Contaminated Medium	Maximum Nickel Level (ppm)
Near building 1351 (near serpentine)	soil	2,570
DEH area	soil	1,520
POL area	soil	1,390
Near buildings 931/950	soil	1,300 (1992)
Near building 979	soil	1,130 (1992)
Near building 937	soil	782
Landfill 1	soil	642
Consolidate motor pool area	soil	570
Landfill 7	soil	542
Near building 929	soil	533
Disturbed area E	soil	393
Landfill 3	soil	144 (1992)
Background	soil	77
900 series building area	groundwater	0.588
California AAL	drinking water	0.4

Naturally high nickel levels are found in some serpentine, so this is one potential source of excess nickel levels at the Presidio. Nickel is accumulated by members of eight plant families, including the mustard and violet families, and by some sponges. Algae accumulate nickel 1,000-fold (Wang and Wood 1984). Concentrations of 0.5 to 2 ppm in water are toxic to plants (Bosen 1979). California AALs to protect freshwater and saltwater organisms are 1 and 6 ppb, respectively. The groundwater nickel level in the 900 series buildings area is toxic to most plants and poses an environmental hazard through bioaccumulation. The MCL for drinking water is 100 ppb. The groundwater near the 900 bldg area will not be used for irrigation or drinking water.

Pesticides

Pesticides in the soils in the DEH area and at landfills present the greatest pesticide exposure risk. Pesticides may affect ecosystems at very low concentrations. To minimize pesticide use, the Park Service has adopted an integrated pest management system that regards pesticide use as the last alternative to be considered in dealing with a pest. The cancer risks at landfill 4 (9 in 1,000,000 for residential use and 2 in 10,000,000 for recreational use) and landfill 5 (6 in 1,000,000 for residential use) are largely due to pesticides in soils.

Aldrin

One background soil sample contained 9 ppb of aldrin; it was found at landfills 3 (5 ppb) and 4 (19 ppb), in soils near building 293 (280 ppb), and in sediments at Mountain Lake (3 ppb). Aldrin and dieldrin are chlorinated hydrocarbon pesticides that were widely used from the 1940s to 1960s for insect control; their use is now banned. Aldrin is absorbed through the skin. It is accumulated 350- to 4,500-fold by mollusks, so the soil level found at the Presidio would be most harmful if aldrin found its way into the bay or ocean. Aldrin kills sensitive fish at 2 ppb and hermit crabs at 33 ppb in water. Aldrin is an EPA class B2 carcinogen that causes liver cancer in mice and rats (Cavender et al. 1988).

The soil aldrin levels near building 293 and at landfills 2 and 4 should be remediated by the Army to a level at which they do not pose a human health or ecological hazard.

Chlordane

Chlordane affects the liver and the nervous and reproductive systems. Chlordane kills mosquito larvae at 130 ppb, bluegill fish at 218 ppb, and house flies at 158 ppb. There is a risk of human noncancer health effects from exposure to soils near building 293 (greater than 80,000 ppb) and at landfill 4 (5,470 ppb), largely as a result of chlordane in the soils. Human chlordane exposure is associated with increased risk of lymphoma (Cantor et al. 1992). The noncancer health hazard for recreational use of building 293 is largely due to chlordane in the soil. The soil chlordane levels near building 293 and at landfill 4 should be remediated to a level at which they do not pose a human health or ecological hazard.

pp'DDD

pp'DDD was present in soil near building 293 (greater than 1,000 ppb); at landfills 3 (13 ppb), 4 (13 ppb), and 5 (6 ppb); and at disturbed area E (26 ppb - 1992). This compound is a degradation product of DDT (discussed below). pp'DDD is accumulated 9,100-fold by mussels. This compound kills sensitive crustacea at 2 ppb. The soils near building 293 should be remediated to minimize the risk of groundwater contamination by pp'DDD.

pp'DDE

pp'DDE was present in soils near building 609[13] (8 ppb), at landfills 3 (7 ppb), 4 (33 ppb), 5 (5 ppb), and7 (60 ppb in 1990 and 110 ppb in 1992 at another location), at the transfer station (greater than 60 ppb in 1992), and in one background soil sample (3 ppb). DDE is a breakdown product of DDT. DDE accumulates up to 50,000-fold in mosquitoes, 36,000-fold in the freshwater snail *Physa*, 12,000-fold in fish, and 11,000- fold in green algae (Verschueren 1983). pp'DDE is a mutagen (causes inheritable changes) (Valencia et al. 1985) and a carcinogen. DDE is an environmental hazard because of its high level of bioaccumulation. Soils contaminated with pp'DDE should be remediated to a level at which they do not pose a human health or ecological hazard.

13. The original building 609 was demolished in 1987, and a new building 609 was built. The new building is used as the Commissary.

DDT

DDT is present in soils near buildings 609 at Crissy Field (131 ppb), 643 (14 ppb in 1992), 293 (5,450 ppb); landfills 3 (35 ppb), 4 (45 ppb), 5 (10 ppb), and 7 (300 ppb, 1992); and in one background soil sample (20 ppb). Earthworms bioconcentrate DDT up to 49-fold (Stollar et al. 1991b). Human DDT exposure is associated with increased risk of lymphoma (Cantor et al. 1992). DDT kills sensitive fish at 0.1 ppb in water. Because of the high sensitivity of fish to DDT and deleterious effects on other organisms at slightly higher levels, DDT in the soil at Crissy Field is of concern with respect to its potential to migrate into San Francisco Bay or the new wetlands. The presence of DDT in one background soil sample suggests that DDT contamination may be present in areas whose history does not suggest its presence. DDT contamination may impact the development of wetlands on Crissy Field until contamination is removed.

2,4-Dichlorophenoxyacetic Acid (2,4-D)

2,4-D, a herbicide, was found in soils near landfill 7 at up to 4.9 ppm. 2,4-D is a suspected carcinogen, is toxic by ingestion and inhalation, and is moderately toxic by skin contact. 2,4-D kills sensitive fish at 0.9 ppm and the larvae of sensitive mollusks at 740 ppb. Should landfill material get into the Crissy Field wetland or the bay, it could affect intertidal organisms.

Dieldrin

Dieldrin was found in soils at landfills 3 (13 ppb), 4 (65 ppb), 5 (12 ppb), and 7 (2 ppb); in graded area 3 (40 ppb - 1992); near buildings 609 (12 ppb) and 293 (937 ppb); and in one background soil sample (4 ppb). Building 609, the former post exchange, was the site of a pesticide spill in 1980 (considered small by the Army - Buck 1993). The area was cleaned up and the building was later demolished (U.S. Army Toxic and Hazardous Materials Agency 1989). There is probably a connection between the pesticide spill and the dieldrin found in soils near building 609.

Dieldrin is absorbed through the skin. Aldrin also causes dieldrin exposure because aldrin is converted to dieldrin in the mammalian liver and in soil. Algae, protozoa, coelenterates (such as jellyfish), worms, arthropods, and mollusks can convert aldrin to dieldrin (Kahn et al. 1972). Dieldrin is bioconcentrated 67-fold by earthworms, 14-fold by insects (Stollar et al. 1991b), 1,800-fold by the local mussel *Mytilus edulis*, and 2,900-fold by oysters. Dieldrin kills sensitive fish at 3 ppb, shrimp at 7 ppb, and hermit crabs at 18 ppb. Dieldrin is an EPA class 2B carcinogen that causes liver cancer in mice and rats (Cavender et al. 1988) and a teratogen (Ailia et al. 1992). The cancer risks for dermal contact with soils at building 268 in the DEH area were 1 in 1,000 both for current industrial and future recreational uses (Stollar et al. 1991b). Soil dieldrin levels should be remediated to reduce cancer risks to a maximum of 1 in 1,000,000.

Dieldrin-contaminated soils may result in closure of identified areas to the public until after cleanup occurs.

Endrin

Endrin is found at landfills 3 (8 ppb), 4 (356 ppb), and 7 (7 ppb) and near building 293 (4,580 ppb). The endrin breakdown product, endrin aldehyde, is found in soil near building 979 (3.2 ppm) and landfill 9 (3,600 ppb). Endrin is bioaccumulated in mussels (*Mytilus edulis*) 1,920-fold, by oysters up to 2,800-fold, and by fish up to 13,000-fold. Endrin is toxic to insects at concentrations as low as 0.03 ppb, is toxic to perch and guppies at concentrations as low as 0.06 ppb, kills threespine stickleback a 0.5 ppb, and kills salmon at 0.6 ppb. The use of endrin has been banned because it is a carcinogen. Endrin is a human health and environmental hazard. Contaminated soils should be remediated to minimize environmental damage.

Endosulfan

a-Endosulfan and b-endosulfan are interconvertible pesticides found in soils near building 293 (532 ppb) and at landfills 3 (3 ppb), 4 (25 ppb) (Stollar et al. 1991c), 5, and 7 (4 ppb) (Watkins-Johnson et al. 1993, vol. IIIA) . The endosulfans are bioaccumulated by mussels 600-fold and by fish up to 1,300-fold. They are toxic to sensitive fish at 0.2 ppb. The ACGIH occupational standard is 0.1 mg/m3 of air. Dust from near building 293 could exceed the occupational standard. Leaching of soils could give rise to water concentrations toxic to fish. Soils in this area should be remediated to a level that will not pose a human health or environmental hazard.

Heptachlor

Heptachlor is present in soils near building 293 (766 ppb) and at landfills 3 (6 ppb), 4 (9 ppb), and 5 (5 ppb), and in water at Mountain Lake (9 ppb). The chronic effects criterion for heptachlor was exceeded in the surface water sample from Mountain Lake (9 ppb). Heptachlor is bioaccumulated by some organisms:

oysters can accumulate heptachlor 18,000-fold, crustacea 8,500-fold, and fish 21,000-fold. Heptachlor kills sensitive crustacea at 2 ppb and sensitive fish at 3 pb.

Heptachlor is oxidized to heptachlor epoxide in the environment. Heptachlor epoxide was found in soils near building 293 (20 ppb) and at landfills 4 (25 ppb) and 5 (3 ppb). Heptachlor epoxide is persistent in the environment and has been found in food crops grown on soils treated 15 years earlier. Heptachlor epoxide is concentrated 1,700-fold by the common Bay Area mussel, 36,000-fold by snails, and up to 12,000-fold by fish.

Heptachlor is an EPA class 2B carcinogen that causes liver cancer in mice. The AAL for heptachlor in drinking water is 0.02 ppb. This level could be exceeded in groundwater beneath soils at building 293. Soils should be remediated to minimize ecological damage and potential groundwater contamination.

Lindane

Lindane (gamma-hexachlorocyclohexane) is found in soils near building 293 (35 ppb); at landfills 3 (10 ppb), 4 (7 ppb), and 5 (7 ppb); at disturbed area E (3 ppb, 1992), and in sediments near Mountain Lake (3 ppb). Lindane is suspected of causing leukemia. It kills sensitive fish at 2 ppb and sensitive mollusks at 0.2 ppb. Soils with lindane should be remediated to minimize the risk of groundwater contamination and human exposure.

Pesticide contamination may affect the implementation of NPS management actions, particularly at in the eastern end of Crissy Field. Closure of these areas to the public may be required until cleanup occurs.

Methoxychlor

Methoxychlor, a suspected carcinogen, is found in soil at 62 ppb near landfill 7 and at Crissy Field, and at up to 300 ppb near the Nike facility. Methoxychlor is bioaccumulated by oysters 5,780-fold and in the American toad at an unspecified rate. Sensitive fish and sensitive crustaceans are killed by methoxychlor levels of 7.5 ppb and 0.5 ppb, respectively. The EPA-recommended limit for freshwater and marine organisms is 0.03 ppb. Should landfill material get into the Crissy Field wetland or the bay, it could affect intertidal organisms.

Polyaromatic Hydrocarbons (PAHs)

PAHs have been found in sediments at the Nike missile site off Battery Caulfield Road near the Public Health Service hospital; in soils at landfills 3 (benzo(a)anthracene 2.9 ppm, phenanthrene 23 ppm, pyrene 14 ppm), 8, and 10; in soils at disturbed area E; in storm drain sediments near building 640 at Crissy Field; in the 900 series buildings area (0.97 ppm benzo(a)pyrene, 1.2 ppm chrysene, 5.4 ppm fluoranthene, 5.0 ppm phenanthrene and 4.2 ppm pyrene); in soils near buildings 979 (1.2 ppm phenanthrene); and near building 643. The Army will make additional tests for organic compounds, including PAHs, in soils near building 643 and at landfill 3 (CDTSC 1992). In 1992, no PAHs were found below 2 feet near building 643, as expected, because PAHs migrate slowly in the soil.

Mixtures of PAHs are formed when anything burns and are found in asphalt, creosote, and used oil. PAHs arestored in fatty tissues, the kidneys, and liver. See table D-6 for carcinogenicity information on some PAHs. Benzo(a)pyrene (BaP) and 7,12-dimethylbenzanthracene inhibit cell division in the formation of sperm (Georgelis et al. 1990) and affect the immune system (Luster et al. 1992). Oysters accumulate about three times as many PAHs from sediments as clams do.

TABLE D-6: PROPERTIES OF SOME CARCINOGENIC POLYAROMATIC HYDROCARBONS (PAHs)

PAH	EPA Carcinogen Rating	IARC Carcinogen Rating	Cancer Site(s)
benzo(α)anthracene	B2	2A	bladder, lung
benzo(α)pyrene	B2	2A	breast, lung, skin, uterus
benzo(b)fluoranthene	B2	2B	skin
benzo(k)fluoranthene	B2	2B	skin
chrysene	B2	3	kidney, liver, stomach, mouth, lung
dibenzo(a,h)anthracene	B2	2A	breast, kidney, lung
indeno(1,2,3-cd)pyrene	B2	2B	kidney, liver, stomach, mouth, lung

Bioconcentration of PAHs by oysters ranges from 1,600- fold for phenanthrene to 29,000-fold for benzo(a)anthracene (Bender et al. 1988)

The half-life for benzo(a)pyrene and benzo(b)fluoranthene in uncontaminated soils is about 35 weeks, for indeno(1,2,3-cd)pyrene it is about 40 weeks, and for chrysene and dibenzo(a,h)anthracene it is about 55 weeks (Park et al. 1990). The half-lives are longer in contaminated soils. In estuarine sediments the half-lives range from 4 weeks for phenanthrene to over 200 weeks for benzo(a)pyrene (Hettkamp and Cerniglia 1987).

The California drinking water AALs are 20 ppb for pyrene and 0.09 for benzo(a)pyrene. The cancer risks for residential use at landfill 9 (3 in 1,000) are primarily due to PAHs in soil (Stollar et al. 1991b).

PAH-contaminated soils may result in closure of areas to the public until after cleanup occurs.

Polychlorinated Biphenyls (PCBs)

PCBs were once used in transformers, capacitors, lubricants, pesticides, paints, etc. Although use of PCBs is now prohibited, electrical equipment containing PCBs is still found, and areas where electrical equipment was serviced often prove to be contaminated with PCBs. The drinking water MCL for PCBs is 0.5 ppb.

PCBs are EPA class B2 liver carcinogens. Presidio sites with the highest cancer risks mainly due to PCBs in soils are listed in table D-7. These risk calculations were performed before it was known that there is a correlation between PCB exposure and human breast cancer. Thus, the risk estimates are probably low. PCBs can cause skin rashes and changes in liver enzyme levels. The Army will clean up PCB contaminated areas as requested by the California Department of Toxic Substances Control (CDTSC 1992).

TABLE D-7: PCB CANCER RISKS AT THE PRESIDIO

Site	Land Use	Cancer Risk
Building 680	infrastructure	3 in 1,000[b]
Building 1151	recreation	3 in 1,000[c]
Building 228[a]	commercial	2 in 1,000
Building 231[a]	commercial	2 in 1,000
Coast Guard station	recreation	3 in 10,000[d]

a. Stollar, et al. 1991, vol. III; comparable information not given in Watkins-Johnson 1993
b. Recalculated as 2 in 10,000 in Watkins-Johnson 1993 based on potential change in land use
c. Recalculated as 3 in 10,000 in Watkins-Johnson 1993 based on potential change in land use
d. Recalculated as 8 in 100,000 in Watkins-Johnson 1993 based on potential change in land use

Tetrachloroethene

Tetrachloroethene (perchloroethylene or Perc) is a metal degreaser that was found in soils near buildings 930-931 (490 ppb) and in groundwater near building 937 (15 ppb in 1984). It kills guppies at 18 ppm in water and affects the human central and peripheral nervous systems at 96 ppm in air, causes pathological changes in rat liver and kidneys at 230 ppm in air, and damages reproduction in rats at 200 ppm. This compound is an IARC 2B carcinogen. The MCL is 5 ppb. The Army will make additional tests for volatile organic compounds in soils near building 931 that are expected to include tetrachloroethene (CDTSC 1992).

Total Petroleum Hydrocarbons (TPH)

Petroleum hydrocarbons were found in groundwater, sediments, surface soils, and subsurface soils in theconsolidated motor pool/POL area at Crissy Field. The maximum level found was in soils near building 638 (80,000 to 100,000 ppm) (Stollar 1991a), which is known to have had petroleum spills and petroleum tank leaks. A soil gas survey and groundwater and soil sampling are being performed in this area pursuant to requirements of the Regional Water Quality Control Board (RWQCB). In 1991 as much as 17 feet of petroleum product was found in wells near building 937 (Watkins-Johnson et al. 1993, vol. IIA).

Aboveground facilities associated with this contamination were removed in 1992, and soil cleanup is funded for 1993 (Macievich 1992b). Free petroleum product containing nonpetroleum organic compounds was found in groundwater near building 937 in 1990 but not in 1992 (Buck 1993). Other areas with petroleum product contamination include storm drain sediments in the 900 series buildings area (TPH up to 3,400 ppm) and soil near building 950 (120,000 ppm). The Army will make additional tests of total petroleum hydrocarbons in soils near building 950 at the request of the California Department of Toxic Substances Control (CDTSC 1992).

Trichloroethene

Trichloroethene (TCE) is found in groundwater near building 937 (up to 390 ppb in 1984, 87 ppb in 1990) and in groundwater near building 979 (over 150 ppb). TCE is used in metal degreasing and as a fumigant. It kills the clawed toad at 45 ppm, kills guppies at 55 ppm, and is toxic to the bacterium *Pseudomonas putida* and the alga *Microcystis aeroginosa* at 65 ppm. TCE is an irritant to human eyes at 160 ppm in air. This substance is an RTECS carcinogen. The California AALs for TCE are 7 ppb for both air and drinking water. This level is exceeded by groundwater near buildings 937 and 979. Groundwater contaminated with TCE will not be used for irrigation or drinking water.

Vanadium

Sites with excess vanadium are shown in table D-8. Vanadium is accumulated by the fungus *Amanita muscaria*, parsley, and some sea squirts. Concentrations of 10 to 40 ppm in water are toxic to plants. Soil vanadium levels at landfills 3 and 5 are hazardous for small mammals, and the level at landfill 9 is toxic to plants. The Army will make further soil metals tests near building 643 as requested by the California Department of Toxic Substances Control (CDTSC 1992).

TABLE D-8: SITES WITH EXCESS VANADIUM

Site	Contaminated Medium	Maximum Vanadium Level (ppm)
Landfill 5	soil	300
Landfill 3	soil	141
Landfill 9	soil	134
Near building 637	soil	92.3
Near building 643	soil	78.6

Vinyl Chloride

Vinyl chloride was found in storm drain sediments at Crissy Field and in groundwater near buildings 937 (100 ppb) and 979 (62 ppb). Vinyl chloride is an IARC group 1 human carcinogen. The California AALs for humans are 0.5 and 0.1 ppb for drinking water and air, respectively.

Vinyl chloride contamination in soils may result in closure of identified areas to the public until after cleanup occurs. Groundwater will not be used for drinking or irrigation.

Zinc

Excess levels of zinc were found in various locations at the Presidio (see table D-9). Plants in the mustard, pink, and violet families accumulate zinc. Zinc is concentrated in pollen. Invertebrates that bioconcentrate zinc include barnacles, mollusks (including scallops), and earthworms (11-fold). Zinc is concentrated in the mammalian eye and prostate gland. Zinc is toxic to some algae at 250 ppm (Ahiluwalia and Kaur 1988). The California AALs are 10 and 30 ppb for saltwater and freshwater organisms respectively and 8,000 ppb for drinking water (humans are relatively less sensitive to zinc than other organisms).

Groundwater near building 937 will not be used for drinking water or irrigation. The soil zinc levels at landfills 1 and 5 are high enough to be toxic to small mammals (Stollar et al. 1991b). The zinc-contaminated soils pose a potential for contaminating groundwater

TABLE D-9: ZINC CONTAMINATED SITES.

Site	Contaminated Medium	Maximum Zinc Level (ppm)
Disturbed area E	soil	24,000
900s buildings area	storm drain sediment	1,220
Landfill 2	soil	1,020
Near building 950	soil	842
Near buildings 930–931	soil	826
Near building 924	soil	775
Landfill 9	soil	749
Near building 935	soil	710
Near building 937	soil	597
Near building 1351	soil	499
Near building 929	soil	426
Near building 268	soil	397
Near building 933	soil	387
Near building 638	soil	353
Landfill 3	soil	188
Landfill 4	soil	139
Landfill 5	soil	127
Background	soil	53
In building 926	dust	105 $\mu g/cm^2$
Near buildings 937	groundwater	367 ppb

Appendix E: Cost Estimates

ALTERNATIVE A (PROPOSED ACTION) **(1993 DOLLARS)**

Construction and Development Costs:	Gross[1,2] Construction Cost		Advance and Project Planning Cost		TOTAL		TOTAL PROJECT COST
	NPS	Tenants[3]	NPS	Tenants	NPS	Tenants	
Main Post	31,570,000	113,060,000	5,920,000	21,580,000	37,490,000	134,640,000	172,130,000
Fort Point/Golden Gate Overlook[4]	9,160,000	260,000	1,690,000	50,000	10,850,000	310,000	11,160,000
Fort Scott	18,230,000	74,010,000	3,410,000	14,120,000	21,640,000	88,130,000	109,770,000
Letterman Complex	13,380,000	88,200,000	2,480,000	16,830,000	15,860,000	105,030,000	120,890,000
Cavalry Stables	4,500,000	8,930,000	850,000	1,700,000	5,350,000	10,630,000	15,980,000
Public Health Service Hospital	730,000	57,730,000	140,000	10,930,000	870,000	68,660,000	69,530,000
East Housing	4,460,000	8,000,000	780,000	1,530,000	5,240,000	9,530,000	14,770,000
Crissy Field	12,250,000	25,600,000	2,260,000	4,880,000	14,510,000	30,480,000	44,990,000
Presidio Hill	11,230,000	3,440,000	2,140,000	660,000	13,370,000	4,100,000	17,470,000
Cemetery	0	1,120,000	0	210,000	0	1,330,000	1,330,000
Presidio Forest	4,440,000	0	840,000	0	5,280,000	0	5,280,000
Lobos Creek	3,670,000	0	700,000	0	4,370,000	0	4,370,000
Coastal Bluffs	1,950,000	0	370,000	0	2,320,000	0	2,320,000
Presidio-wide actions[5]	36,690,000	0	6,980,000	0	43,670,000	0	43,670,000
Studies	2,430,000	0	0	0	2,430,000	0	2,430,000
Asbestos abatement	11,060,000	14,140,000	2,110,000	2,700,000	13,170,000	16,840,000	30,010,000
TOTALS TENANT AND NPS	165,750,000	394,490,000	30,670,000	75,190,000	196,420,000	469,680,000	666,100,000[6]
U.S. 6th Army costs[7]	0	93,240,000	0	17,790,000	0	111,030,000	111,030,000

FOOTNOTES:

1. Government prepared class C conceptual estimates.
2. Exhibits, interpretive media, and furnishings are not included in estimates.
3. "Tenant" = park partner, concessionaire, or non-NPS user.
4. Rehab. costs for Fort Point National Historic Site not included.
5. Overall site development, i.e., infrastructure, grounds improvements, roadways, etc.
6. Estimates for telephone system improvements not included.
7. Army estimates include costs for building rehabilitation, asbestos abatement, and removal of interim use nonhistoric housing.

ALTERNATIVE B

Construction and Development Costs:	Gross[1,2] Construction Cost		Advance and Project Planning Cost		TOTAL		TOTAL PROJECT COST
	NPS	Tenants[3]	NPS	Tenants	NPS	Tenants	
Main Post	18,960,000	117,890,000	3,510,000	22,500,000	22,470,000	140,390,000	162,860,000
Fort Point/Golden Gate Overlook[4]	6,500,000	920,000	1,180,000	180,000	7,680,000	1,100,000	8,780,000
Fort Scott	19,280,000	76,000,000	3,680,000	14,500,000	22,960,000	90,500,000	113,460,000
Letterman Complex	30,000	245,370,000	10,000	46,830,000	40,000	292,200,000	292,240,000
Cavalry Stables	2,700,000	8,940,000	520,000	1,710,000	3,220,000	10,650,000	13,870,000
Public Health Service Hospital	N/A	N/A	N/A	N/A	N/A	N/A	N/A
East Housing	60,000	20,410,000	10,000	3,890,000	70,000	24,300,000	24,370,000
Crissy Field	2,390,000	52,780,000	380,000	10,070,000	2,770,000	62,850,000	65,620,000
Presidio Hill	9,080,000	49,330,000	1,730,000	9,410,000	10,810,000	58,740,000	69,550,000
Cemetery	0	1,120,000	0	210,000	0	1,330,000	1,330,000
Presidio Forest	4,120,000	0	780,000	0	4,900,000	0	4,900,000
Lobos Creek	1,640,000	20,000	310,000	10,000	1,950,000	30,000	1,980,000
Coastal Bluffs	1,900,000	0	360,000	0	2,260,000	0	2,260,000
Presidio-wide actions[5]	4,290,000	0	820,000	0	5,110,000	0	5,110,000
Studies	2,270,000	0	0	0	2,270,000	0	2,270,000
Asbestos abatement	1,000,000	40,050,000	190,000	7,640,000	1,190,000	47,690,000	48,880,000
TOTALS TENANT AND NPS	74,220,000	612,830,000	13,480,000	116,950,000	87,700,000	729,780,000	817,480,000[6]
U.S. 6th Army costs[7]	0	67,170,000	0	12,820,000	0	79,990,000	79,990,000

FOOTNOTES:

1. Government prepared class C conceptual estimates.
2. Exhibits, interpretive media, and furnishings are not included in estimates.
3. "Tenant" = park partner, concessionaire, or non-NPS user.
4. Rehab. costs for Fort Point National Historic Site not included.
5. Overall site development, i.e. infrastructure, grounds improvement, roadways, etc.
6. Estimates for telephone system improvements not included.
7. Army estimates include costs for building rehabilitation, asbestos abatement, and removal of interim use nonhistoric housing.

ALTERNATIVE C

Construction and Development Costs:	Gross[1,2] Construction Cost		Advance and Project Planning Cost		TOTAL		TOTAL PROJECT COST
	NPS	Tenants[3]	NPS	Tenants	NPS	Tenants	
Main Post	43,360,000	93,760,000	8,170,000	17,890,000	51,530,000	111,650,000	163,180,000
Fort Point/Golden Gate Overlook[4]	8,830,000	270,000	1,630,000	50,000	10,460,000	320,000	10,780,000
Fort Scott	19,750,000	70,640,000	3,700,000	13,480,000	23,450,000	84,120,000	107,570,000
Letterman Complex	2,110,000	56,120,000	330,000	10,710,000	2,440,000	66,830,000	69,270,000
Cavalry Stables	4,500,000	8,820,000	850,000	1,680,000	5,350,000	10,500,000	15,850,000
Public Health Service Hospital	n/a	n/a	n/a	n/a	n/a	n/a	n/a
East Housing	5,160,000	2,040,000	910,000	390,,000	6,070,,000	2,430,000	8,500,000
Crissy Field	12,140,000	25,650,000	2,240,000	4,900,000	14,380,000	30,550,000	44,930,000
Presidio Hill	4,040,000	3,820,000	770,000	730,000	4,810,000	4,550,000	9,360,000
Cemetery	0	1,120,000	0	210,000	0	1,330,000	1,330,000
Presidio Forest	4,370,000	330,000	820,000	60,000	5,190,000	390,000	5,580,000
Lobos Creek	3,730,000	0	710,000	0	4,440,000	0	4,440,000
Coastal Bluffs	1,950,000	0	370,000	0	2,320,000	0	2,320,000
Presidio-wide actions[5]	37,600,000	0	7,150,000	0	44,750,000	0	44,750,000
Studies	2,430,000	0	0	0	2,430,000	0	2,430,000
Asbestos abatement	12,960,000	7,570,000	2,480,000	1,450,,000	15,440,000	9,020,000	24,460,000
TOTALS TENANTS AND NPS	162,930,000	270,140,000	30,130,000	51,550,000	193,060,000	321,690,000	514,750,000[6]
U.S 6th Army costs[7]	0	95,040,000	0	18,140,000	0	113,180,000	113,180,000

FOOTNOTES:

1. Government prepared class C conceptual estimates.
2. Exhibits, interpretive media, and furnishings are not included in estimates.
3. "Tenant" = park partner, concessionaire, or non-NPS user.
4. Rehab. costs for Fort Point National Historic Site not included.
5. Overall site development, i.e. infrastructure, grounds improvement, roadways, etc.
6. Estimates for telephone system not included.
7. Army estimates include costs for building rehabilitation, asbestos abatement, and removal of interim use nonhistoric housing.

ALTERNATIVE D

Construction and Development Costs:	Gross[1,2] Construction Cost		Advance and Project Planning Cost		TOTAL		TOTAL PROJECT COST
	NPS	Tenants[3]	NPS	Tenants	NPS	Tenants	
Main Post	25,790,000	114,950,000	4,820,000	21,940,000	30,610,000	136,890,000	167,500,000
Fort Point/Golden Gate Overlook[4]	9,170,000	270,000	1,690,000	50,000	10,860,000	320,000	11,180,000
Fort Scott	18,360,000	73,600,000	3,430,000	14,050,000	21,790,000	87,650,000	109,440,000
Letterman Complex	0	0	0	0	0	0	0
Cavalry Stables	4,500,000	8,920,000	850,000	1,700,000	5,350,000	10,620,000	15,970,000
Public Health Service Hospital	720,000	79,950,000	140,000	15,260,000	860,000	95,210,000	96,070,000
East Housing	3,550,000	19,050,000	600,000	3,630,000	4,150,000	22,680,000	26,830,000
Crissy Field	12,250,000	25,600,000	2,260,000	4,880,000	14,510,000	30,480,000	44,990,000
Presidio Hill	11,660,000	10,000	2,230,000	10,000	13,890,000	20,000	13,910,000
Cemetery	0	1,110,000	0	210,000	0	1,320,000	1,320,000
Presidio Forest	4,440,000	0	840,000	0	5,280,000	0	5,280,000
Lobos Creek	3,620,000	0	690,000	0	4,310,000	0	4,310,000
Coastal Bluffs	1,950,000	0	370,000	0	2,320,000	0	2,320,000
Presidio-wide actions[5]	33,490,000	0	6,370,000	0	39,860,000	0	39,860,000
Studies	2,430,000	0	0	0	2,430,000	0	2,430,000
Asbestos abatement	7,550,000	14,050,000	2,680,000	2,680,000	8,990,000	16,730,000	25,720,000
TOTALS TENANT AND NPS	139,480,000	337,510,000	25,730,000	64,410,000	165,210,000	401,920,000	567,130,000[6]
U.S. 6th Army costs[7]	0	381,660,000	0	72,760,000	0	454,420,000	454,420,000

FOOTNOTES:

1. Government prepared class C conceptual estimates.
2. Exhibits, interpretive media, and furnishings are not included in extimates.
3. "Tenant" = park partner, concessionaire, or non-NPS user.
4. Rehab. costs for Fort Point National Historic Site not included.
5. Overall site development, i.e. infrastructure, grounds improvements, roadways, etc.
6. Estimates for telephone system improvements not included.
7. Army estimates include costs for building rehabilitation, asbestos abatement, and removal of interim use nonhistoric housing.

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